

BOOK98R

Notes:

"Solution 4 U(4.9) O₂F₂ U(1.95) 51-53 U(3.85) slugs P 270" on front

"Solution #4 U(4.9) O₂F₂ U(1.95) U(3.85)" on spine

Blank pages: page opposite page 1, 10, 98, 128, 129, 241, 299, 300, inside back cover sheets

-envelope between front cover sheets containing:

- 1) 2 negatives paper clipped together with an index card stating "Please prepare a slide and a print of whichever of these is the best negative."
- 2) index card stating "2 each glossy Prints"
- 3) 3 photos
- 4) 2 negatives

-pages 46/47 have piece of torn paper between pages

-pages 133/134(top), 157/158(top), 159/160(bottom), 173/174(bottom), 269/270(bottom), have paper clip on each page

-pages 150/151 have 4 big graph sheets between pages

-page 270 has small piece of paper - paper clipped at top of page

-pages 271, 272(2), 274, 276, 278(2), 281, 283, 288, 291, 293, 296, 298(2), have 1 (or2) small drawing glued to each

Scanned by:

Sheila Finch

RSICC /Oak Ridge National Lab.

September 10, 1999

Solution Jy #4

4/23/65 → 9/13/65 U(4.9) 0.2 Fr

9/22/65 →

U(1.95)

THE PAPER USED IN THIS BOOK WILL
GIVE COMPLETE WRITING SATISFACTION.
IT WAS SELECTED FROM MANY PAPERS
FOR ITS FINE WRITING LEDGER SURFACE



No. 168 BLANK BOOK

JOURNAL

SINGLE ENTRY LEDGER

DOUBLE ENTRY LEDGER

RECORD

WITHOUT

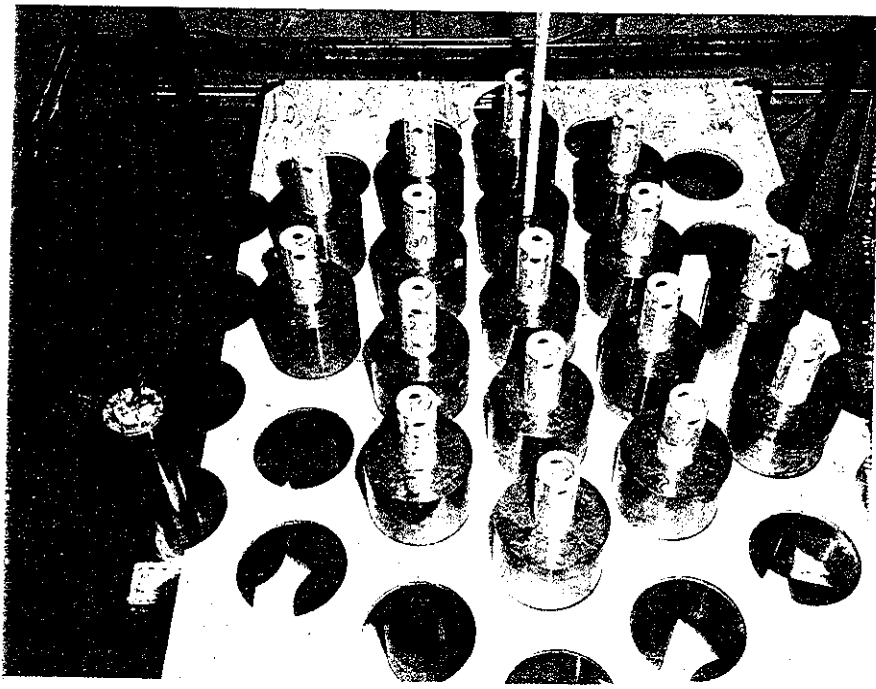
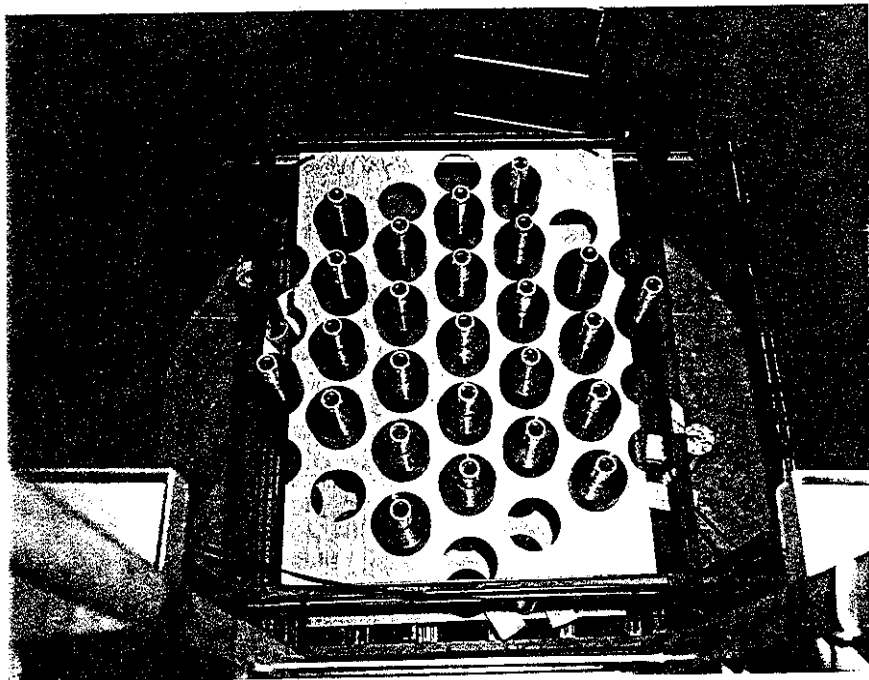
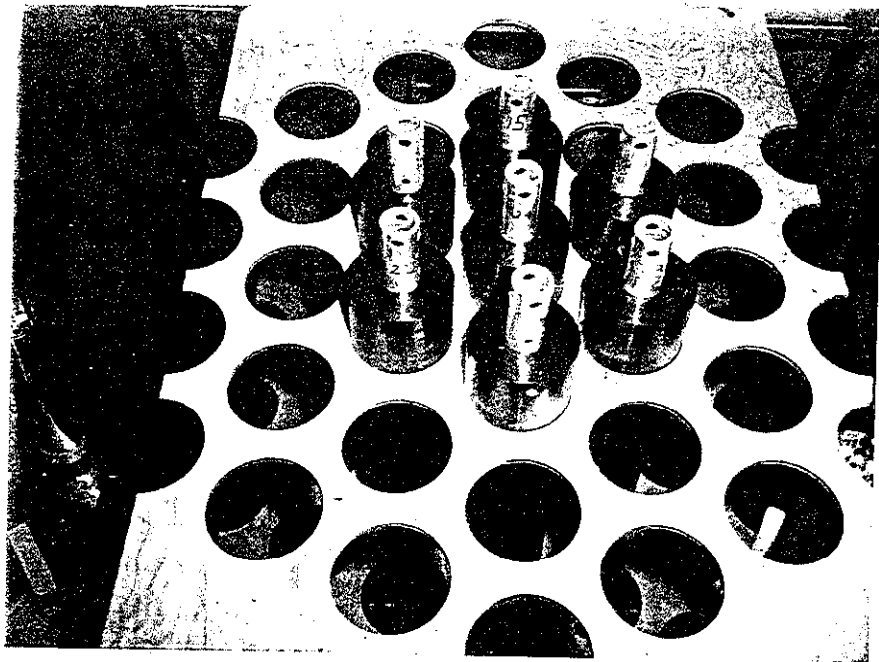
UNITS

IN 150 AND 300 PAGES

M A D E I N T H E U . S . A .

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

14-2-1



3/20/68

U(3.85) slugs

Triangular array

2.0" separation - edge-edge

7 rods just crit.

water at 72.00 cm

Page 293 log

1-rod critical

4/4/68

U(3.85) slugs

Separation = 2.625"

25 rods - sub. crit.

Page 20 log book

3/28/68

U(3.85) rods

Separation = 2.50"

17 rods critical

Page 12 log book

4-23-65

1

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	3"	✓	10×10^{-12}
"	"	Fast	"	✓	"
K-2	"	Meter	"	✓	"
"	"	Fast	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm	cont	✓	500V
PM-2	1200V	Low	14	✓	900V
"	"	Alarm	1"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

15.5" S.S. (.031" wall) used.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-43

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

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

Red light on by AKM Time 0815

Start-up OK'd by F.D.C. AKM Date 4-23-65

Purpose to check out critical wt. (4-22-65)

Solution Zero

20.2 cm

M-4 sh

22.20 cm

13-11

0850 (V) 202 (cm) $\Delta h = 2.75 \text{ cm}$ M-4 (in)
 + Per 125.60 cm 53.85"
 $\bar{v} = 65.19 \text{ m} = 13.6 \text{ f} = 4.95 \text{ f/cm}$

0900 $\frac{4}{h} = 100.65 \text{ cm}$
 122.85 cm $\frac{4}{h} = 39.63''$ 52.78"
 System just critical. $\frac{4}{h} = 2.56$
 Drain.

1330 Installed four thermocouples 2 inside reactor and 2 outside reactor.

Solution Zero 202 (cm) M-4 (in)
 22.20 cm. 13.11"

Thermocouple #1 inside vessel ~ 8" from bottom
 #2 ~ half way up from bottom
 #3 outside 10" from bottom (fasten to side of vessel by duo seal with thermo)
 #4 outside bottom near spout (fasten to bottom by duo seal)
 #6 measuring air temp. at thermo joint

TIME	#1	2	3	4	6	Sol HT	Therm on vessel
1350	25.0°	25.5°	25.5°	25.0°	24.5°	0.0	25.0°
1400	24.5	26	25	24.5	24.5	33.90	24.6°

1426 + Per 202 (cm) $\Delta h = 2.45 \text{ cm}$ M-4 in
 126.10 cm 54.10"
 $\bar{v} = 76.23 \text{ m} = 11.9 \text{ f} = 4.86 \text{ f/cm}$

202 (cm) 9h = 101.45 cm @ 25°C
 1443 123.65 9h = 39.94" $\frac{h}{d} = 2.58$ M-9" 53.11

System just critical:

TIME	#1	2	3	4	6	sol. HT.	Thermo. on Vessel
1440	25°C	25°C	25°C	25°C	25.7°C	101.45 cm	24.5°C
1454	24.5°C	25°C	25°C	25°C	24.5°C	101.45 cm	24.5°C

System very very slightly + pos. (See stem 2% on K-1 K-2 scale)

1505 made slight adjustment by ~~adding~~ draining. Not able to read change on 202. System now very very slightly - neg.

#1	2	3	4	6	sol. ht	Thermo.
25.0°C	25.0°C	25.0°C	25.0°C	25.0°C	101.45 cm	24.5°C

1515 System still very very slightly - neg.

1521 202 after 16 min 202 reads 123.60 cm. 9h = 101.45
 System still very very slightly - neg.

#1	2	3	4	6	sol. ht	Thermo.
24.5°C	25.0°C	25.0°C	25.0°C	24.5°C	101.40	24.5°C

System still very very slightly - neg.

1528 Made slight adjustment by adding: in order to ~~level~~ try to level. Not able to read change on 202. = 123.60" System now level.

over:

1538 Repten still very slightly - Neg. Throm on well

1542 { #1 24.5° #2 25.0° #3 25.0° #4 25.0° #6 25.5° 101.40cm 24.5°
 10098 = 24.5°
 60098

Repten still very very slightly - Neg.

1548 { 202 after solution at 123.60 - Repten still very very slightly - Neg.

#1 #2 #3 #4 #6 101.40cm
 24.5° 25.0° 25.0° 25.0° 24.5° 24.5°

1553 Drain!

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13 X16	12	Meter ✓	3"	✓	
"		Fast ✓	"	✓	
K-2	"	Meter ✓	3"	✓	
"		Fast ✓	"	✓	
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	
PM-2	1200V	Low ✓	14"	✓	
"		Alarm ✓	1"	✓	

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

DUMP WELL PROBE LIGHT _____

START-UP CHECK LIST

Equipment checked by A.K.D. Personnel check by F.D.C.
 Instruments and safeties checked and reset by RKD
 Source in checked by RKD Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1 K-2 PM-1 PM-2
 Red light on by RKD Time 0830
 Start-up OK'd by F.D.C. (RKD) Date 4-26-65

5°C

5°C

5°C

Solution Level 20.2 (cm) 19-4 in
 22.20 cm. 13.11"

Thermocouple pos same as described on page 2.

0916 (V) 20.2 cm $b_h = 2.108m$ M-4 in
 + Per 125.45 cm 53.80 in
 $C = 89.81 m = 10.74 = 4.86 H/cm$ 52.72

0928 } $q_h = 101.05 cm, @ 45^\circ C$
 123.25 cm $q_h = 39.78"$ 52.98"
 System just critical $\frac{q}{C} = 2.57$

Temp: K-3
 #1 #2 #3 #4 #6 Therm on vent.
 .00095 = 23.75 24.5°C 24.5°C 24.5°C 25.0 24.1°C

Drains:

0920 Pump on; Dump open

0915 Pump off:

1048 (W) 20.2 (cm) 19-4 in
 + Per 127.15 $b_h = 2.170$ 54.54"
 $C = 70.25 m = 12.94 = 4.78 H/cm$

arr:

6

1059 202 (cm) $\frac{d}{h} = 102.25 \text{ cm}$ M-9 in
 124.45 cm $\frac{d}{h} = 40.26''$ $\frac{d}{h} = 2.60$ 53.47''

Temp. Lepton just critical.

#1	(K-3)	#2	#3	#4	#6	Thermo of critical.
25.25°		26.0°	26.0°	25.7°	25.5°	25.2°
Nil						

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3''	-	10×10^{-12}
"	"	" ✓	"	-	"
K-2	"	Meter ✓	3''	-	"
"	"	" ✓	"	-	"
R-1					
P 2					
PM 1	700V	Alarm ✓	cont	-	500V
PM-2	1200V	Low ✓	19''	-	900V
"	"	Alarm ✓	1''	-	"
LOG IN CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT ✓					

Received by 4-27/65

7

START-UP CHECK-LIST

Equipment checked by AKH Personnel check by FIDC

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

Emergency equipment in control room checked by FIDC

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

Red light on by AKH Time 0835

Start-up OK'd by FIDC EBF AKH Date 4-28-65

2 in:	222 cm	M-4
	22.5 in	13.21 in.

-> New Zero; Exposed bulge in bottom. with 2-15.25" disk under bottom.

0905 Feed rate: 13.21" - 15.62" = 2.41" ⁱⁿ/min.

Drain rate $\frac{1}{2}$ " drain valve: 52.80" - 50.27" = 2.53" $\frac{in}{30 sec}$ = 5.06" ⁱⁿ/min

" " 3.0" drain valve: 50.27" - 42.80" = 7.47" $\frac{in}{15 sec}$ = 29.88" ⁱⁿ/min

Thermocouples - per same as described on page 2 ^{all reading on K-3}

(1) 202 (cm) M-4 in.

0930 + Per 126.10 cm bh = 3.10 cm 54.04

E = 55.04 cm = 15.34 = 4.94 ft/cm

0944 123.00 cm $\frac{cm}{h} = 100.50 cm$ 52.80

Hydrin fuel critical: $\frac{cm}{h} = 39.57" \frac{h}{h} = 2.55$

Temp	#1	#2	#3	#4	#6
	23.85°	23.75°	23.85°	23.40°	23.70°
Milli volts	.954	.952	.954	.937	.951

1020 Removed the 2 - 15.25" S.S. discs from bottom.

Salution Zero - $H_{av} = 202 \text{ (cm)}$ $M = 9 \text{ in}$
 22.20 cm 13.07 ''

U.C
H 118
T 24
Hc 9.6
Red 300

1136 (2) 202 (cm) $d_h = 2.75 \text{ cm}$ $M = 9 \text{ in}$
 + Rev 126.35 54.16 ''
 $t = 69.54 \text{ mm} = 13.04 = 4.73 \text{ f/cm}$

1149 202 (cm) $d_h = 101.40 \text{ cm}$ $M = 9 \text{ in}$
 123.60 cm $d_h = 39.92 \text{ ''}$ $\frac{d}{\delta} = 2.58$ 53.08 ''

System just critical.

Temp.	#1	#2	#3	#4	#6
	24.50°	24.5°	24.5°		
millivolts	.980	.980	.980	.970	.960

1330 Added 6 SS strips .031" thick 48.8" long around 15.50 SS Vessel. These were placed between ab rings by using SS bands 3" wide. Height of strips = 46.25" from bottom of vessel.

1356 202 (cm) $M = 9 \text{ (in)}$
 3 + Rev 121.10 cm $d_h = 2.72 \text{ Temp. corr.}$ 52.12 ''
 $t = 65.19 \text{ mm} = 13.64 = 5.00 \text{ f/cm}$

1406 118.70 cm $d_h = 96.50 \text{ mm}$ $M = 9 \text{ in}$
 51.12 ''

System just critical. $d_h = 96.18 \text{ mm}$ $\frac{d}{\delta} = 2.44$

Temp. millivolts	#1	#2	#3	#4	#6
	24.75°	24.75°	24.75°	24.40°	24.01°
	.990	.990	.990	.975	.960

Temp correction of $h_0 = .32 \text{ cm}$.

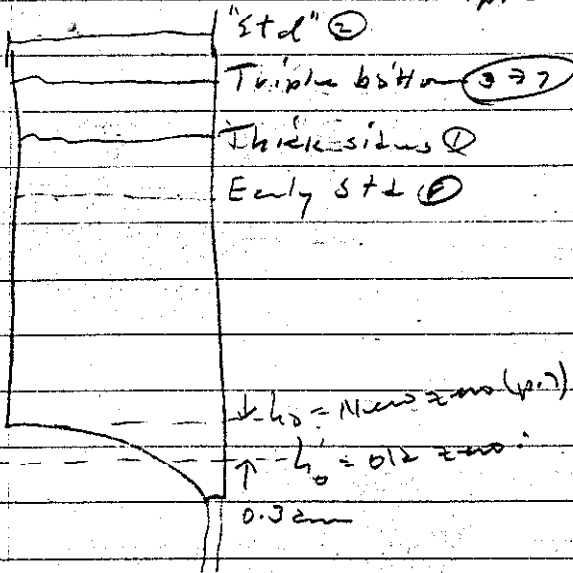
4/29/65 see page 7.

Summary: learn: changing zero line on map. $\Delta h_0 = 0.3 \text{ cm}$

In reverse time sequence:

	① P.8	② P.8	③ P.7	④ P.6	⑤ P.5	⑥ P.4	⑦ P.4	⑧
H	118.70	123.60	123.00	124.45	123.25	120.60	122.85	122.85
T	24.75	24.50	23.85	25.25	23.75	24.50	(24.50) 23.75	(23.00)
Hc	96.80	101.70	100.80	102.25	101.05	101.40	100.65	100.80
(old zero)	(21.90)	(21.90)	(22.20)	22.20	22.20	22.20	22.20	22.05

Triple Bottom



4-30-65 25 l bottles

11

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SFT	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter <input checked="" type="checkbox"/>	4"	<input checked="" type="checkbox"/>	3 X 10 ⁻¹²
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	3"	<input checked="" type="checkbox"/>	"
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	Cont	<input checked="" type="checkbox"/>	500V
PM-2	900V	Low <input checked="" type="checkbox"/>	14"	<input checked="" type="checkbox"/>	900V
"	"	Alarm <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	"
LOG 'N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. B-80	
DUMP-WELL PROBE LIGHT <input checked="" type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by AKK Personnel check by FIDC
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-1 K-2 PM-1 PM-2
 Red light on by AKK Time 1050
 Start-up OK'd by FIDC AKK Date 4-30-65

Feed & drain rates for 2 remote filled units.
 Feed rate: 0" - 2.82" = 2.82 in/min
 Drain rate 1/2" drain valve: 32.01" - 29.65" = 2.36 in/30 sec = 4.72 in/min
 " " 3/4" valve: 29.65" - 29.90" = 6.75 in/10 sec = 40.50 in/min
 av.

4/30/65

4/30

Solution Zero 202 (cm) M-4 (in)
 units 1+3 27.60 cm 15.18"

76.85 cm even with bottom of cups - 39.62" same.

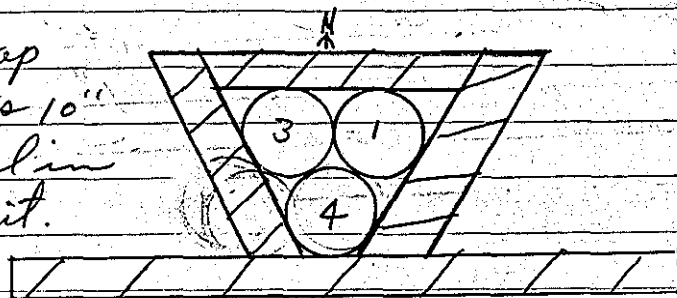
When units 1+3 are even with fixed-filled units.

202 reads ~~42.70~~ cm & M4 reads 32.01."

202 (cm) M-4 (in)

$q_h = 42.70$ cm $q_h = 16.83$ in.

note: top reflector is 10" above fuel in fixed unit.



6" Polyethylene reflector on art sides. Bottles in contact

11:14 202 (cm) M-4 in
 + Pen 71.50 cm $2h = .55$ cm 32.52"
 $D = 47.07$ cm $= 17.14 = 31.12$ cm

11:20 70.95 cm $q_h = 43.35$ cm 32.31"

system just critical.

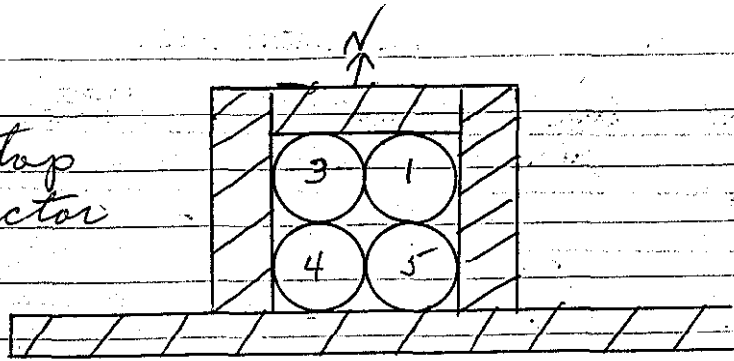
12:30 Removed top reflector from array shown above.

12:59 202 (cm) M-4 in
 73.75 cm $q_h = 46.15$ cm 33.43"

system just critical.
 Ordini

4/30/65

no top reflector



14:30 now have 2 x 2 square array as shown above. Reflected on five sides with 6" Polyethylene. Bottles in contact

14:45 (2) 202 (cm) M-4 in.
 + Per 64.95 cm. $\Delta h = .560 m.$ 29.94 in.
 $\bar{v} = 48.52 m = 16.7 ft = 30.39 ft/m.$

14:51 64.40 cm $\bar{h} = 36.80 cm$ 29.75 "

System just critical:
 Drain:

14

5-3-65

5-3

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	<input checked="" type="checkbox"/>	4"	<input checked="" type="checkbox"/>	10-10 ⁻¹²
"	"	<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	<input checked="" type="checkbox"/>	2"	<input checked="" type="checkbox"/>	"
"	"	<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	2"	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Alarm <input checked="" type="checkbox"/>	10"	<input checked="" type="checkbox"/>	900V
		Alarm <input checked="" type="checkbox"/>	2"	<input checked="" type="checkbox"/>	"
LOG N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. B-80	
DUMP WELL PROBE LIGHT <input checked="" type="checkbox"/>					

089

091

092

093

094

START-UP CHECK LIST

Equipment checked by _____ Personnel check by _____

1030

Instruments and safeties checked and reset by _____

Source in checked by _____ Source No. _____

Emergency equipment in control room checked by _____

104

Instruments in trip circuit: _____

Red light on by RRD Time 0835

105

Start-up OK'd by _____ Date _____

Solutions Level 20.2 cm
27.60 cm

M-9 (in)
15.18"

5-3-65

15

0845

same array as shown on page 13. side-side
separation now = .50" in. "No top reflector."

0910

202 (cm)

19.4 in.

76.70 cm

34.60"

System sub critical.

Drain:

0925

added top reflector. Separation still .50" in.

202 (cm)

 $\Delta h = .50 \text{ cm.}$

19.4 in.

0939

(1)

+ Per 70.25 cm.

32.05" in.

 $E = 60.11 \text{ sec} = 14.44 = 28.84 \text{ cm.}$

0945

69.75 cm

 $q/h = 42.15 \text{ cm.}^2$

31.85"

System just critical.

1030

same array as above. Separation now = .375"
"No top reflector."

(2)

202 (cm)

19.4 (in)

1046

+ Per 71.10 cm

 $\Delta h = .55 \text{ cm.}$

32.37"

 $E = 77.49 \text{ sec} = 12.04 = 21.34 \text{ cm.}$

1050

70.55 cm

 $q/h = 42.95 \text{ cm.}^2$

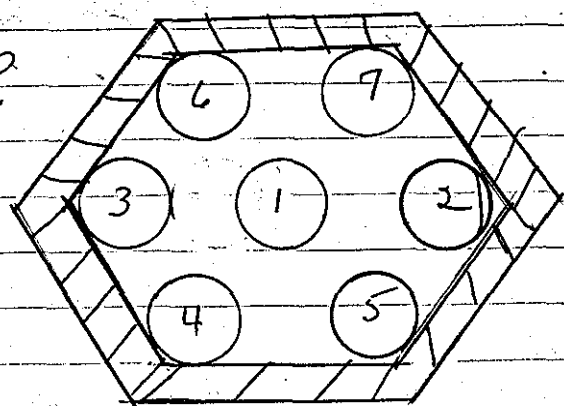
32.19"

System just critical.

16
5/3/65

5/4

Note - Top reflector 10" above fuel in fitted units



Seven units triangular array, surface to surface separation 1.75". With top reflector

1435 (3) 20.2 (cm) M-9
+ Per 60.30 cm, h = .20 cm 28.17"

$\Sigma = 102.13 \text{ cm} = 9.74 = 48.5 \text{ ft/cm}$

1443 60.10 cm $h = 32.50 \text{ cm}$ 28.09"

System just critical.
Drain.

1455 Top reflector removed; array same as above:

1513 (4) 20.2 (cm) h = .35 cm M-9 (lin)
+ Per 65.05 cm 30.00"

$\Sigma = 86.18 \text{ cm} = 11.14 = 31.8 \text{ ft/cm}$

1522 64.70 $h = 37.10 \text{ cm}$ 29.90"

System just critical.

5/4/65

17

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	10^{-12}	Meter ✓	4"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	1"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT		✓			

START-UP CHECK LIST

Equipment checked by AMF Personnel check by RRMInstruments and safeties checked and reset by AMFSource in checked by AMF Source No. M-43Emergency equipment in control room checked by I.D.CInstruments in trip circuit: K-1 K-2 PM-1 PM-2Red light on by I.D.C Time 0845Start-up OK'd by I.D.C AMF Date 5-4-65

Same array as shown on page 16. Seven units
 triangular array. surface - surface separation now
 = 2.375" with top reflector.

5/4/85 Selection Zero 202 (cm)
27.60 cm

M-F in
15.18"

5/4/

0910 (1) 202 (cm) $dh = .35$ cm
+ lens 66.45 cm
 $T = 91.27 \text{ cm} = 10.44 = 29.74 \text{ f/cm}$

M-F in
30.55

149

0919 66.10 cm $dh = 38.50$ cm.

30.49"

145

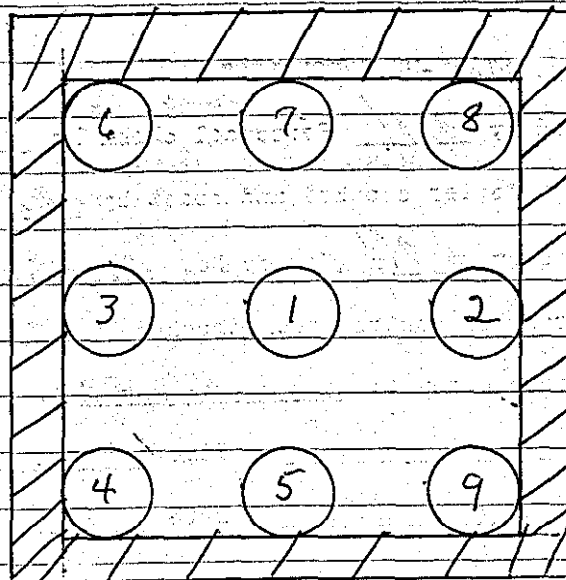
System just critical.

0940 Removed top reflector.

1004 76.45 cm

34.50"

System ^{sub}critical.
Drain:



3x3 square array as shown above.
Surface to surface separation ~~is~~ 3.750
with top reflector.

1446 (2) 202 (cm) M-e-
 + Rev 68.30 cm $D_h = .55$ cm 31.30
 $E = 65.91$ cm $= 13.5 \phi = 24.57 \phi$ / cm.

1454 67.75 cm $q_h = 40.15$ cm. 31.12 "
 System just critical: with top reflector.
 Davis.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	3"	✓	10×10^{-12}
"	"	Fast	"	✓	"
K-2	"	Meter	2"	✓	"
"	"	Fast	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm	cont	✓	500V
PM-2	1200V	Low	14	✓	900V
"	"	Alarm	1"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-50

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by PKV

Source in checked by PKV Source No. M-93

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

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

Red light on by PKV Time 10.00

Start-up OK'd by F.D.C. PKV Date 5-5-65

Solution Zero = 202 (cm)
27.60 cm

M-9 is
15.18"

Same array as shown on page 18. 3x3 square array. S-S separation = 2.375".
"No Top reflector."

1032. 202 (cm)
77.45 cm

M-9 is
34.87"

System sub critical
Drain.

12:35 Same array as shown on page 14. 3x3 square array. S-S separation = 2.125". No top reflector,

202 (cm)
75.90 cm.

M-9 (is)
32.83 ? ?

System sub critical.
Drain.

Same array as shown on page 18. 3×3 square array
 S-S separation now = 1.750". No top reflector.

(1) 202 (cm) $M = 4$ (in)
 90 $b_1 = .60$ cm
 1408 + P_{ss} 70.93 32.20 "
 $b = 73.14$ cm $= 12.54 = 20.75$ H cm.

1416 " 70.30 cm $b_1 = 42.70$ cm 32.01 "
 System just critical. No top reflector.
 Drain.

22
5/5/65
6

5/5/65
6

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	4"	—	10×10^{-12}
"	"	Fast ✓	"	—	"
K-2	"	Meter ✓	1"	—	"
"	"	Fast ✓	"	—	"
R-1					
R-2					
PM-1	700 V ✓	Alarm ✓	cont	—	500 V
PM-2	1200 V ✓	Low ✓	14"	—	900 V
"	"	Alarm ✓	1"	—	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-93

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

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

Red light on by AKM Time 1250

Start-up OK'd by F.D.C. AKM Date 5-6-65

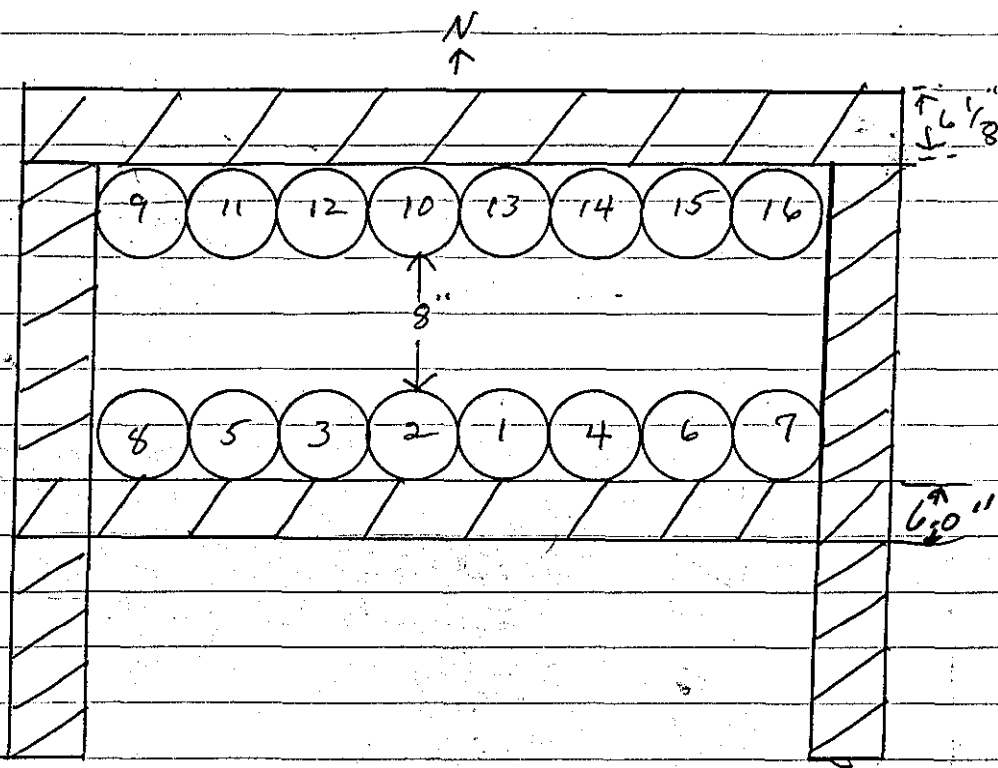
121

Solier

10

13

5/5/65
6



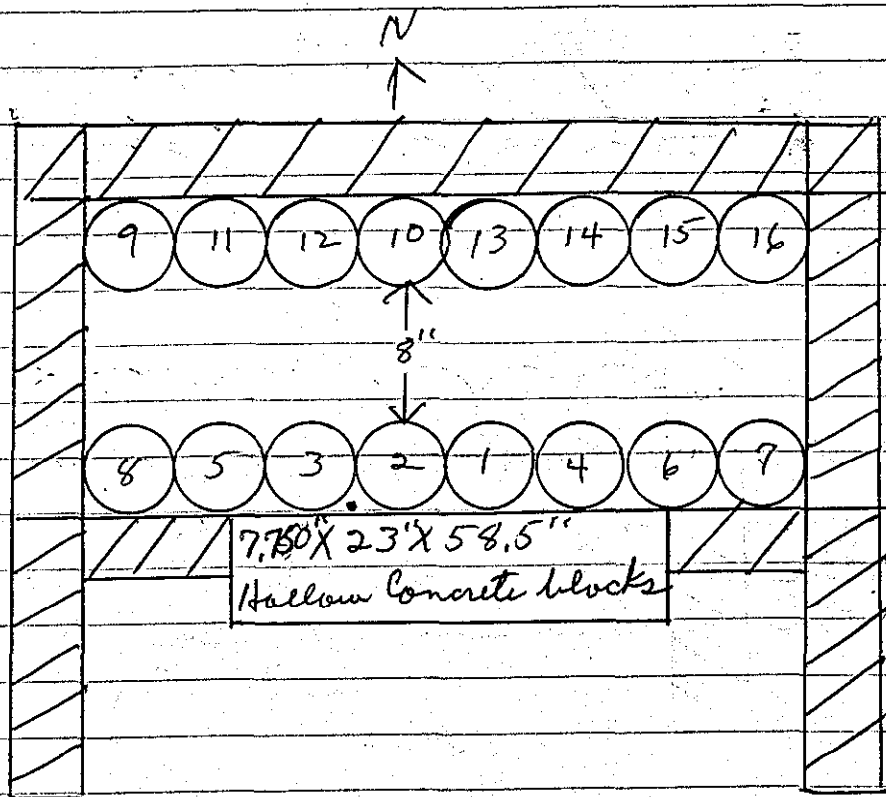
12:30 Array has 2" x 45" x 72" plexygloss top reflector centered on top of array 10.0" from top of bowl in biper filled units.

Solution Zero 20.2 (cm) 19.4 (in)
27.60 15.14"
Rebuild after building array:

1310 $f_{per} = 58.25 \text{ cm}$ $b/h = .95 \text{ cm}$ 27.19"
 $\sigma = 60.84 \text{ cm} = 14.34 = 15.02 \text{ cm}$

1317 57.30 cm $c/h = 29.70 \text{ cm}$ 26.85"
System just critical.

24
5/6/65



Added hollow blocks to north row
(7.750" x 23" x 58.5" 2" top reflector see above)

1550 $\frac{202 \text{ (cm)}}{7 \text{ per}} = 28.86 \text{ cm}$ $b_h = .90 \text{ cm}$ $M = 2 \text{ in}$
 $5 = 59.76 \text{ cm} = 14.51 \text{ ft} = 16.01 \text{ ft/cm}$

1557 59.40 cm $q_2 = 31.80$ 27.70 \"

System just critical.
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	10-12	Meter ✓	4"	—	—
"	"	Fast ✓	"	—	—
K-2	"	Meter ✓	2"	—	—
"	"	Fast ✓	"	—	—
R-1					
R-2					
PM-1	700v	Alarm ✓	cent	—	—
PM-2	1200v	Low ✓	19"	—	—
"	"	Alarm ✓	1"	—	—
LEG IN CAL STATE			OPERATE	SOURCE No.	B-80
DUMP WELD ROBE LIGHT					

START-UP CHECK LIST

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

Instruments and safeties checked and reset by ARKV

Source in checked by ARKV Source No. M-43

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

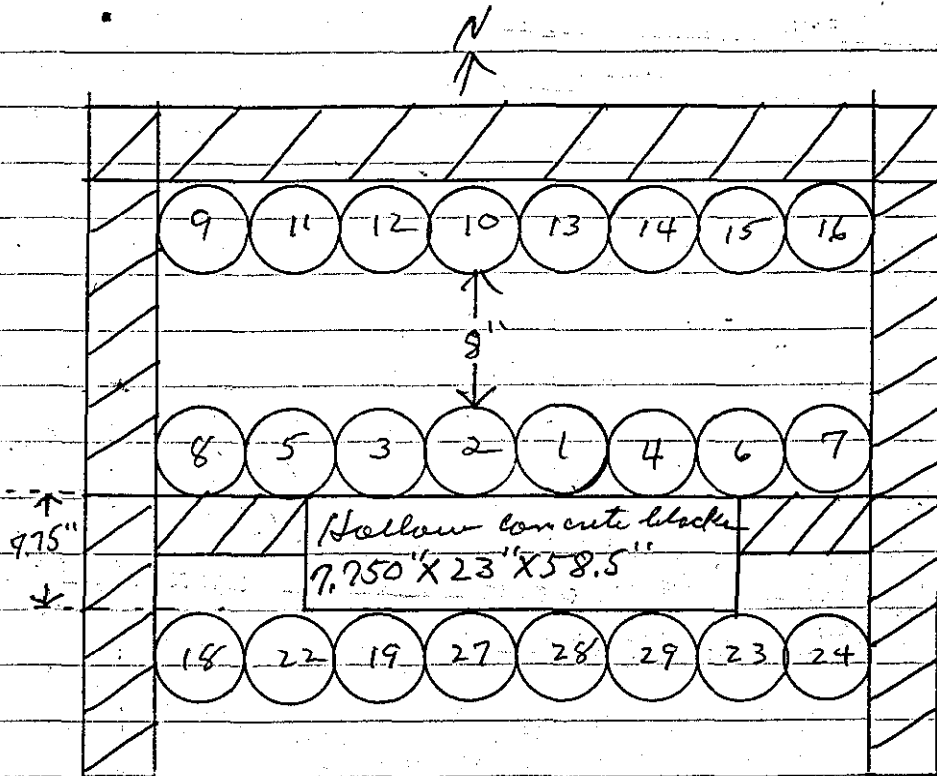
Instruments in trip circuit: K-1 K-2 PM-1 PM-2

Red light on by ARKV Time 0825

Start-up OK'd by F.D.C. ARKV Date 5-7-65

26
5/7/65

5/9/



09.

093

095

1008

0830 added 8 more units as shown above with 2" top reflector as described before separation of south row = 7.750" in contact with wall.

1017

0842 (1) $\frac{20.2 \text{ (cm)}}{51.20 \text{ cm}} \quad \Delta = .90 \quad M = 8 \text{ in} \quad 24.95''$
 $E = 79.31 \text{ cm} \approx 11.84 = 13.14 / \text{cm}$

115

0851 $50.30 \quad \frac{9}{4} = 22.70 \text{ cm} \quad 24.12''$
 system just critical
 Over

1140

0915 South row separation now 3" from hollow block wall. Total separation from south wall 10.750"

115

5/19/65

0930 2 20.2 (cm) 19-8 in.
 + level 55.10 cm $dh = .90$ 25.98"
 $C = 70.02 = 12.94 = 14.34/cm$

0939 54.20 cm $dh = 1.6$ 25.66"
 $dh = 1.6$
 hepten just critical.
 Drain.

0955 South now separation now 12.0" from hollow block wall. Total separation from south wall now = 19.750"

1008 3 20.2 (cm) 19-8 in.
 + level 58.65 cm $dh = 1.00$ cm 27.91"
 $C = 53.24 = 15.74 = 15.74/cm$

1017 57.65 cm $dh = 30.05$ cm. 28.60 ??
 hepten just critical.
 Drain.

11:15 Removed hollow concrete block wall and replaced with super boron hot foam. No other changes. Hot foam 8" thick. Total separation from south wall = 19.750"

1140 24 20.2 $dh = .95$ cm. 11-8
 + level 69.55 cm 32.07 in.
 $C = 88.0 = 10.94 = 11.44/cm$

1150 Critical 68.60 cm $dh = 41.00$ cm 31.97 in.
 Drain

5/16/65

Moved bottles to 3" separation between them and foam plastic. This means 11" separation between bottles inside and outside the array. led other change.

15

1313 #5 20v 67.55 cm $sh = .90$ 31.67 in
C = 72.80 cm = 12.6 f = 14.0 f/cm

1320 Critical 66.65 cm $hc = 39.05$ 32.07 in ??
Drain

15

Moved bottles into contact with foam plastic slab. This means 8" separation between bottles inside and outside array. led other change.

153

1355 #6 20v 66.00 cm $sh = .75$ 30.21 in
C = 84.75 cm = 11.2 f = 14.9 f/cm

154

1400 Critical 65.30 cm $hc = 37.70$ 29.92 in

155

Removed 8 bottles from table. Now have only "super ad" in south wall of reflector. led other change.

160

1431 #7 20v (cm) 71.70 cm $sh = 1.00$ 32.57 in
C = 95.61 cm = 10.2 f = 10.2 f/cm

1440 70.70 cm $hc = 43.1$ 33.50 ??
Reflector just critical
Does.

1513 Put Styrofoam in south wall in the place of the "super Box foam". Styrofoam 8" thick. 8 bottles placed 3" from south of styrofoam, making 11 in. separation between bottles inside and outside array, but other changes. (Top reflector still in place.)

??
1526 #6 202 (cm) $z_h = 1.70$ cm M-4 in.
+ Per 59.70 28.11 "
 $\sigma = 84.75$ sec ≈ 11.4 $\phi = 16.0$ ϕ/cm

2. 1534 59.00 $\phi_h = 31.40$ cm 28.47 ? ?
ile hyper just critical.
Drain.

1541 separation of south row row = 20.00"

1555 #9 202 (cm) $z_h = 1.85$ M-4 (-in)
+ Per 66.05 30.24 "
 $\sigma = 76.66$ sec = 12.2 $\phi = 14.4$ ϕ/cm .

only
in 1604 65.20 cm $\phi_h = 37.60$ cm, 29.91
hyper just critical:
Drain.

30
5/20/65

5/2

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE D	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	3"	-	10 X 10 ⁻¹²
"	"	Fst ✓	"	-	"
K-2	3 X 10 ⁻¹²	Meter ✓	cont	-	"
"	"	Fst ✓	"	-	"
R-1					
R-2					
PM-1	650V	Alarm ✓	cont	-	500V
PM-2	1200	Low ✓	14"	-	900V
"	"	Alarm ✓	1"	-	"
LOG N CALIBRATE ✓		OPERATE ✓	SOURCE No. B-80		
DUMP WELL PROBE LIGHT ✓					

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKN

Source in checked by RKN Source No. M-43

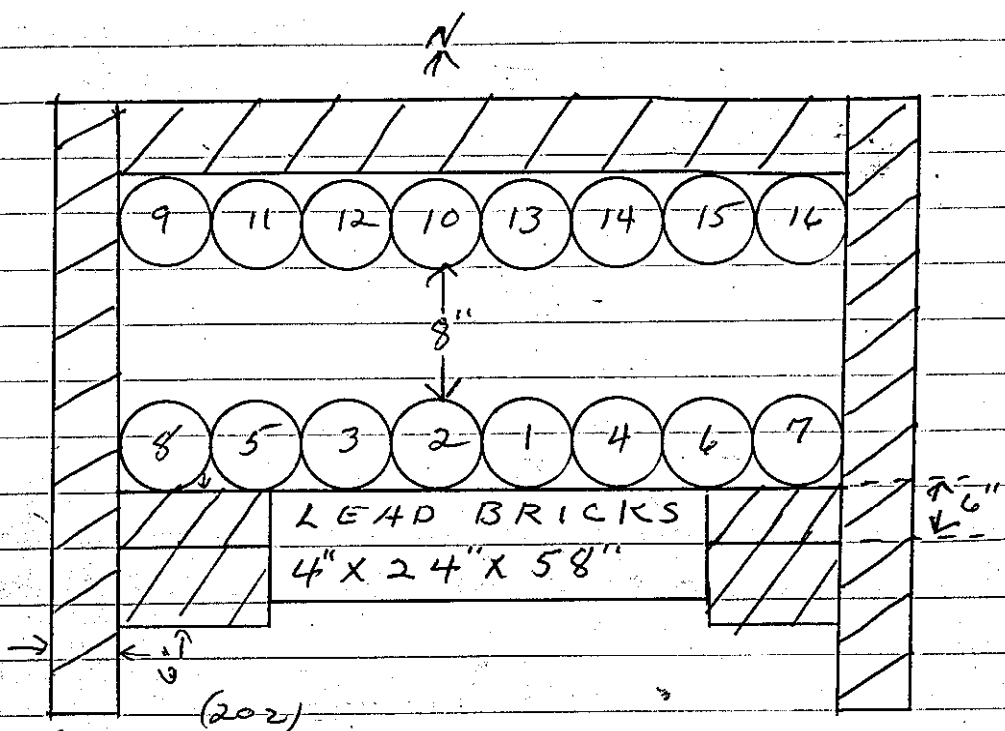
Emergency equipment in case of robot checked by I.D.C.

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

Red light on by RKN Time 1245

Start-up OK'd by I.D.C. RKN Date 5-20-65

5/20/65



Solution Zero $\frac{26.70 \text{ cm}}{202} = 27.60 \text{ cm}$.

13:45 Array as above, with 2" thick Plexiglas top reflector.
Continuation of previous work.

13:55 (1) $\frac{202 \text{ (cm)}}{56.75 \text{ cm}}$

14:04 $\frac{56.15 \text{ (cm)}}{94} = 28.55 \text{ cm}$.
System just critical:

15:00 added third row of tubes: separation = 6.0" ^{8 units.}
Bl_g on all channels higher than usual.

15:13 $\frac{202 \text{ (cm)}}{92.70 \text{ cm}}$

System very slightly + Pos. Discrim.

all.

32
3/20/65

51

Due to low critical wt. did not do
+ Pres. Drain to check array for movement
and set.

1522 Made check of array: Every thing normal.

1532 202 cm $q_h = 14.75$ cm.
42.35 cm
System just critical:
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	10^{-12}	Meter	3"	✓	10×10^{-12}
"	"	Fast	"	✓	"
K-2	"	Meter	1"	✓	"
"	"	Fast	"	—	"
R-1					
R-2					
PM-1	675 V	Alarm	cont	—	500V
PM-2	1200 V	Low	14"	—	900V
"	"	Alarm	1"	—	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

08
09
09
09

5/21/65

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FIDC

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-93

Emergency equipment in control room checked by FIDC

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

Red light on by AKM Time 0820

Start-up OK'd by FIDC AKM Date 5-21-65

Same array as shown on page 31. Separation of third row now = 12.00" in.

0840 (1) 202 (cm) M-9 in
+ Per 52.00 24.83" ?

0847 51.35 cm $4h = 23.75 \text{ cm}$ 24.81" in
System just critical.

0907 Separation of third row now = 9.0" in.

0918 (2) 202 (cm) M-9 in
+ Per 49.50 cm 23.18

0925 48.90 cm $4h = 21.80 \text{ cm}$ 22.93"
System just critical.
Down.

34
5/21/65

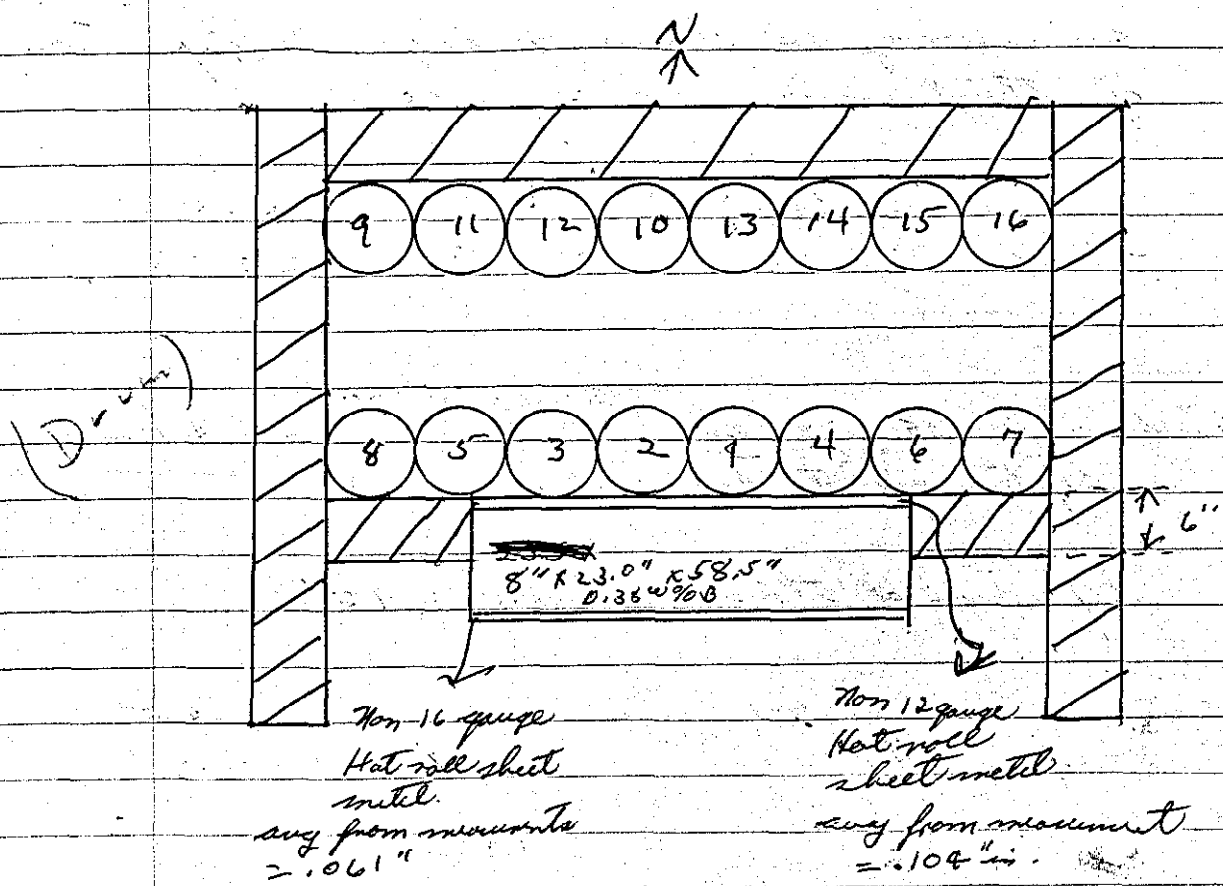
3/21

1005 Separation of third row row = 20.00" in

1025 (3) 202 (cm) M. 4 in.
7 Per 54.75 cm 25.25" in

1034 54.10 cm c/p = 26.50 cm. 25.09" in

System just critical.
Drain



Now have 8" x 23.0" x 58.5" box from ~.38" #16 B.
+ sheet metal as shown above.

3/21/65

35

1440 (4) 202 (cm) M-9 (pts)
+ Per 69.25 cm 30.98"

1449 68.90 cm $q/h = 40.80 \text{ cm.}$ 30.65"

System just critical.
Drain.

1522 added third row of units: Separation = ~~8.108"~~ 8.165"

1536 (5) 202 (cm) M-9
+ Per 64.50
64.05 cm 29.12"

1545 63.80 cm $q/h = 36.20 \text{ cm.}$ 28.80"

System just critical.
Drain.

36
5/24/65

INSTRUMENT CHECK

3/2

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"		
"	"	Fast ✓	"		
K-2	"	Meter ✓	1"		
"	"	Fast ✓	"		
R-1					
R-2					
PM-1	700V	Alarm ✓	cont		
PM-2	1200V	Low ✓	14"		
		Alarm ✓	1"		
LOG IN CALIBRATE		✓	OPERATE	✓	SOURCE No. <u>B-80</u>
DUMP WELL PROBE LIGHT		✓			

0
09
09
09

START-UP CHECK LIST

Equipment checked by AKM Personnel check by AKM
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-93
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 PM-2 PM-1
 Red light on by AKM Time 0820
 Start-up OK'd by F.D.C. AKM Date 5-24-65

07
3-
null
ad

Same array as shown on page 34-35. Separation of third row now = 12.165."

Rev
cor

Solution Zero 202(cm) = 27.60 cm.

5/24/65

0853 (1) 202(cm) M-4
 + Per 66.40
 56.40 29.85"

0900 65.45 cm $q_h = 37.85 \text{ um}$ 29.50"

System just critical.
 Drain.

0928 Separation of third row now = 20.165"

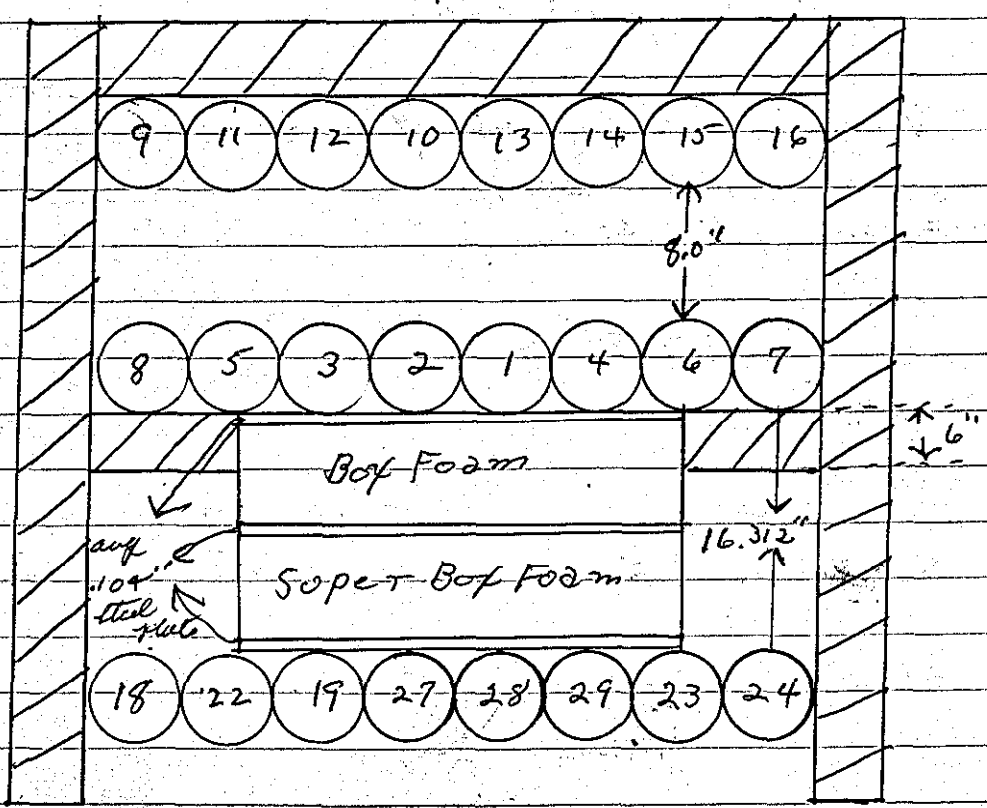
0945 (2) 202(cm) M-4 (out)
 + Per 67.60

0958 66.90 cm $q_h = 39.30 \text{ cm}$

System just critical.
 Drain.

Array has
 3 - .104" bot
 roll steel plates
 as shown
 +

Blind row at
 contact.



ans.

38
5/24/65

1059 (3) + Per 202 (cm)
67.50 cm.

1102 66.60 cm $q/h = 39.00 \text{ cm}$

hepton just critical.
D. new.

1230 Separation of third row now = 20.312" in.

1249 4 + Per 202 (cm)
67.60

1300 67.00 cm $q/h = 39.40 \text{ cm}$

hepton just critical.

1325 Removed third row of units.

1343 5 + Per 202 (cm)
68.40 cm.

1353 67.70 cm $q/h = 40.10 \text{ cm}$

hepton just critical.

14:30 Removed hof foam and shut metal plates. Added plywood 6" X 23.5" X 58.5"

1501 6 + Per 202 (cm)
58.40 cm

5/24/65

1510

202 (cm) c/h = 29.95 cm.
57.55 cm

System just critical.
Drain.

1530 added third row of units. Separation = 6.0" in.

1522 7 Per 202 (cm) 50.90

1550

49.60 cm c/h = 22.00 cm.

System just critical.
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"		10×10^{-12}
"	"	Fast ✓	"		"
K-2	"	Meter ✓	2"		"
"	"	Fast ✓	"		"
R-1					
R-2					
PM-1	100V	Alarm ✓	cont		500V
PM-2	1200V	Low ✓	14"		900V
"	"	Alarm ✓	1"		"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

15"

5/25/65

57

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

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

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

Red light on by AKH Time 0805

Start-up O. & W. I.D.C. AKH Date 5-25-65

Same array as described on page 38-39.
Separation now = 12.0" in

0840 ⁽¹⁾ + Per 202 (cm) 55.70 M-43

0853 55.00 cm $4h = 27.40$ cm. 25.37

System just critical.
Drain.

0905 Separation of third row now = 20.0" in.

0915 ² + Per 202 (cm) 57.20 cm M-43 26.19

0921 56.20 cm $4h = 28.60$ 25.83

System just critical.
Drain.

5/25/45

41

1000 Removed plywood: third row separation still
20.0" "air void"

1026 3 202 (cm) M = 4 in.
+ Per 65.30 cm 29.40"

1033 64.95 cm $q/h = 36.85 \text{ cm}$ 29.08"
system just critical.
Drain.

1245 added solid concrete block: 7.625" ~~7.625~~^{23.00}" x 58.5"
separation of third row = 20.0"

1311 4 202 (cm) M = 4 in.
+ Per 53.90 cm 24.93"

1320 53.10 cm $q/h = 25.50 \text{ cm}$ 24.62"
system just critical.
Drain.

separation of third row now = 7.625"

1337 5 202 (cm) M = 4 in.
+ Per 49.90 cm 23.35"

1345 49.10 cm $q/h = 21.50 \text{ cm}$ 23.04"
system just critical
Drain aer.

42/5
5/25/65

5/26

1420 Removed third row of units.

1436 (4) 202 (cm) M-4 in.
+ Per 54.80 cm 25.25

1449 54.05 cm $C/L_2 = 26.45 \text{ cm}$ 25.00"

System just critical.
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE D. TANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	9700V	Alarm ✓	cont.	✓	500V
PM-2	1200V	Low ✓	18"	✓	900V
"	"	Alarm ✓	1"	✓	"

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

3/26/65

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

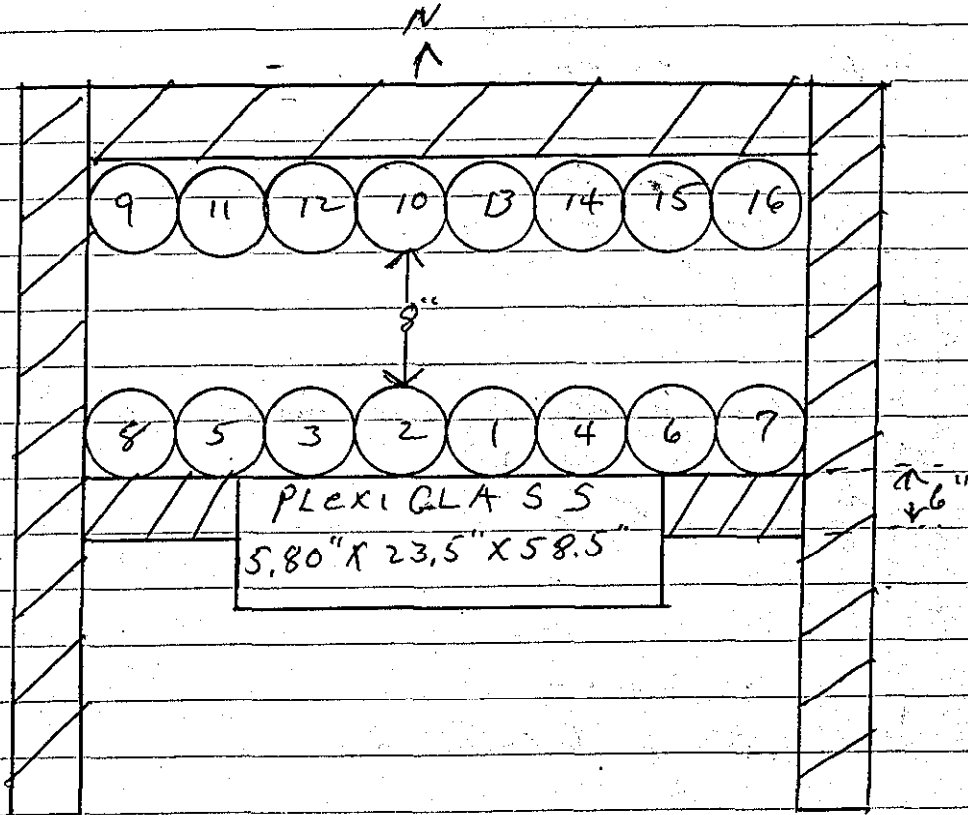
Source in checked by AKM Source No. M-43

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

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

Red light on by AKM Time 0825

Start-up OK'd by E.D.C AKM Date 5-26-65



0830 now have plexiglass wall, 5.80" X 23.5" X 58.5"
As shown above.

ack

44
5/26/65

0846 (1) + Per 202 (cm) 56.40 M-9

55.30 cm $q_h = 27.70 \text{ cm}$

0855 System just critical.
Drain.

0925 Added third row of units. separation = 20.0"

2 202 (cm)

0939 + Per 55.80 cm

55.30 cm $q_h = 27.70 \text{ cm}$

0949 System just critical.
Drain.

10.00 separation of third row row = 6.0"

202 (cm)

1014 3 + Per 55.30

54.80 cm $q_h = 27.20 \text{ cm}$

1020 System just critical.

separation of third row row = 12.0"

202 (cm)

1045 4 + Per 55.80 cm

$q_h = 27.50 \text{ cm}$

1058 55.10 cm
System just critical. Drain.

5/26/65

45

1400 Same array as on page 37 with
 Surf foam + Super-leaf foam.
 Except ~~with~~ the 104 mil Steel plates
 have been removed, leaving air
 gaps. Separation of 3rd row = 16.312"

1427 ⁵ + Per 202 (cm) M-1
 69.30 cm 30.98"

1435 68.40 cm $q/h = 40.80 \text{ cm}$ 30.65"

System just critical.
 Drain:

1445 Separation of third row now = 20.312"

1458 ⁶ + Per 202 (cm) M-1 in
 69.10 cm 30.94

1515 68.75 cm $q/h = 41.15 \text{ cm}$ 30.78"

System just critical.
 Drain:

1535 Removed third row:

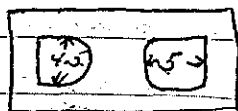
1549 ⁷ + Per 202 (cm) M-2 in
 70.30 31.39

69.65 cm, $q/h = 42.05$ 31.16

1601 System just critical
 Drain:

Summary of Densities for Materials
used in test area of well:

Hollow Concrete Block:



$$15 \frac{7}{8} \times 7 \frac{1}{4} \times 7 \frac{7}{8} \text{ in.}, 19.35 \text{ kg}$$

$$\frac{19.35}{15130.8 - 5715} = 2.055 \text{ g/cm}^3$$

Solid Concrete Block

$$15 \frac{7}{8} \times 7 \frac{7}{8} \times 7 \frac{7}{8} \text{ in.}, 33.5 \text{ kg}$$

$$\frac{33.5}{14886.8} = 2.25 \text{ g/cm}^3$$

"Boxform" (First pink foam from A. M. Wall, containing
3.8 w/o boron)

$$1) 11.0 \times 8.0 \times 58.5 \text{ in.}, 9.3 \text{ kg} = 0.110 \text{ g/cm}^3$$

$$2) 11 \frac{1}{4} \times 8 \times 58.5 \text{ in.}, 8.55 \text{ kg} = 0.0983 \text{ g/cm}^3$$

"Super Boxform" (Second pink foam containing ~5.5 w/o)

$$1) 11.0 \times 8.0 \times 58.5, 7.40 \text{ kg} = 0.0877 \text{ g/cm}^3$$

$$2) 12.0 \times 8.0 \times 58.5, 8.64 \text{ kg} = 0.0939 \text{ g/cm}^3$$

These slabs were "pat dust" and did not foam
uniformly, \therefore their density is not uniform.

C. Crane.
Roll

6-9-65

252 batteries
in Big lid.

47

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	10×10^{-11}
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	"
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
R-1					
R-2					
PM-1	700 V	Alarm <input checked="" type="checkbox"/>	cont	<input checked="" type="checkbox"/>	500 V
PM-2	1200 V	Low <input checked="" type="checkbox"/>	16"	<input checked="" type="checkbox"/>	900 V
"	"	Alarm <input checked="" type="checkbox"/>	2"	<input checked="" type="checkbox"/>	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKA

Source in checked by AKA Source No. M-93

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

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

Red light on by AKA Time 0900

Start-up OK'd by F.D.C. AKA Date 6-9-65

Feed rate - 8.1 cm - 10.25 cm = 2.15 cm/min

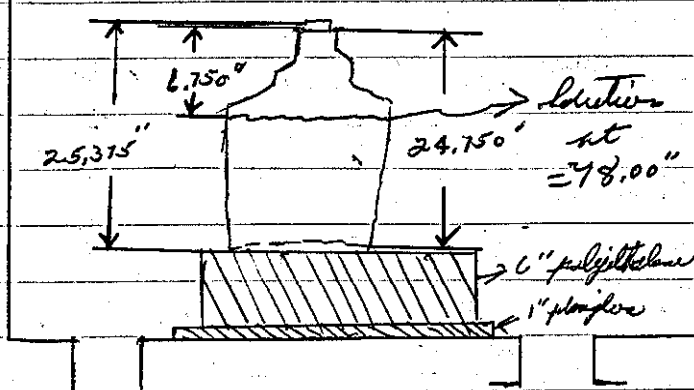
Dump rate = 10.1 cm - 6.6 cm = 3.5 cm/30 sec = 7.0 cm/min

Drain rate? 17.1 cm - 10.1 cm = 7.0 cm/min

B)

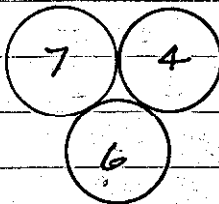
48

6-9-65



in big hole.

Water ht = 0.0 cm when at top of polyethylene slab or bottom of bottle.



Have three piped filled units as shown above in contact.

0947 Water ht = 32.85 cm.
System just critical.

1315 Separation of units now = .50"

1407 Water ht = 72.3 cm.
System slightly sub critical.
Drain.

6-9-65

14-9

151

6-9-65

1440 Separation of units now = .375"

1515 Water ht = 44.60 cm.
Lepton joint critical.
D rain.

INSTRUMENT-CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-11}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	16"	✓	900V
"	"	Alarm ✓	7"	✓	"

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

DUMP WELL PROBE LIGHT _____

50
6/10/65

START-UP CHECK LIST

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

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

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

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

Instruments in trip circuit: K-1-2 P17-1-2

Red light on by R.H.H. Time 0815

Start-up OK'd by F.D.C. R.H.H. Date 6-10-65

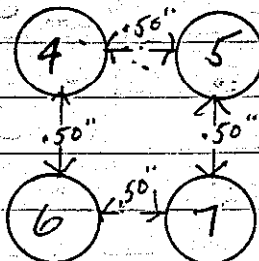
Water ht zero = 0.0 cm.

N
↑



08:30 Eight units in contact sitting on 6" polyethylene slab in Big Sid.

09:10 Water ht = 71.80 cm
System sub critical.
Drain.



13:15 Four units .50" separation on 6" polyethylene slab in big sid. Shown above.

6/11/65

1357

Water lts = 73.00 Cms.
System sub critical.
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE	
K-1	10 x 10 ⁻¹²	Meter ✓	cont	-	3 x 10 ⁻¹¹	
"	"	Fast ✓	"	-	"	
K-2	"	Meter ✓	"	-	"	
"	"	Fast ✓	"	-	"	
R-1						
R-2						
PM-1	700V	Alarm ✓	cont	-	500V	
PM-2	1200V	Low ✓	14"	-	900V	
"	"	Alarm ✓	2"	-	"	
LOG 'N CALIBRATE		✓	OPERATE		✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT _____						

ans.

52

6-11-65

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKV

Source in checked by AKV Source No. M-93

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

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

Red light on by AKV Time 10.10

Start-up OK'd by F.D.C AKV Date 6-11-65

Water ht zero = 0.0 cm

6

5

8

4

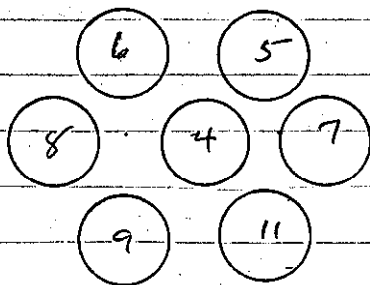
7

10:20 Five units 2.75" separation sitting on 6" Polyethylene slab in big side.

1058 Water ht = 72.90 cm.

System very sub critical.
Drain

12:30



12:30 Now have seven units at 2.75" separation
sitting on 6" polyethylene slab in bag sid.

132.6 Water ht = 72.70 cm
system sub critical.
Drain.

142.5 Separation now = 2.250"

151.5 water ht = 73.30 cm
system very sub critical
Drain.

6-17-65 added ~ 100 l of solution to manifold
in order to fill 9.5" I.O. al cylinders.
4 samples taken after mixing ~ 30 min.

#1 Y-12 Rq # 684981 #2 X-10 Rq A881

G = 165.9	out for 24g	G = 159.6	out for 24g = 4472
T = 19.2	sp. gr. 2.0270 @ 26°	T = 19.2	sp. gr. 2.0313
N = 146.7g	sp. away = 4.98%	N = 140.4g	Density = 2.0270

Samples # 1-A & 2-A held for records.

6-18-65

INSTRUMENT CHECK

55

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	10 3 x 10 ⁻¹²	Meter	1/2"	-	10 x 10 ⁻¹²
	3 x 10 ⁻¹²	Fast	"	-	"
K-2	10 3 x 10 ⁻¹²	Meter	3"	-	"
	3 x 10 ⁻¹²	Fast	"	-	"
R-1					
R-2					
PM-1	700 v	Alarm	cont	-	500 v
PM-2	1200 v	Low	16"	-	900 v
	"	Alarm	2"	-	"

81
12
313
0272

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

3 x 3 array: 9.5" F.D. al cylinders
 { 60.96 cm ~~alt.~~ solution alt.
 29.00" START-UP CHECK LIST

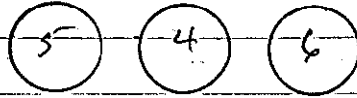
Equipment checked by AKA Personnel check by FIDC
 Instruments and safeties checked and reset by AKA
 Source in checked by AKA Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKA Time 1255
 Start-up OK'd by FIDC AKA Date 6-18-65

Solution Zero in cylinders 1-2-3 = 6.30 cm on
 202 non line: ~ 6.10" on M-4
 Solution alt in cylinders #3 4-5-6-7-8-9 =
 { 60.96 cm.
 29.00" avg.

56
4/18/65

N
↑

Solution 1st in
fixed cylinders
= 20.96 cm.



$\frac{1}{2} \times \frac{5}{8} \times 48''$
wooden spacers
still in at bottom
for final run.

1315 3 X 3 array: 9.5" T.D. AL. cylinders
separation .50"

Feed rate = 1.51 in/min

$\frac{1}{2}$ drain rate = 4.38 in/min

3.0" drain rate = 12.12 in/min

6-21-65 note: Replaced diaphragm in 3.0" drain valve. Drain
rate now = 49.2 in/min

1335 + Per 20.2 (cm) $\Delta h = .25$ cm M-4 in.
65.10 cm 29.33 cm.
 $E = 152.11$ cm = 7.1 ϕ = 28.4 ϕ /cm

1345 64.85 cm $\phi/h = 58.55$ cm, $\delta = 9$ in
= 23.05"
hepton just critical.
Drain. (Per ϕ/h at .50" = 23.85")
solution P. Page 71

6/21/65

57

INSTRUMENT CHECK

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

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

3X3 array: as shown on page 56.

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-43

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

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

Red light on by AKM Time 1245

Start-up OK'd by F.D.C. AKM Date 6-21-65

Purpose is to check critical re without 1/2" x 5/8" x 9' wooden spars in.

1335

(1) 202 (cm) Δ 42.40 cm 12-2 (in)

+ Rev 65280 29.64"

$E = 108.65 \text{ m} = 9.3\% = 23.25 \text{ ft/cm}$ cov.

58
6/21/65

1343

202 (cm) $eff_h = 59.10 \text{ cm} \checkmark$
 65.40 cm $eff_h = 23.27 \text{ ft}$

14-8"

29.51

System just critical.
 Drain.

1450

(2) 202 (cm) $dh = .30 \text{ cm} \checkmark$
 + Per 65.80
 $E = 102.13 \text{ cm} = 9.74 = 52.34 \text{ ft}$

M-F in

29.62

1504

65.50 (cm) $eff_h = 59.20 \text{ cm} \checkmark$
 $dh = 23.30 \text{ ft}$

29.48" ?

System just critical.
 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-13	10^{-12}	Meter <input checked="" type="checkbox"/>	3"	<input checked="" type="checkbox"/>	10×10^{-12}
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	Cont	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Low <input checked="" type="checkbox"/>	16"	<input checked="" type="checkbox"/>	900V
"	"	Alarm <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	"
LOG-N-CALIBRATE		<input checked="" type="checkbox"/>	SOURCE No.		B-80
DUMP-WELL-PROBE-LIGHT		<input checked="" type="checkbox"/>			

6/22/65

59

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.D.C.Instruments and safeties checked and reset by AKMSource in checked by AKM Source No. M-43Emergency equipment in control room checked by F.D.C.Instruments in trip circuit: K-1-2 PM-1-2Red light on by AKM Time 1450Start-up OK'd by F.D.C. AKM Date 6-22-65

added ~~2.0~~ 2.0" x ~6.2" x 8.0" of fir wood floor under array. Purpose is to make smooth floor in park in order to see con supports stands. The ~~array~~ bottom of array is ~27.76" away from floor.

Solution Zero in cylinders 1-2-3 = 6.30 cm.

1533 + Per 65, 20 cm $2h = 12.5$ cm $M-4$ (in) 29.37
 $C = 127.47$ m = 8.14 = 32.44/cm

1543 64.95 cm $chl = 54.65$ cm $qk = 23.09$ 29.25"
 System just critical!
 Drain.

60

6-24-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	3"	✓	
"	"	Fast ✓	"	✓	
K-2	"	Meter ✓	Cont	✓	
"	"	Fast ✓	"	✓	
R-1					
R-2					
PM-1	7000	Alarm ✓	Cont	✓	
PM-2	12000	Low ✓	14"	✓	
"	"	Alarm ✓	1"	✓	
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT		✓			

3 X 3 array, 500" separation (al-al)

START-UP CHECK LIST

Equipment checked by AKM Personnel check by IIRCInstruments and safeties checked and reset by AKMSource in checked by AKM Source No. M-93Emergency equipment in control room checked by IIRCInstruments in trip circuit: K-1-2 PM-1-2Red light on by AKM Time 1345Start-up OK'd by IIRC AKM Date 6-24-65

added 2 - 1/8" X 4.0' X 8.0' sheets of al on top of wood floor under array. (Purpose to give better support for low mass support stands. Bottom of array ~ 27 1/8" away from floor.)

6/24/65

61

Solution Flow in cylinders 1-2-3 = 6.80 cm:

Cylinders 4, 5, 6, 7, 8, 9 are fixed in ht = 29.00"

Array still on 9.0" channels:

Now have two thermocouples #^s 1 & 2 in remote filled vessel #2, #1 at bottom, and #2 about 20" up from bottom. Thermocouple #6 is air temp in Room 201.

1523 (1) 20.2 (cm) M-4 in-1
 + Per 65.60 cm, $\Delta h = .40$ cm 29.5?
 $\bar{v} = 83.29$ m = 11.4 ft = 28.50 ft/min ✓

1535 65.20 cm. $\Delta h = 56.40$ cm ✓
 $\bar{v} = 22.99$ " ?

System just critical:

Temp #1 = 24.0°C #2 = 24.3°C #6 = 27.5°C

1535 Drained ~ 3.0 cm

1540 (2) 20.2 (cm) $\Delta h = .35$ cm M-4
 + Per 65.60 cm. out?
 $\bar{v} = 89.10$ m = 10.84 ft = 30.89 ft/min ✓

1550 65.25 cm. $\Delta h = 58.45$ cm ✓
 $\bar{v} = 23.01$ " ?

System just critical.

Temp #1 = 24.2°C #2 = 24.5°C #6 = 26.5°C

Drain.

62

6-28-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE D. REFERENCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter ✓	3"	-	10X10 ⁻¹²
"	"	" ✓	"	-	"
K-2	"	Meter ✓	3"	-	"
"	"	" ✓	"	-	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	-	500V
PM-2	1200V	Low ✓	19"	-	900V
"	"	Alarm ✓	1"	-	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

Equipment checked by AKH Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 M-1-2
 Red light on by AKH Time 1500
 Start-up OK'd by F.D.C. AKH Date 6-28-65

Solutions Feasible:
 202 (cm)
 6.50 cm

64-9 mi.
 6.09"

154
 155

6-28-65

Same array of channels on page 56. Except that 4" al channel remained and cylinders are now on con supports. Con supports are made from al tubing same as cylinders. 9 3/4" O.D. 9 1/2" I.D. 27 7/8" high.

(1)	202 (cm)	$D_h = 1.35 \text{ cm}$	M-4 (in)
1540	+ Per 65.30 cm		29.30"
	$S = 114.08 \text{ cm}$	$w = 8.9 \text{ ft}$	$= 25.45 \text{ ft/cm}$

		$D_h = 58.25 \text{ cm} \checkmark$	
1555	64.95 cm		29.19"

Hydrogen just critical,
Temp number out.

64

6-29-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter	3"	✓	10 X 10 ⁻¹²
"	"	Fast	"	✓	"
K-2	"	Meter	cont	✓	"
"	"	Test	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm	cont	✓	500V
PM-2	1200V	Low	14"	✓	900V
"	"	Alarm	1"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-93
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0840
 Start-up OK'd by F.D.C. AKH Date 6-29-65

Report of 6-28-65. 3 X 3 array on con supports
 spacing = .500" sl-sl.
 saturation zero: 202 (cm)
 6.50 cm.

6/29/65

65

(1) 20 cc cm) $\Delta h = .25 \text{ cm}$ $M = 2 \text{ (min)}$
 0918 + Pen 65.75 cm $29.51''$
 $\Sigma = 151.02 \text{ sec} = 7.1 \phi = 26.2 \phi / \text{cm}$

0930 65.50 cm $\Delta h = 59.00 \text{ cm}$ $29.9''$
 hepten just critical. Temp #1 = 24.5° 2 = 25.0°
 Drain ~ 1.0" $\#6 = 27.5^\circ \text{ (air)}$

(2)
 0935 + Pen 65.90 cm $\Delta h = .40 \text{ cm}$ $29.57''$
 $\Sigma = 103.22 \text{ sec} = 9.1 \phi = 24.0 \phi / \text{cm}$

0945 65.50 cm $\Delta h = 59.00 \text{ cm}$ $29.92''$
 hepten just critical: #1 = 24.5° #2 = 25.0°
 $\#6 = 27.50$
 Drain:

6-30-65 Cylinders #5 4-5-6 filled to 148.75 cm - 6.50 (zero)
 = 142.25 cm. 56.0" (See page 54 for analysis)

7-1-65 added ~ 150 l of solution to manifold, mixed
 ~ 30 mins 4 samples taken. Cylinders #7-8-9
 filled to 148.65 - 6.40 (zero) = 142.25 cm. 56.0"

over:

Sample #1 sent to X-12; #2 sent to X-10. 1-A & 2-A held for recheck.

#1 Reg # 689488

#2 A-610

#1

orb for.

#2

C = 150.0g

1 - $g/g = 4.47400$

C = 149.4g

1 - $g/g = 4.4595$

T = 19.3

2 - $sp. gr. = 2.0197$

T = 17.8

2 - $sp. gr. = 2.0332$

H = 130.7g

3 - $sp. gr. \checkmark$

H = 131.6

3 - $density = 2.0291$

4 - $avg. 4.95$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE	
K-1	3×10^{-12}	✓	3"	✓	10×10^{-12}	
"	"	✓	"	✓	"	
K-2	"	Meter ✓	"	✓	"	
"	"	✓	"	✓	"	
R-1						
R-2						
PM-1	700v	Alarm ✓	cont	✓	500v	
PM-2	1200v	✓	14"	✓	900v	
"	"	✓	1"	✓	"	
LOG N CALIBRATE		✓	OPERATE		✓	SOURCE No. B-80
DUMP WELL-PROBE-LIGHT		✓				

7/1/65

3 x 3 array: 56" height.
Separation = 2.2" al-al.

67

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKV

Source in checked by AKV 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 AKV Time 1255

Start-up OK'd by F.D.C AKV Date 7-1-65

(On al channel)

Solution Flow: (cylinder # 1-2-3)

202 (cm)

M-4 (in)

6.30 cm.

6.03

(1)

202 (cm)

$2h = 1.40 \text{ cm.}$

M-4 (in)

1415

+ Per

150.70 cm

63.01

$5 = 256.41 \text{ cm} = 4.5 \text{ ft} = 3.74 / \text{cm.}$

$C/h = 143.00 \text{ cm}$

1426

149.30 cm.

62.47"

System just critical.

Drain.

#1 = 25.5°C #2 = 26.0 #6 (air) 28.0°C

7/2/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SET	START-UP RANGE
K-1	3x10 ⁻¹²	Meter ✓ Fast ✓	3"	✓	10x10 ⁻¹²
K-2	3x10 ⁻¹²	Meter ✓ Fast ✓	3"	✓	10x10 ⁻¹²
R-1	—	—	—	—	—
R-2	—	—	—	—	—
PM-1	700V	Alarm	Contact	✓	500V
PM-2	1200V	Low Alarm	14"	✓	900V
LOG IN CALIBRATION		✓	OPERATE	✓	SOURCE No. B-80
DUMP W/FLYBACK CIRCUIT		✓			

START-UP CHECK LIST

Equipment checked by IDC Personnel check by IDC
 Instruments and safeties checked and reset by EJ
 Source in checked by EJ Source No. M-43
 Emergency equipment in control room checked by IDC
 Instruments in trip-circuit: K-1, K-2, PM-1, PM-2
 Red light on by EJ Time 0945
 Start-up OK'd by IDC, EJ Date 7/2/65

Repeat of critical of 7/1/65. 9 minutes in. High
 on oil channel. $\epsilon = 200.76 \text{ cm} = 4.44 = 2.84 \text{ cm}$
 + Period M-4: 62.73 in. $\Delta h = 1.25 \text{ cm}$ $202 = 150.50 \text{ cm}$
 Critical 62.25 in. $H_c = 142.5 \text{ cm} = 148.8 \text{ cm}$
 Thermocouples: #1 = 251.0, #2 = 251.5, #6 (air) = 28.0 °C
 Drain

1113
1125

7/9/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	3"	✓	10 X 10 ⁻¹²
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	3"	✓	"
	"	Fast ✓	"	✓	"

R-1

R-2

PM-1 700V Alarm ✓ cont ✓ 500V

PM-2 1200V Low ✓ 14" ✓ 900V

" Alarm ✓ 1" ✓ "

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

DUMP WELL PROBE LIGHT ✓

56" ht 3x3 array on con supports. separations = 2.2"
START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-43

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

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

Red light on by AKM Time 0815

Start-up OK'd by F.D.C. AKM Date 7-9-65

Solution Zero

0.02 (cm)
6.30 cm

M-4 (in)
6.03"

over.

0.929 (1) 202 (cm) $D_h = 1.2$ cm. M-4
 + Per 148.0 61.86"
 $t = 245.55$ sec = 4.76 = 3.9 f/cm.

0.947 146.80 cm $D_h = 140.50$ cm. 61.45
 hyper joint critical. Temp: #1 = 25.0°
 Drain. #2 = 25.5°
 #3 = 26.5° (air)

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	3"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	14"	✓	500V
PM-2	200V	Low ✓	1"	✓	9.00V
	1200V	Alarm ✓	Cont	✓	"
LOG N CAL. CRATE		✓	OPERATE	✓	SOURCE No. <u>M-43</u>
DUMP WELL PROBE LIC		✓			<u>B-80</u>

7-15-65

50" HT; 3 X 3 array;

71

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

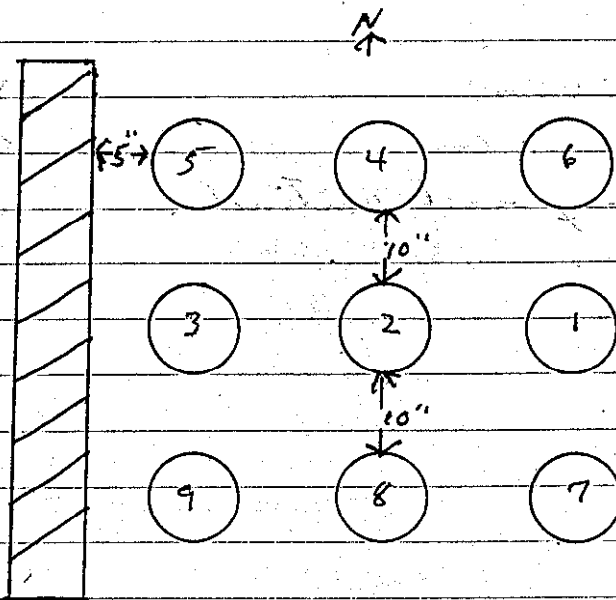
Instruments in trip circuit: K-1-2 PM-2

Red light on by AKH Time 10:15

Start-up OK'd by F.P.C. AKH Date 7-15-65

Solution Zero:

20.2 (cm)	M-9 (in.)
6.50 cm	6.13



10:30 Purpose is to establish critical separation with 6" reflector on four sides of array shown above:

ovs.

7/16/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	10×10^{-12}
"	"	Fast	"	✓	"
K-2	"	Meter ✓	3"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	14"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source-in checked by AKK Source No. 19-43

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

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

Red light on by AKK Time 0540

Start-up OK'd by F.I.D.C. AKK Date 7-16-65

AKK

0845 added nepluton to north face of array.
 Now have nepluton on three faces of array.

0955 202 (cm) M-4
 148.80 02.11
 System very sub critical.
 Down.

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 ✓	3"	-	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	900V	Alarm ✓	cont	-	500V
PM-2	1200V	Low ✓	14"	-	900V
"	"	Alarm ✓	1"	-	"
LOG - CALIBRATE		✓	OPERATE	✓	SOURCE No. 0-80
DUMP WELL PROBE LIGHT					

7-20-65

75

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.D.C.
 Instruments and Safeties checked and reset by AKM
 Source in checked by AKM Source No. M-1-2
 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 1035
 Start-up OK'd by F.D.C. AKM Date 7-20-65

Same array as shown on page 71. Now have
 6" reflector on three faces; plus 2 pcs of 1"
 fiber (one 45" x 72" + one 37" x 72") centered
 north & south in array. Separation of units
 = 10.0"

202 (cm) M-2 (in)
 134.60 56.70"
 1136 System very sub critical
 Drain:

1300 added reflector (6") to north face; now
 have four faces reflected + 2 pcs fiber
 as described above:

202 (cm) M-2 (in)
 136.00 cm. 57.17"
 System very sub critical. No multiplication
 on start-up range.
 Drain:

76
9/23/65

2/6

DUMP WELL PROBE LIGHT

LOG N CALIBRATE

OPERATE

SOURCE No. _____

Alarm

Low

Alarm

R-2

R-1

F-1

F-2

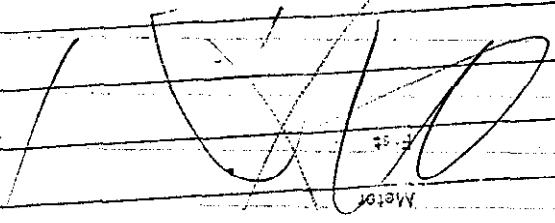
Meter

K-2

Fast

Meter

K-1



INSTRUMENT CHECK

INSTRUMENT RANGE TRIP SOURCE DISTANCE SET START-UP RANGE

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 ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. 15-80

DUMP WELL PROBE LIGHT

7/23/65

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FID.C

Instruments and safeties checked and reset by AKM.

Source in checked by AKM Source No. M-43

Emergency equipment in control room checked by FID.C

Instruments in trip circuit: K-1-2 P19-1-2

Red light on by AKM Time 12:30

Start-up OK'd by FID.C AKM Date 7-23-65

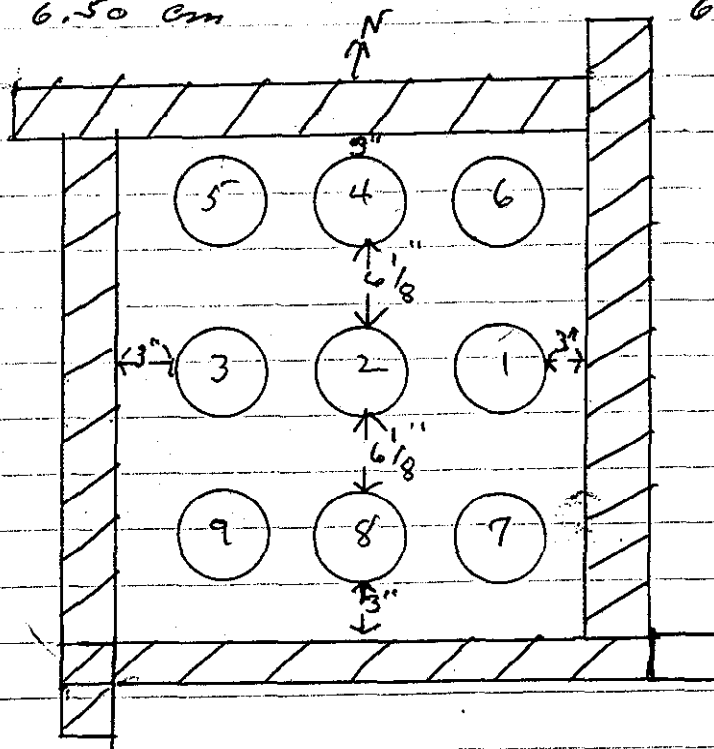
Solution Zero:

202 (cm)

M-4 (in)

6.50 cm

6.13"



12:30 3x3 array at 56" solution ht. fully reflected on four faces as shown above.

202 (cm)

M-4 in.

149.0 cm.

62.33"

13:45 system very sub critical.
Over:

8-2-65 Sent 2 solution samples to Y-12. There are
 methyl sample. #2 taken 4-20-65 & #2-A
 taken 7-1-65. Also ask for complete assay
 for J.T.T.

#2 Reg # 684489

G = 165.5g

T = 19.3

N = 146.2

ask for

1 = $g/g = .448090$

2 = sp. gr. = 2.0259 at 25°C

3 = complete assay = X = 4.97

4 = spec = see file

#2-A 684490

G = 142.3

T = 18.5

N = 123.8

ask for

1. $g/g = .448020$

2. sp. gr. = 2.0241 at 25°C

3. Complete assay X = 4.97

4. spec see file.

8/2/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter <input type="checkbox"/>	1"	<input type="checkbox"/>	10×10^{-12}
"	"	Fest <input checked="" type="checkbox"/>	1"	<input type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	1"	<input type="checkbox"/>	"
"	"	Fest <input checked="" type="checkbox"/>	1"	<input type="checkbox"/>	"
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	cont	<input type="checkbox"/>	500V
PM-2	1200V	Low <input checked="" type="checkbox"/>	14"	<input type="checkbox"/>	900V
"	"	Alarm <input checked="" type="checkbox"/>	2"	<input type="checkbox"/>	"
LOG N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. B-80	
DUMP WELL PROBE LIGHT <input checked="" type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.I.D.C
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-93
 Emergency equipment in control room checked by F.I.D.C
 Instruments in trip circuit: K-1 K-2 PM-1-2
 Red light on by AKM Time 1445
 Start-up OK'd by F.I.D.C AKM Date 8-2-65

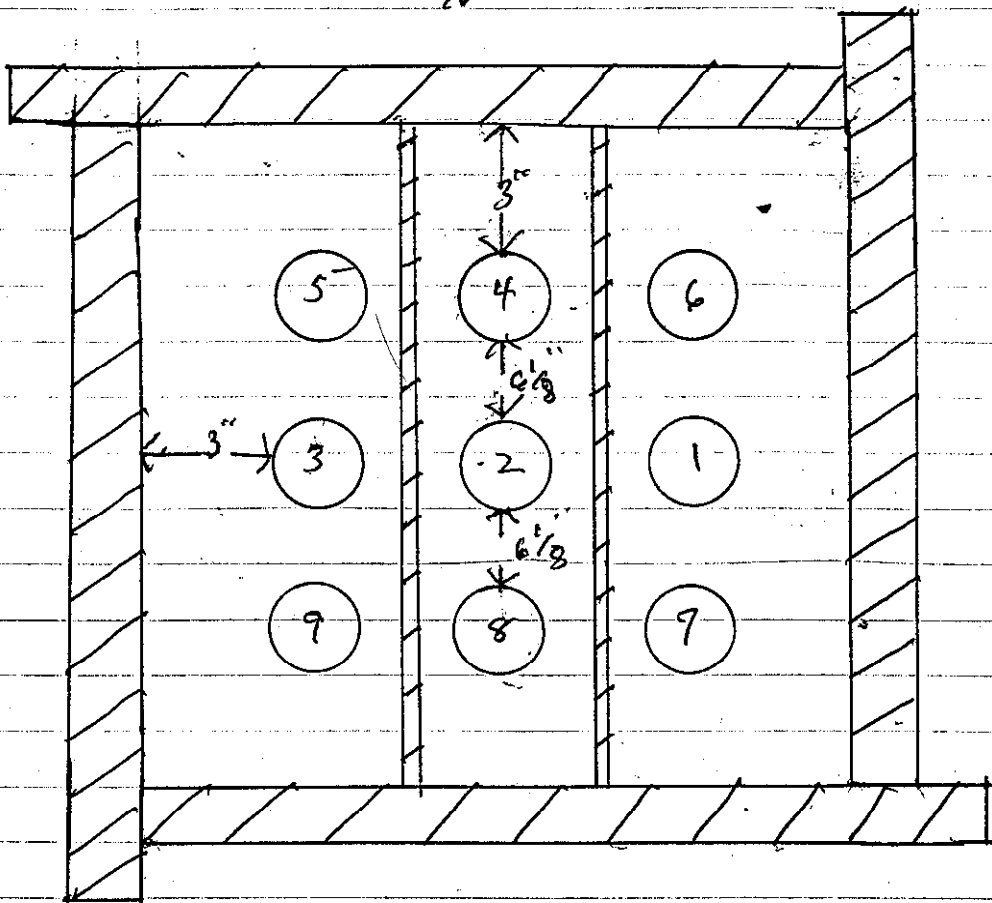
Solution Zero

202 (cm)
6.50 cm.

19-8 (in)
6.13"

over.

890
8/2/65



Added 3 sheets of pleiglass $\frac{1}{4}$ " x 62" x 47.625"
as shown above. ~~Two~~ Pleiglass centered
between rows.

1547

202 (cm)

M - 9" in

149.10 cm

62.27"

system very sub critical:

Drain:

$$K-1 = 20\% \cdot 10 \times 10^{-12}$$

$$K-2 = 22\% \cdot 10 \times 10^{-12}$$

INSTRUMENT CHECK

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

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

DUMP WELL PROBE LIGHT ✓

START-UP-CHECK-LIST

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

Instruments and safeties checked and reset by AKA

Source in checked by AKA Source No. M-43

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

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

Red light on by AKA Time 1057

Start-up OK'd by E.D.C. AKA Date 8-4-65

Solution Fro
202 (cm)
6.50 cm

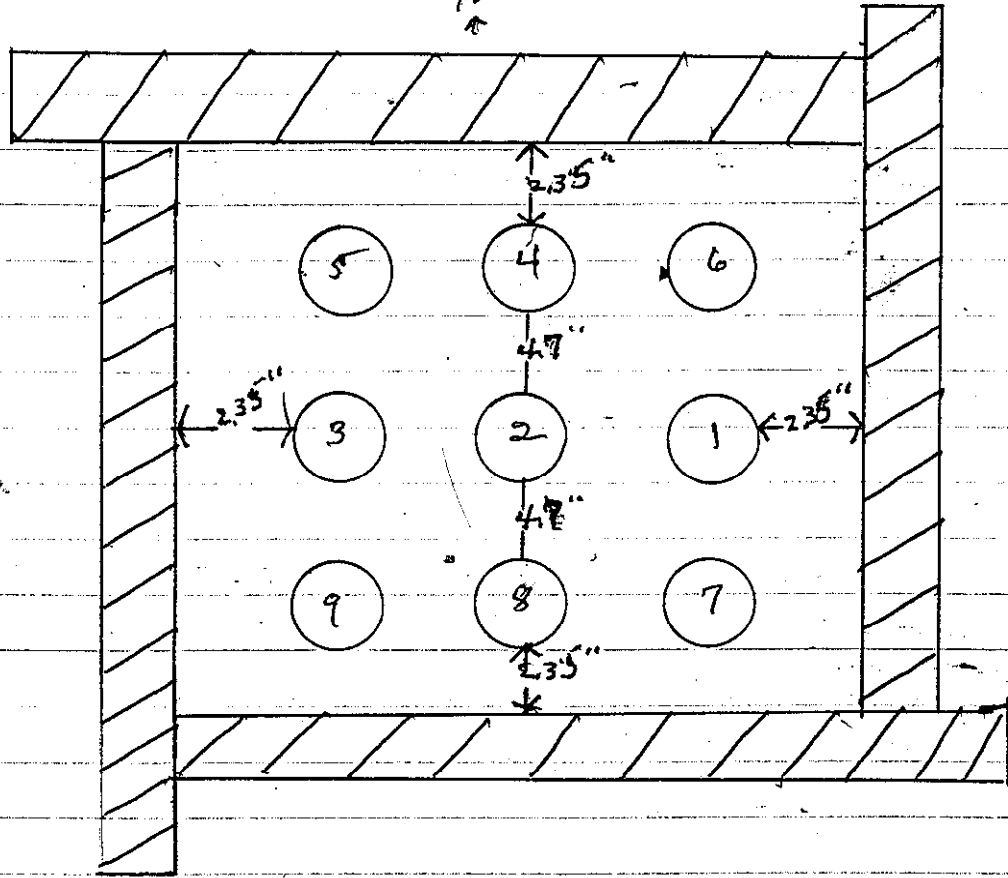
M-43
6.13"

over

5"
Tend

-12
-12

82
8/7/65



Separation of units 4.7" Reflector: 2.35"
from array.

1157 (1) 802 (cm) $D_h = 1.90 \text{ cm}$ $M - P \text{ in}$
 $T_{ref} \quad 141.00 \text{ cm} \quad 59.07''$
 $C = 80.40 \text{ cm} = 11.678 \phi = 6.15 \phi / \text{cm}$

1204 139.10 cm $d/L = 132.60 \text{ cm}$
 $= 52.20''$ $58.29''$

Septens just criticals

8-9-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter ✓	1"	✓	10X10 ⁻¹²
"	"	Fast ✓	"	-	"
K-2	"	Meter ✓	1"	✓	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	1"	✓	"
LOG IN CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT		✓			

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

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

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

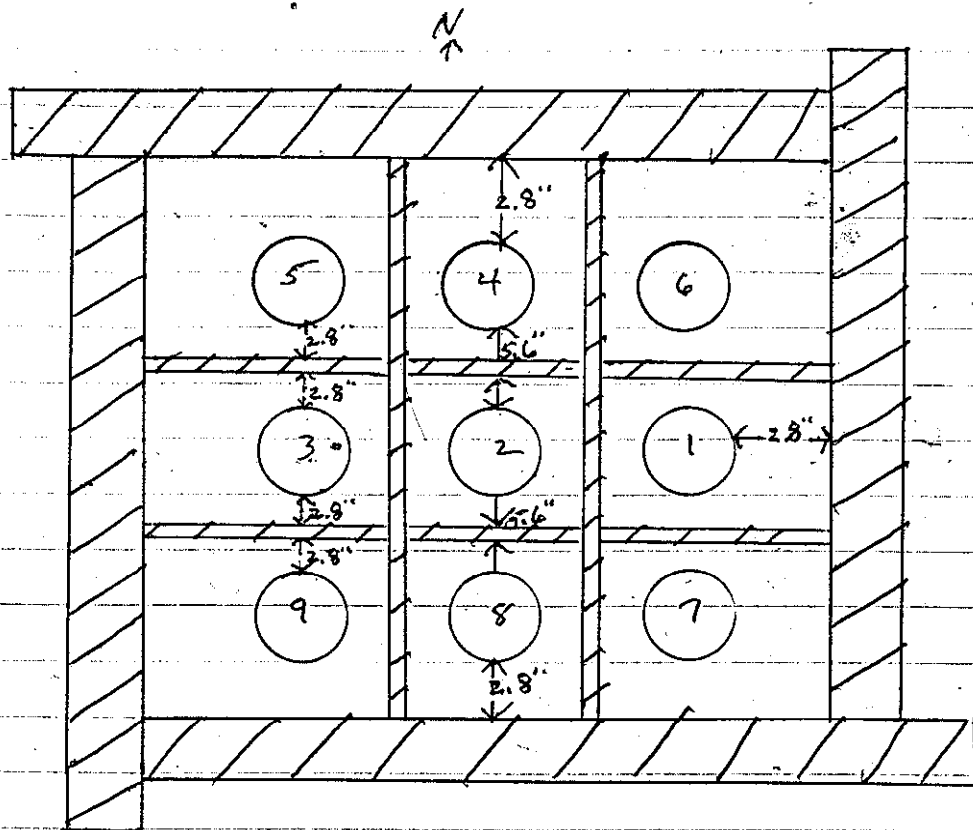
Red light on by AKH Time 1332

Start-up OK'd by F.I.C. AKH Date 8-9-65

Solution Zero
20.2 (cm)
6.50 cm

M-43
6.13" in
avg.

8A
8/9/65



3x3 array with $\frac{3}{4}$ " thick plexiglass moderator + 6" polyethylene reflector, unit separation = 5.6" reflector + moderator equally spaced (2.8")

1440 + Per $\frac{202(\text{cm})}{153.30 \text{ cm}} \quad \delta h = 1.30 \text{ cm} \quad M = 9(\text{in})$
 $\tau = 278.14 \text{ sec} = 4.24 = 3.24/\text{cm} \quad 64.20 \text{ ''}$

1450 } System just critical.
 $\frac{202(\text{cm})}{152.00 \text{ cm}} \quad \delta h = 145.50 \text{ cm} \quad M = 9 \text{ in}$
 $= 57.28 \text{ ''} \quad 64.19 \text{ ''} ??$

Draw.

8-11-65

INSTRUMENT CHECK

85

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-43

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

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

Red light on by AKK Time 0810

Start-up OK'd by F.D.C. AKK Date 8-11-65

Solution Zero

2.02 cm

6.50 cm

M.F. (in)

6.13"

over

rotor
2.6"
8")
)

??

88015

added four ^{Pieces} of 1" plexiglass which makes an egg crater ⁴ around # 2 cylinder no other change in array. See page 84 for diagram.

0920

202 (cm) $\frac{4}{h} = 149.75 \text{ cm}$
 $= 58.96 \text{ in.}$

M-4 (in)
 65.19"

System sub critical.

-Per $t = -208.61 \text{ sec} = 7.7 \text{ f}$

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	1"	✓	10 x 10 ⁻¹²
	"	Fast ✓	"	✓	"
	"	Meter ✓	1"	✓	"
	"	Fast ✓	"	✓	"
P-1					
	700v	Alarm ✓	cont	✓	500v
P-2	1200v	Low ✓	14"	✓	900v
	"	Alarm ✓	2"	✓	"
LOG N CALIBRATE		OPERATE		SOURCE No. 13-80	
DUMP WELL PROBE LIGHT					

8-13-65

START-UP CHECK LIST

Equipment checked by AKN Personnel check by F.P.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 F.P.C
 Instruments in trip circuit: K-1-2 DM-1-2
 Red light on by AKN Time 1035
 Start-up OK'd by F.P.C. AKN Date: 8-13-65

Same array as shown on page 94. Except separation now = 5.3" - Moderator = 3/4"

Solution Zero

202 (cm)	M-9 (in)
6.50	6.13"

(1)	202 (cm) $\Delta L = 6.10 \text{ cm}$	M-9 in
112.5	+ p.w. 132.00	55.63"
	$\Sigma = 137.07 \text{ cm} = 7.7\% = 1.0 \text{ ft/cm}$	

	$q_{1/2} = 124.40 \text{ cm}$	
1136	130.90 cm = 48.98 cm	55.17"

System just critical.
Drain:

Temp # 1 = 29.2°
 2 = 29.5°
 6 (in) = 27.5°

also:

88-13-65

1455 Same array and spacing. Reduced moderator thickness to 1/2" in.

1537 $\lambda = 202 \text{ (cm)}$ $D_h = 1.10 \text{ cm}$ $M - 9 \text{ (in.)}$
+ Per 131.40 $55.92''$
 $\sigma = 127.12 \mu = 8.2 \phi = 7.4 \phi / \text{cm}$

1546 130.30 cm $\lambda/L = 123.80 \text{ cm}$ $48.74''$ $54.94''$

System just critical.
Drain:

Temp #1 = 29.7°C
 $\lambda = 25.0 \text{ cm}$
G (in) 27.5°C

8-16-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	1"	✓	"

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

START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.P.C.
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-93
 Emergency equipment in control room checked by F.P.C.
 Instruments in TRP circuit: K-1-2 PM-1-2
 Red light on by AKM Time 1030
 Start-up OK'd by F.P.C. AKM Date 8-16-65

Some error as shown on page 89. Separation = 5.3". Moderator = 14."

Solution Zero
 202 (cm)
 6.50 cm

M-F
 Co. 13"

8-16-65

5.087/20

8/17/6

1127 (1) 202 (cm) $\Delta h = 1.45 \text{ cm}$ 17-4 (in)
 + Press 145.45 cm. 60.90
 $\bar{v} = 161.89 \text{ cm} = 6.74 = 4.62 \text{ ft/cm}$

1138 144.00 cm $\frac{v}{h} = 137.50 \text{ cm}$
 $= 54.13''$ 60.28''

System just critical

Drain.

Temp. #1 = 24.5°C

2 = 25.0°C

6 (air) = 27.5°C

1440 Now have 3/4" moderator in array. Purpose is to reach critical point.

1520 (2) 202 (cm) $\Delta h = .70 \text{ cm}$ 17-4 (in)
 + Press 132.80 cm. 55.91''
 $\bar{v} = 280.32 \text{ cm} = 4.14 = 5.86 \text{ ft/cm}$

1535 132.10 cm $\frac{v}{h} = 125.60 \text{ cm}$
 $= 49.45''$ 55.67''

System just critical.

Drain.

Temp. #1 = 25.0°C

2 = 25.5°C

6 (air) = 27.5°C

8/17/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	"
	"	Fast ✓	"	✓	"

R-1

R-2

PM-1 700V Alarm ✓ cont ✓ 500V

PM-2 1200V Low ✓ 10" ✓ 900V

" Alarm ✓ 1" ✓ "

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

START-UP CHECK LIST

Equipment checked by RAK Personnel check by TIDC

Instruments and safeties checked and reset by RAK

Source in checked by RAK Source No. M-43

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

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

Red light on by RAK Time 1400

Start-up OK'd by TIDC RAK Date 8-17-65

Same array as shown on page 89. Repeneration = 5.3". Moderator thickness = 1.0"

Solution Zero.

202 (cm)

6.50 cm

M-8 min.

6.13 "

avg.

92
8/17/65

(1) 202 (cm) $\Delta h = 1.0 \text{ cm}$

M-4 (in) 11
60.44
60.46

1450 + Pen 144.25 = 4.64/cm
 $\bar{v} = 248.81 \text{ cm} = 4.64 = 4.64$
 $q_h = 136.75 \text{ cm}$

~~1505~~
~~1505~~ Critical 143.25 cm. = 53.84" ... 60.23 in

1510 Drumm

1505 Temp #1: 24.7 °C
#2: 25.0
#6: 27.0

8/23/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter	3.5"	-	10 X 10 ⁻¹²
"	"	Fast	"	-	"
K-2	3 X 10 ⁻¹²	Meter	3.0"	-	"
"	"	Fast	3.0"	-	"

R-1

R-2

PM-1	700V	Alarm	cont	-	500V
PM-2	1200V	Low	19"	-	900V
"	"	Alarm	1"	-	"

LOG N CALIBRATE

OPERATE

SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-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 AKM Time 0900

Start-up OK'd by F.P.C AKM Date 8-23-65

Solutions Zero:

202 (cm)

6.75 cm

M-8 (in)

6.20"

o.c.w.

94
8/23/65

8/2

Same array as shown on page 84. Put, 1 - no
reflector or moderator. 2 - ~~no~~ no bottom
support. Separation of units = 2.20" in. array
= 27 7/8" from floor.

1005 ~~Solution~~ ~~ht~~ =

202 (cm) $g_h = 149.55 \text{ cm}$ 19 - 4 in.
156:30 = 58.87 65.22" in.

Kepton joint critical.
Hot cell solution running over top of 3 remote
filled cylinders.
Drain: Temp #1 = 25.0 °C
#2 = 25.5 °C

8-24-65

1455 Residuals of zero after run & clean up of above
experiment.

202 (cm) 19 - 4 in.
6.40 cm 6.07" in.

∴ The g_h for the above experiment should read
149.90 cm. ~~149.90 cm~~ or ~~59.02~~ 59.02" in. This difference in
zero must be due to stretch or give in
cables which now hold array. Also
some additional stretch when the 3 remote units
are full.

9/25/65

INSTRUMENT CHECK

95

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	3"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	1"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT		✓			

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FID.C

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-43

Emergency equipment in control room checked by FID.C

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

Red light on by AKM Time 1005

Start-up OK'd by FID.C AKM Date 9-25-65

Purpose is to try to manure - Per with unit at 56.0" ht. Survey is described on top of page 94. Also have scope mounted to check stretch in cables.

ack

96

8/25/65

Solutions & slope zero's.

		M-4 (in)	Slope (cm)
1030	202 (cm) 7.80 cm	6.60 "	5.0 cm

1050	44.20	20.99 "	5.12 cm
------	-------	---------	---------

1100	68.95	30.74 "	5.20 cm
------	-------	---------	---------

1109	95.80	41.29 "	5.30 cm
------	-------	---------	---------

1116	119.10	50.53 "	5.38 cm
------	--------	---------	---------

1122	133.00	56.10 "	5.40 cm
------	--------	---------	---------

1137	150.10	62.75 "	5.50
------	--------	---------	------

+ Per with same in +112.1" x 2.1" plunger reflector
near top of one face.

1145	149.60 cm	62.55 "	5.50
------	-----------	---------	------

(1) + Per with plunger reflector: same alt.
 $E = 374.84 \text{ m} = 3.24$

1209	Remained reflector		
------	--------------------	--	--

- Per
 $E = 85.83 \text{ m}$

1218	Drain!		
------	--------	--	--

1330	Recheck of solutions & slope zero's after run above.		
------	---	--	--

8/25/65

97

202 (cm)

M-4 in.

leg (cm)

7.60 cm

6.52"

5.15 cm

1350 added 4" d channel (3 pc. + 3 pc.) under array: Purpose to reach critical pt as shown on page 67-68.

Isolation & ripple zero:

202 (cm)

M-4 in

leg.

7.70

6.58

5.0 cm

1433

120.00 cm

51.04"

5.30 cm

1500

(1) 154.25 cm
- Per.

4% = 126.95 cm
= 57.45"

64.40"

5.40 cm

Temp #1 = 25.5°

2 = 26.0°

3 = 26.5°

1503

Put source in to increase power level in order to better measure - Per.

1505

Same set; kept sub critical
- Per

 $\sigma = 265.10 \text{ m} = 5.8 \text{ f.}$

Temp #1 = 25.5°

2 = 26.0°

3 = 25.5°

1509

Diam.

8/26/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	3"	✓	10 x 10 ⁻¹²
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	3"	✓	"
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
	"	Alarm ✓	1"	✓	"

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

START-UP CHECK LIST

Equipment checked by AKV Personnel check by FID.C
 Instruments and safeties checked and reset by AKV
 Source in checked by AKV Source No. M-93
 Emergency equipment in control room checked by FID.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKV Time 0805
 Start-up OK'd by FID.C AKV Date 8-20-65

Solution Zero.

202 (cm) hope M-93
 6.65 cm 5.0cm. 6.17

AKV

8/26/65

58

1500 Removed 4.0" of channel; now on slings + 1" x 2" x 2" reflector.

Calculation zero

202 (cm)	height (cm)	M - 4 in
7.60	5.0	6.48

1555

155.30 cm.

$\frac{4}{5} = 148.20 \text{ cm}$ (corr for 4.0")
 $58.35"$
 5.5 cm

64.83

+ Per with reflector.

$\frac{5.084}{0.2} (2) = 5.35 \text{ cm}$ Temp $\mu = 26.0^\circ$
 1.5 ft/cm $148.20 - 5.35 =$ $\mu = 26.5^\circ$
 $H = 142.85 \text{ cm}$ (Temp μ). $\mu = 26.0^\circ$

1606

Removed reflector.

4 - Per

$\mu = -169.50 \text{ cm} = 70.6 \text{ ft}$ in channel + Temp Cal (p. 100)
 is with this.

(Reactivity decreases when Cal not removed.)

3000

102
8/30/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter -	3"	-	10 x 10 ⁻¹²
"	"	Fast ✓	"	-	"
K-2	"	Meter ✓	"	-	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700V	Alarm -	cont	-	500V
PM-2	1200V	Low -	14"	-	900V
"	"	Alarm ✓	1"	-	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-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 RKH Time 12:10

Start-up OK'd by F.D.C RKH Date 8-30-65

Solution & scope zero

702 (cm) Scope (cm) 19-4 in

8.60 cm 5.0 cm 6.90"

8/30/65

103

3x3 array. Mounted on slings. Now have a 22" x 44" x 44" polyethylene reflector which is 6.5" from bottom of array. Separation of units = 2.2" ϕ

(1) $202 \text{ (cm)} - 24 = 90 \text{ cm}$ $h_{\text{opt}} \text{ (cm)}$ $14.9''$
 1305 + $P_{\text{ref}} 149.90 \text{ cm}$ 5.40 cm $62.66''$
 $\sigma = 358.55 \text{ sec} = 3.3\%$ $= 3.66 \%$

1324 149.00 cm 5.40 cm $62.33''$

System just critical. $h_c = 140.80 \text{ cm}$
 $= 55.43''$

1325 D_{min} T_{avg}
 $\#1 = 25.0^\circ\text{C}$
 $\#2 = 25.5^\circ\text{C}$
 $\#6 = 26.5^\circ\text{C}$

$$\frac{1^\circ (5.05 \frac{\%}{\text{cm}})}{3.66} = 1.39 \text{ cm}$$

$$140.80 - 1.39 = 139.41 \text{ cm}$$

$$\frac{1.39}{139.41} = 54.89''$$

By comparing the height of 142.85 cm (14.121) at which the array was subcritical by 12.6% with the h_c above of 139.41 cm, $\Delta h = 3.44 \text{ cm} (3.66 \%) = 12.6\% + 10.6\% = 23.2\%$, width of bottom reflector location on above.

1500 Four samples taken from manifold. 1 sent to Y-12 & X-10. Two held for later.

Y-12 Reg # 684491 (#1)

X-10 Reg # A-887 (#2)

G = 162.0 g

G = 161.0 g

T = 18.8

T = 19.0

N = 143.2 g

N = 142.0 g

over.

y-12
obs for:
 1. $g^{1/2} = 1.447640$
 2. *sp. hr. (1 temp) 27.9°*
 3. *sp. hr. = 2.0224 = 4.9*

x-10
obs for
 1 - $g^{1/2} = 1.44499 = 909.85$
 2 - *sp. hr. (2 temp) 2.0334 @ 25°*
 3 - *Density = 2.0293 @ 25°*

Using an average d/d of 6.45 g/cm (3.5 at top ^(52 in.) 5.4 at this h.), the fat midget is worth 6.45 (28 cm) = \$1.81.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	3"	✓	3×10^{-11}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	3"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	10"	✓	900V
	"	Alarm ✓	1"	✓	"
LOG N CALIBRATE		✓	OPERATE		✓
DUMP WELL PROBE LIGHT		✓	SOURCE No.		B-80

8/31/65

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FID.C

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

Emergency equipment in control room checked by FID.C

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

Red light on by AKH Time 0845

Start-up OK'd by FID.C AKH Date 8-31-65

3 x 3 array: mounted on slings. Have a 22" x 44" x 44" polyethylene bottom reflector which is 6.5" from bottom of array. Also have on center of north face a 6" x 16" x 24.750" polyethylene slab (in contact). Separation of units = 2.20"

Solution Zeros. (loop)

20.2 (cm)
4.60

loop (cm)
5.0

M-4 (in.)
6.90"

0936

(11)
+ Rev 123.00 (cm)
C = 243.4 m = 4.74 = 9.4 % cm.

24 = 1.50 cm.

5.3 (cm)

52.06 (in.)

0951

122.50 cm

5.3 (cm)

51.87 in

Kepten just critical.

4/4 = 114.20 cm
= 44.96"

Temp

#1 = 24.7 °

142.22 - 114.20 = 28.02 cm

2 = 25.0 °

28.02 cm x 9.4 % cm = 263.58 d

3 = 27.0 ° air

air

106
8/31/65

1110 Moved 6" x 7.60" x 25.750" polyethylene slab on north face out 6.0" from face.

1150 + Per 202 (cm) $\rho_{1/2}$ slope (cm) 19.2 (in)
 138.40 cm 1.20 cm 5.3 cm 58.17"
 $B = 151.02 \text{ m} = 7.1\% = 5.92\%/\text{cm}$

1200 " 137.20 cm 5.3 cm 57.70"
 System just critical. $\rho_{1/2} = 1.28..90 \text{ cm}$
 Drain = 50.75"
 Temp
 #1 = 25.5°
 2 = 26.0°
 6 = 26.5°

Using average depth of 7.65 ft/cm (from H₂O 1.25 of 9.44/cm and 5.94/cm above), the reactivity lost by moving fast widget out 6 in. was 14.7 cm (7.65) - 1.12. Using depth from 5.5 to 3.54/cm of 4.84/cm, the worth of the plastic to the array is 64%.
 $\therefore 1.12 + 0.64 = 1.76$ fast worth of plastic in contact with array. Cf 4.10% percent note.

9/1/65

INSTRUMENT CHECK

107

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter	3"	-	10×10^{-12}
"	"	Fast	"	-	"
K-2	"	Meter	3"	-	3×10^{-12}
"	"	Fast	"	-	"
R-1					
R-2					
PM-1	700V	Alarm	Cont	-	5000
PM-2	1200V	Low	14"	-	9000
"	"	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 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 PM-1-2

Red light on by RKL Time 0815

Start-up OK'd by F.D.C RKL Date 9-1-65

Selection & scope zero:

202 (cm)
7.20

scope (cm)
5.0

M-4 (in)
6.35

over:

108
9/1/65

9/8

3x3 array mounted on slings. Now have bottom reflector in contact with bottom of array. Have filled in around valve & sparts with small pc of polyethylene & plexiglas.

0914 + Per 20.2 (cm) ρ_b slope (cm) 14.4 (in)
 133.50 cm = 6.20 cm 5.20 cm 56.20"
 $\bar{E} = 165,15 \mu = 6.6 \text{ } \rho = 5.5 \text{ } / \text{cm}$.

0926 132.30 cm 5.20 cm 55.17"

System just critical. $\rho_b = 125.30 \text{ cm}$

Drain. Temp.
 $\frac{508 \text{ } \rho_{\text{max}}}{5.5 \text{ } \rho_{\text{min}}} = .92 \text{ cm} - 125.30 = \rho_b = 124.38 \text{ cm}$.
 $T_1 = 25.0^\circ \text{C}$
 $T_2 = 25.2^\circ \text{C}$
 $T_3 = 26.5^\circ \text{C}$

142.24 124.38 = 17.86 cm short of full 56" being
 "but great" average ρ of 5.5/cm, this is 89.3%.
 Since array now 10.6% subcritical (p. 103), the
 bottom reflector is worth 99.9%.

9/8/65

INSTRUMENT CHECK

109

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	3"	✓	10 X 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	4"	✓	"
"	"	Fast ✓	"	✓	"

R-1

R-2

PM-1

700V

Alarm ✓

Cont ✓

500V

PM-2

1200V

Low ✓

14" ✓

900V

"

Alarm ✓

1" ✓

"

LOG N CALIBRATE ✓

OPERATE ✓

SOURCE-No.

D-80

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

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

Red light on by AKH Time 0840

Start-up OK'd by E.D.C EBT WAKH Date 9-8-65

Solution Feen

2.02 (cm)

6.50"

M-4 (cm)

6.08"

over?

110
9/8/65

3 X 3 array: solution wt = 56.00" in: separation
of units = 3.60". ⁶" Polyethylene reflector on two (2)
faces. (Unit per. came on on page 84.)

1015

202 (cm)

$\frac{1}{4}h = 145.70 \text{ cm}$

M = 4 (in.)

152.20 cm

= 57.36"

63.52"

System sub critical.

Drain:

Temp.

#1 = 25.0°C

2 = 25.5°C

6 = 26.0°C

9/10/65

111

INSTRUMENT CHECK

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

START-UP CHECK LIST

Equipment checked by AKM Personnel check by EID.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 EID.C

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

Red light on by AKM Time 0805

Start-up OK'd by EID.C AKM Date 9-10-65

Same array as described on page 110. Separation
 now = 3.10"
 Solution Zero
 202 (cm)
 6.50 cm.

M-4 in
 6.14"

112
9/10/65

9/13

0910 +Pw 202 (cm) 19-4 in
126.00 cm $h = .70$ cm 53.27
 $\sigma = 181.45 \text{ sec} = 6.14 = 8.74/\text{cm}$

0924 125.30 cm $h = 119.80$ cm 53.01"
system just critical = 46.77"
Drain Temp #1 = 25°C
2 = 25°C
6 = 27°C

1200 Removed south face reflector: now have reflector on west face only. separation still 3.10"

1307 202 (cm) 17-8 in
150.90 cm 63.18"
system very sub critical.
Drain Temp #1 = 25.5°C
2 = 26.0°C
6 = 27.5°C

9/13/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	3"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	4"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	7005	Alarm ✓	cont	✓	5005
PM-2	12005	Low ✓	14"	✓	9005
"	"	Alarm ✓	11"	✓	"

LOG IN CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. M-13

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

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

Red light on by AKM Time 0905

Start-up OK'd by I.D.C. AKM Date 9-13-65

Solution 3.50

202 (Gm)
6.50 cm

M-4 (in)
6.12"

114
9/13/65

Same array as described on page 110. Separation
now = 3.320"

10.25 + Per 202 (cm) $D_4 = .60$ cm M-4
139.90 cm 58.73"
 $\sigma = 322.69 \text{ cm} = 3.64 = 6.0\% \text{ cm.}$

10.42 139.30 cm $\frac{1}{4} = 132.80$ cm
 $= 52.28''$ 58.54"

Heater just critical
Down.

Temp $\alpha_1 = 25.0^\circ$
 $\alpha_2 = 25.5^\circ$
 $\alpha_6 = 27.5^\circ$

9/9/65 Gave to JTT the number of ± 0.03 in. at 0.1 cm
as the accuracy to which ^{grades} spacing within an
array was set. This number reflects the
irregularities in the cylinder surfaces primarily
because the spacers were cut to the value of
 ± 2 mils. Ref: *Sci. J.* #3, p. 62.

0 (1.95) Slugs in feed - 115

9/22/65

INSTRUMENT CHECK

7.2" OD, 2.6" ID
40 in. long

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10 ⁻¹²	Meter ✓ Fast ✓	2"	✓	10x10 ⁻¹²
K-2	3x10 ⁻¹²	Meter ✓ Fast ✓	2"	✓	10x10 ⁻¹²
R-1					
R-2					
PM-1	700 V	Alarm ✓	Contact		500 V
PM-2	1200 V	Low ✓ Alarm ✓	16" 1"		900 V
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT					

START-UP CHECK LIST

Equipment checked by EQ-DC Personnel check by EDC

Instruments and safeties checked and reset by Edwards

Source in checked by EDC Source No. M-40

Emergency equipment in control room checked by EDC

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

Red light on by Edwards Time 0845

Start-up OK'd by DCERR, EQ EDC Date 9/22/65

Distance from bottom of tank to top of grating:
10.5 in.

Distance from top of grating to top of slug:
40.25, 40³/₈, 40.25 in.

Found at top of grating: 0.0 cm one lead metal scale
Array of 25 slugs spaced 2 in. between surfaces

9/22/65

in square pattern. Sams near center slugs,
 Ly N, K1 and K2 on patting at 3 corners.

0940 Water breaking near top of slugs @ 102.2 cm

0945 H_2O at 117.9 cm. Lid appeared (multiplication)

0949 Dump. (See p. 118⁽²⁾ for diagram^A)

9/23/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	Trip	SOURCE	SET	START-UP RANGE
<u>Wiring</u> K-1	10×10^{-12}	Meter <input checked="" type="checkbox"/>	1 ²	<input checked="" type="checkbox"/>	10×10^{-12}
		Test <input checked="" type="checkbox"/>			
K-2	10×10^{-12}	Meter <input checked="" type="checkbox"/>	1 ²	<input checked="" type="checkbox"/>	10×10^{-12}
		Test <input checked="" type="checkbox"/>			
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	Contact	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Low <input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	900V
		Alarm <input checked="" type="checkbox"/>			
LOG N CALIBRATE	<input checked="" type="checkbox"/>	OPERATE	<input checked="" type="checkbox"/>	SOURCE No.	B-80
DUMP WELL PRESS LIGHT	<input checked="" type="checkbox"/>				

Spacing set to 0.5 in. between surfaces
 in square pattern. Any arrangement
 the same as that shown on p. 118⁽²⁾, diagram A.

9/23/65

START-UP CHECK LIST

Equipment checked by EQ DC Personnel check by IDCInstruments and safeties checked and reset by EQSource in checked by DC Source No. M-43Emergency equipment in control room checked by IDCInstruments in trip circuit: K-2, PM-1Red light on by EQ Time 1515Start-up list by DC, EQ, IDC Date 9/23/65 $Z_{rod} = 0.2 \text{ cm on metal track scale}$ 1550 H_{rod} at 79.8 cm. + period1555 H_{rod} at 79.55 cm. Critical. - 0.2 = 79.35 cm1557 H_{rod} at 79.45 cm. - period.

Drain

1.18

9/24/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE RANGE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓ F-st ✓	1 1/2"	✓	10 X 10 ⁻¹²
K-2	3 X 10 ⁻¹²	Meter ✓ F-st ✓	1 1/2"	✓	10 X 10 ⁻¹²
R-1	—	—	—	—	—
R-2	—	—	—	—	—
PM-1	700V	Alarm ✓	Contact	✓	500V
PM-2	1200V	Low ✓ Alarm ✓	16"	—	900V
ECC BY CANDIDATE ✓		OPERATE ✓	SOURCE No. B-10		

START-UP CHECK LIST

Equipment checked by DC Personnel check by FDC
 Instruments and safeties checked and reset by EQ
 Source in checked by DC Source No. M-43
 Emergency equipment in control room checked by FDC
 Instruments in trip circuit: K-2, PM-1, PM-2
 Red light on by DC Time 0910
 Start-up OK'd by DC, EQ, FDC Date 9/24/65

spacing 0.5 in. or on 7/23/65. Remained corner elements from NW and NE. Now have 23 elements, square pattern. Diagram B, p. 118

9/24/45

0945 H_2O at 85.80 cm. Slightly positive0953 H_2O at 85.75 cm. Critical - 0.4 = 85.350955 H_2O at 85.70 cm. Slightly negative

Drain

0.4
2 in = 1/2 in.

Removed the two elements from the SE & SW corners. Now have 21 elements spaced 0.5 in. in square pattern. Diagram C, p. 124

1135 H_2O at 95.6 cm. Positive period1140 H_2O at 95.1 cm. Critical - 0.4 = 94.7 cm1144 H_2O at 94.8 cm. Negative

Drain

Removed element at SE end of south row. Now have 20 elements. Diagram D, p. 124

1345 H_2O at 124.1 cm. Slightly subcritical. Period #1

Drain

1440

V40P Replaced element in SW corner of array - ^{Diagram E,} p. 124

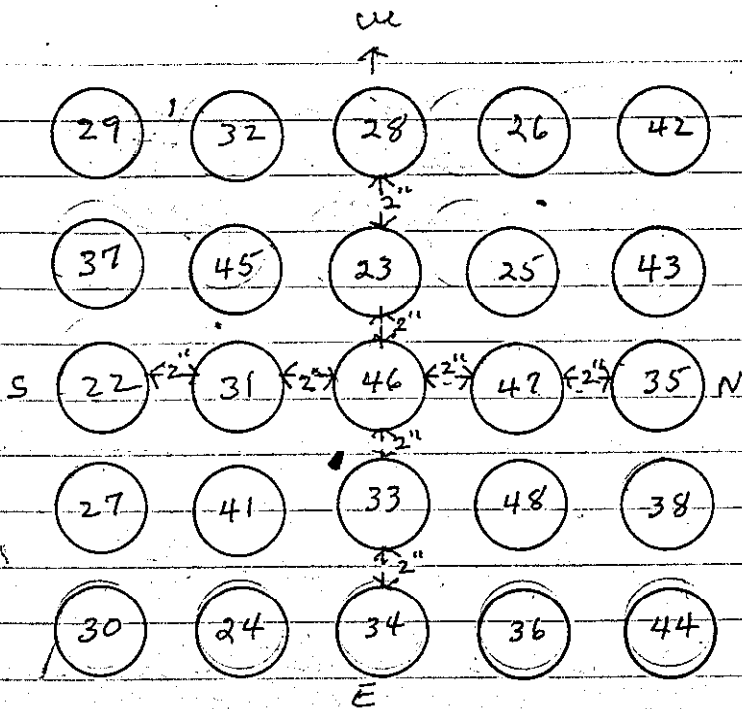
1440

Start H_2O 1525 H_2O at 102.05 cm. Slightly positive1530 H_2O at 102.00 cm. Critical. - 0.4 = 101.61532 H_2O at 101.85 cm. Slightly negative (more neg. than above positive)

Drain

DIAGRAM "A" = 2" spacing
" " = 0.5" "

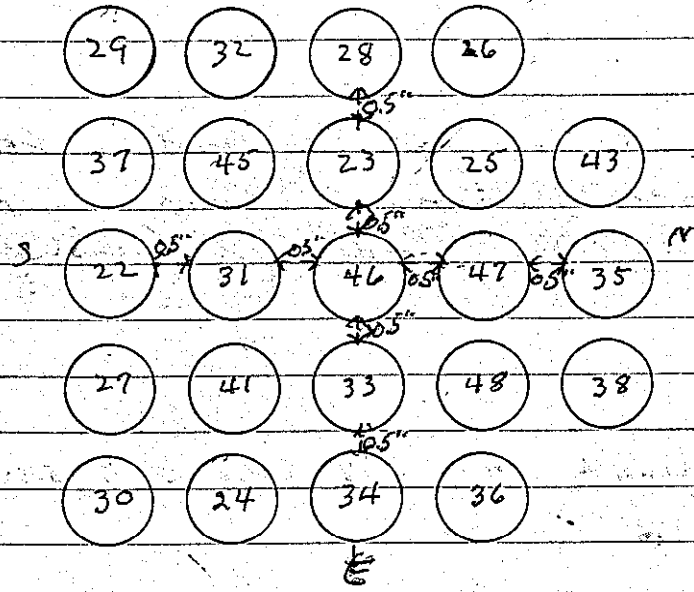
9/22/65
9/23/65



9/2

9/24/65

DIAGRAM "B" = 0.5" spacing



9/2

DIAGRAM "C" SPACING = 0.5"

9/24/65

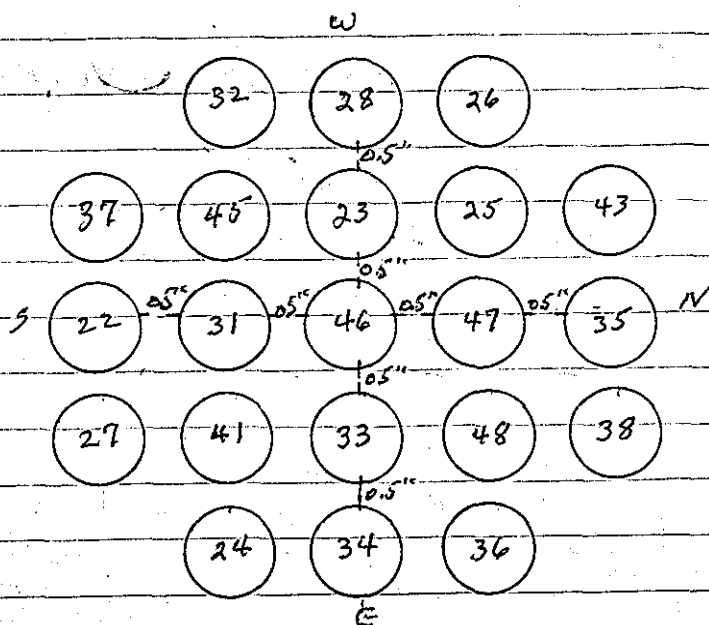
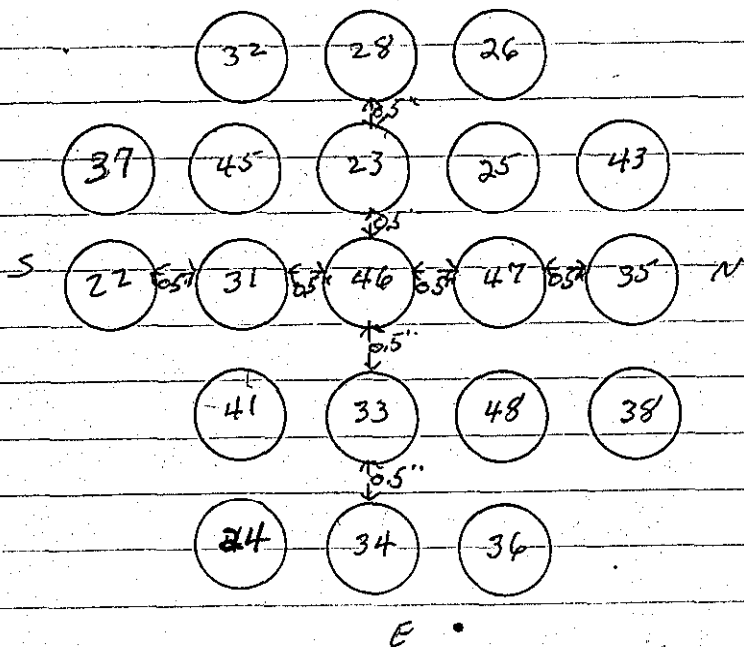


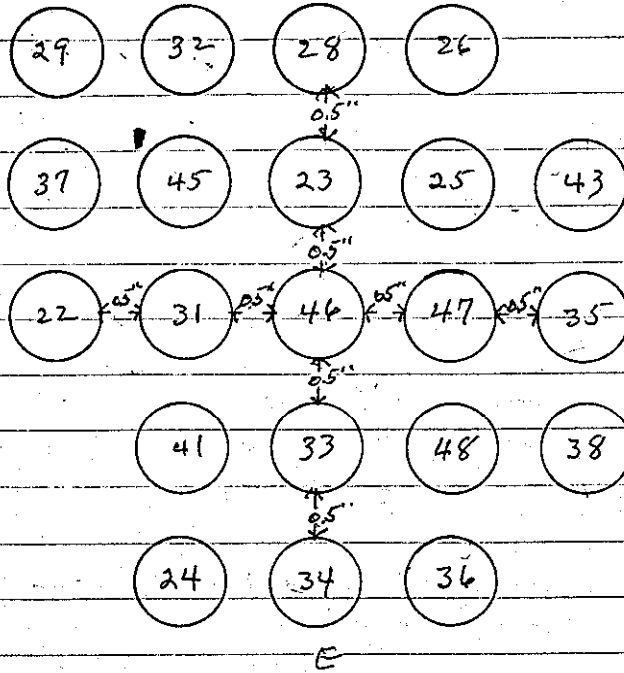
DIAGRAM "D" SPACING = 0.5"

9/24/65



9/24/65

W DIAGRAM "E" SPACING = 0.5"



9/27/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Master ✓ Fast ✓	$1 \frac{1}{2}''$		10×10^{-12}
K-2	3×10^{-12}	Master ✓ Fast ✓	$1 \frac{1}{2}''$		10×10^{-12}
R-1	—				
R-2	—				
PM-1	700V	Alarm ✓			500V
PM-2	1200V	Low ✓ Alarm ✓	$1 \frac{1}{2}''$		900V
LOG N. CALIBRATE ✓		OPERATE ✓	SOURCE No. <u>B-P</u>		
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

Equipment checked by EQ Personnel check by IDC
 Instruments and safeties checked and reset by EQ
 Source in checked by IDC Source No. M-43
 Emergency equipment in control room checked by IDC
 Instruments in trip circuit: K-2, PM-1, PM-2
 Red light on by IDC Time 1345
 Start-up OK'd by EQ, IDC Date 9/27/65

Repeat of last entry p. 115

1435 H₂O at 103.4 cm Critical = 0.4 = 103.01437 H₂O at 103.8 cm + recheck

124
9/27/65

1445 H₂O at 103.4 cm Critical = 103.1

1445 Drain to about 75 cm.

1535 Start filling

1550 H₂O at 103.3 cm. Critical 102.9

Raised level

1605 Critical at 103.25 cm.

Drain

9/29/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	1"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1/2"	✓	3 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	7000	Alarm ✓	Cont	✓	5000
PM-2	12000	Low ✓	16"	✓	9000
"	"	Alarm ✓	1"	✓	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-93

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

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

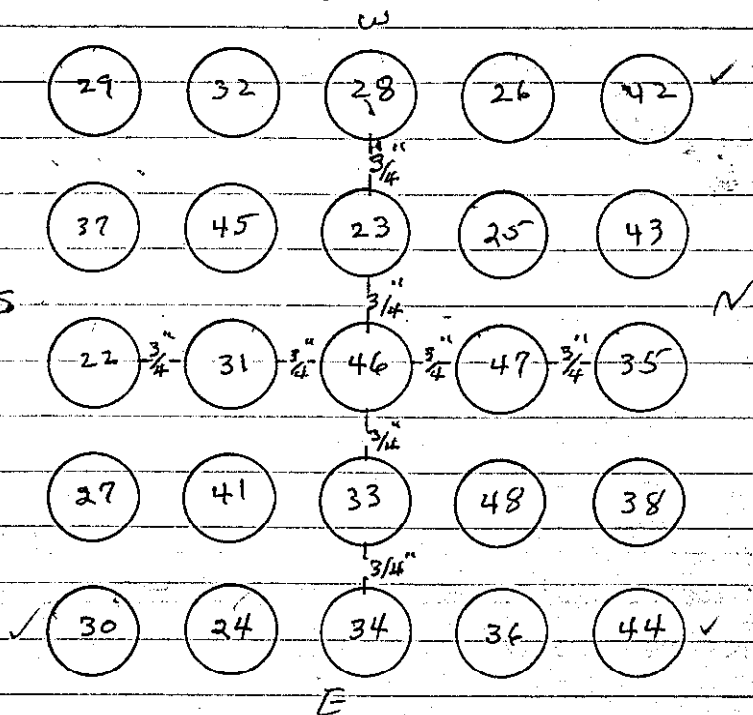
Red light on by AKH Time 0830

Start-up OK'd by F.P.C AKH Date 9-29-65

5 x 5 array; separator of units = 1.750"
 See page 126 for diagram of array.

9/29/65

5x5 array. Spacing = .750"



0925 Water ht = 90.90 cm
 System just critical.
 Drain.

Removed units from NW and NE corners.
 Now have 23 units, square pattern, 0.75 in sep.
 # 42, & 44 = 23

1050 - Water ht = 100.40 cm.
 System just critical.
 Drain.

9/29/65

127

Removed unit # 30 from S.E. corner:

1400 Water ht = 106.90 cm

System just critical
Drain.

Removed unit # 29 from S.W. corner:

Now have the four units # 42, 48, 30, & 29 removed
from array shown on page 126.

1500 Water ht = 118.10 cm

System sub critical.
Drain.

130
9/30/65

9/3

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	SFT	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	Cont	✓	10×10^{-12}
"	"	Flt ✓	"	✓	"
K-2	"	Meter ✓	"	✓	3×10^{-12}
"	"	Flt ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1,200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	"	✓	"
LOG-N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT					

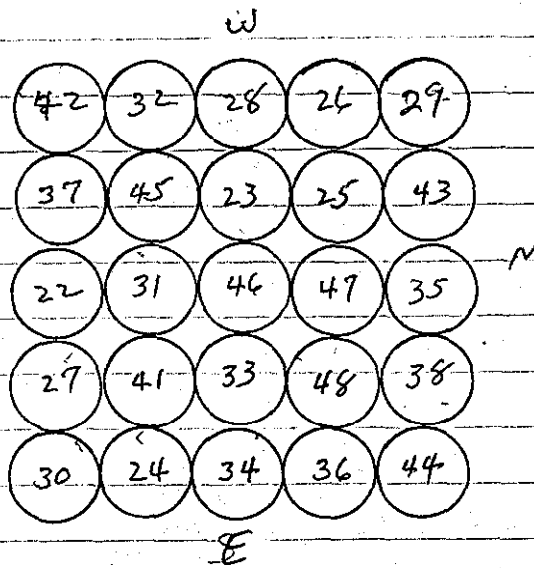
START-UP CHECK LIST

Equipment checked by PKM Personnel check by F.D.C.
 Instruments and safeties checked and reset by PKM
 Source in checked by PKM 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 PKM Time 1520
 Start-up OK'd by F.D.C. PKM Date 9-30-65

Five by five array units in Contact.

Five by five array - units in contact.

9/30/65



1555

Water ht = 100.90 cm
System just critical.
Drain: ✓

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13	10^{-12}	Meter ✓	1"	✓	10×10^{-12}
"	"	Fast ✓	1"	✓	"
K-2	"	Meter ✓	1"	✓	3×10^{-12}
"	"	Fast ✓	1"	✓	"
R-1					"
R-2					
PM-1	700V	Alarm ✓	ent	✓	500V
PM-2	1200V	Low ✓	1 1/2"	✓	900V
"	"	Alarm ✓	1"	✓	"

LOG IN CALIBRATE ✓

OPERATE ✓

SOURCE No.

13-80

DUMP WELL PROBE LIGHT

132
10/1/65

101
14

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKA

Source in checked by AKA Source No. M-43

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

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

Red light on by AKA Time 0820

Start-up OK'd by F.D.C AKA Date 10-1-65

Removed unit # 30 from S.E corner of array shows on page 131. now have 26 units in array.

0908 Water hts = 108.15 cm
system just critical.
Drain:

Drain rates
Temp water = 10.4 ^{cm}/min
Drain valve = 10.9 ^{cm}/min
Water Feed rate
= 5.7 ^{cm}/min.

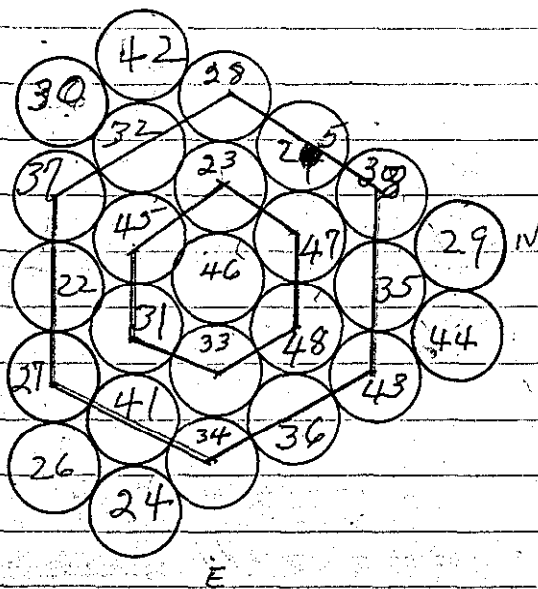
Removed unit # 42 from S.W corner of array show on page 131. now have 23 unit in array.

1006 Water hts = 119.05 cm
system sub critical.
Drain:

10/1/65

1400

now have 25 units in triangular pattern at contact, as shown below.



1429

Water hts = 120.50 cm.

System very sub critical.
Dmin.

134

10/4/65

INSTRUMENT CHECK

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

LOG N CALIBRATE OPERATE

SOURCE No.

B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by Z.V.C.Instruments and safeties checked and reset by AKMSource in checked by AKM Source No. M-43Emergency equipment in control room checked by FIDOCInstruments in trip circuit: K-1-2 M-1-2Red light on by AKM Time 1900Start-up OK'd by Z.V.C./AKM Date 10-4-65

10/4/65

1400

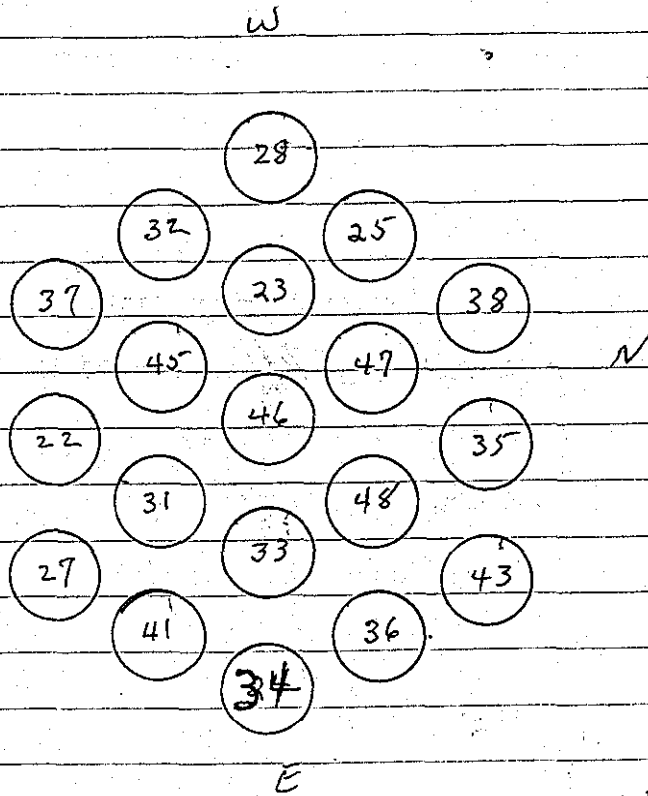
Same array as shown on page 133.
Side to side separation now = 0.50"

1432

Water ht = 54.30 cm
hyetrs just critical
Drain.

1525

Now have 19 units in triangular array as
shown below. Separation = 0.50"



Water Temp. = 21.5 °C

1551

Water ht = 61.40 cm
hyetrs just critical
Drain.

136

10/5/65

10/0

INSTRUMENT CHECK

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

LOG N CALIBRATE ✓

OPERATE ✓

SOURCE No.

D-80

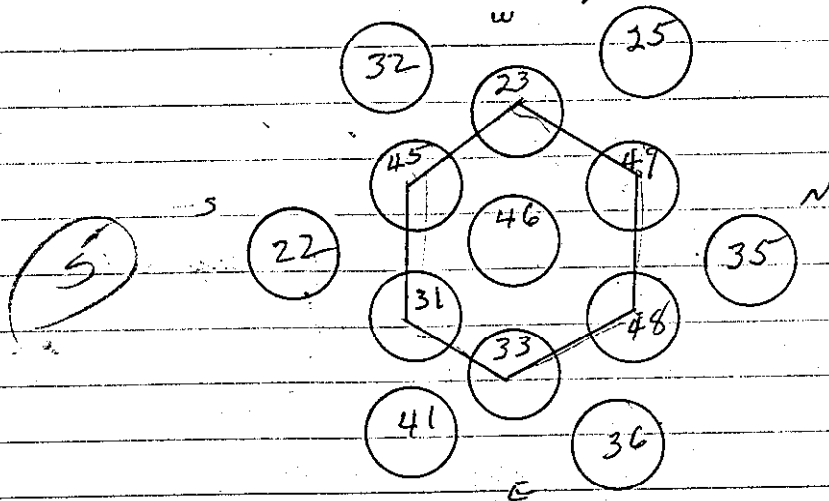
DUMP WELL PROSE LIGHT _____

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FID.CInstruments and safeties checked and reset by AKHSource in checked by AKH Source No. M-93Emergency equipment in control room checked by FID.CInstruments in trip circuit: K-1-2 PM-1-2Red light on by AKH Time 0845Start-up OK'd by FID.C AKH Date 10-5-65

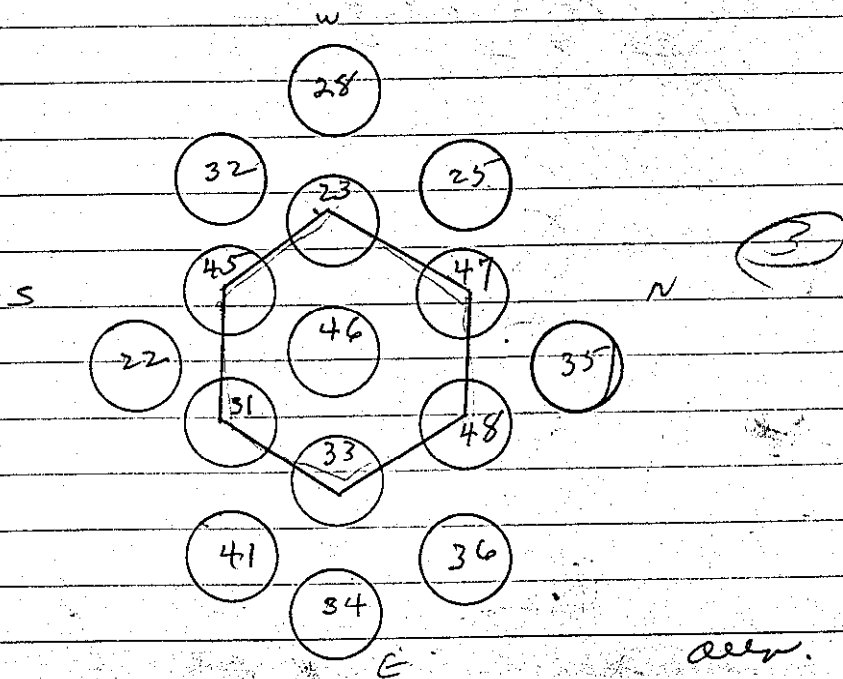
10/5/65

0845 new hole 13 units in triangular array as shown below - separation still 0.5"



0918 Water ht = 119.0 cm
hydraulic critical:
Onair.

10:20 new hole 15 units in triangular array as shown below - separation 0.5"

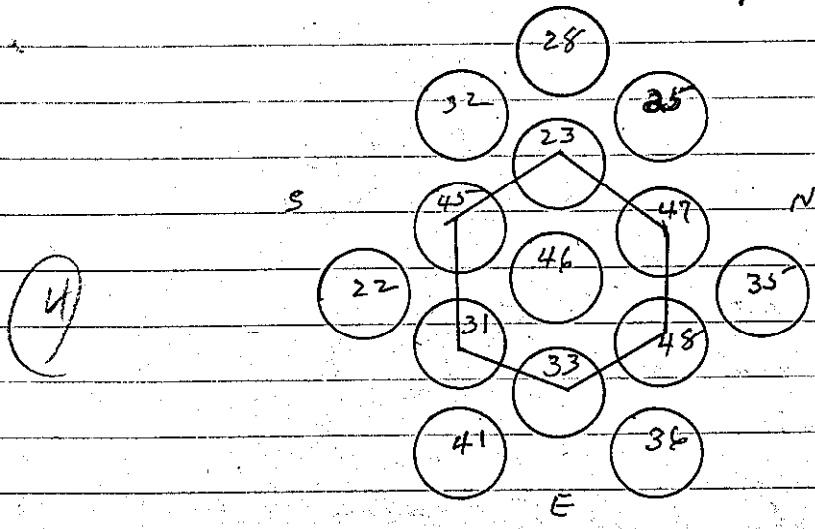


all.

138
10/5/65

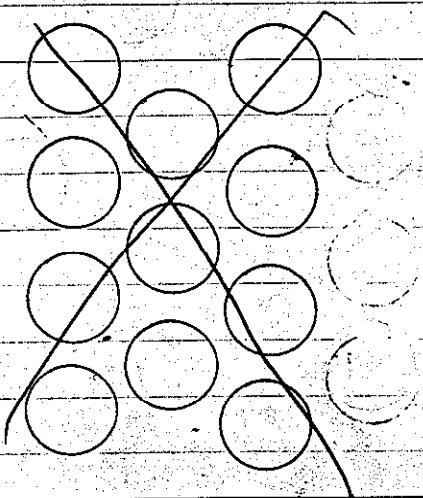
1050 Water ht = 87.85 cm
system just critical
Drain

11:15 now have 14 units in triangular array
as show below w. Separation = 0.5"



1147 Water ht = 104.80 cm
system just critical
Drain

Water Temp.
= 22.5°C



10/6/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
	"	Fast ✓	"	—	"
K-2	"	Meter ✓	"	✓	3×10^{-12}
	"	Fast ✓	"	—	"
R-1					
R-2					
PM-1	700V	Alarm ✓	amb	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
	"	Alarm ✓	1"	✓	"

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

START-UP CHECK LIST

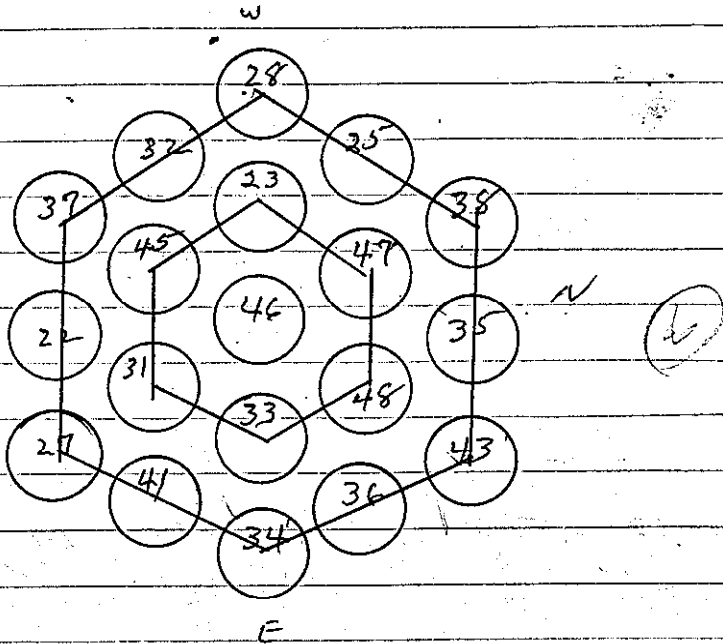
Equipment checked by AMH Personnel check by FIDC
 Instruments and safeties checked and reset by AMH
 Source in checked by AMH Source No. M-93
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-1-E-PM-1-2
 Red light on by AMH Time 0940
 Start-up OK'd by FIDC AMH Date 10-6-65

AMH

140

10/6/65
09:40

Now have 19 units in triangular array
as shown below. Separation = 1.00"

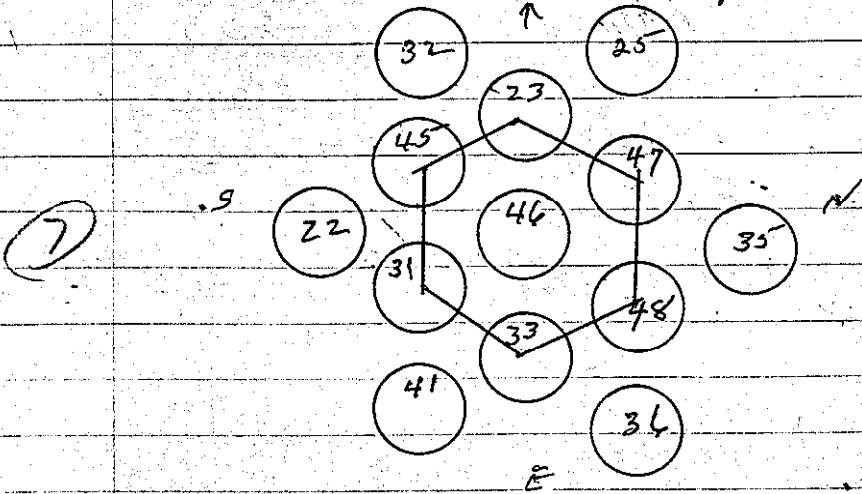


10:08 Water ht = 47.70 cm

Water temp = 22.2°C

System just critical
Drain

11:00 Now have 13 units in triangular array
as shown below. Separation = 1.00"



Rev.

10/6/65

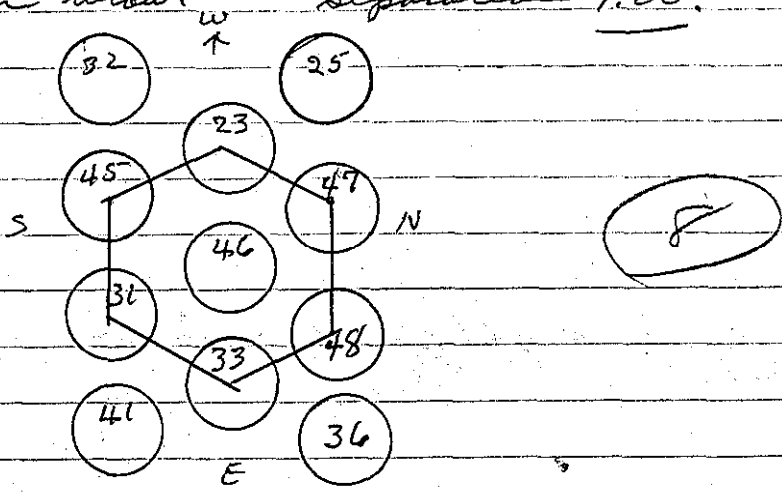
11:20 Water ht = 72.15 cm

Water temp =

System just critical
Drain

22.5°C

12:15 Now have 11 units in triangular array
as shown below. Separation 1.00"



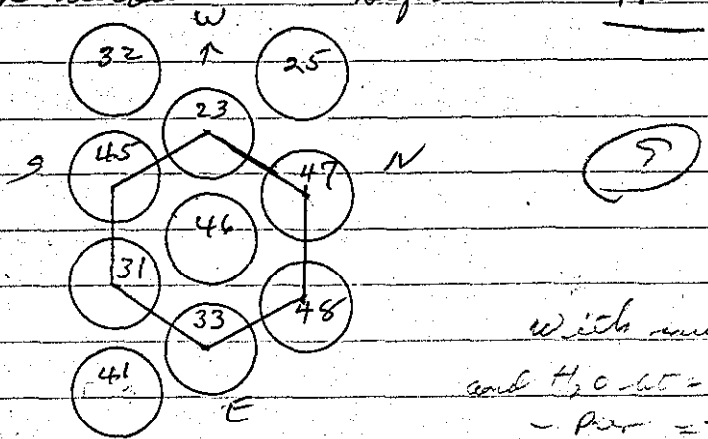
12:55 Water ht = 96.40 cm

Water temp.

System just critical
Drain.

22.5°C

13:15 Now have 10 units in triangular array
as shown below. Separation 1.00"



Water ht = 119.40 cm

With units out
and H₂O ht = 119.40
- Per = 75 + 25 cm
= 11.87

System slightly sub critical
Drain.

avr.

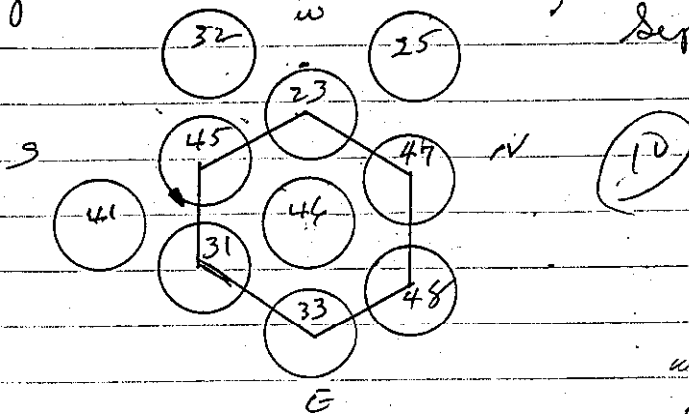
142

10/6/65

14:15

10/1

Still have 10 units in triangular array - changed slug #41 to another location as shown below



separation = 1.00"

with same amt

H₂O hit = 120.0 cm

-P_{av} = -302.05 m

= -4.9 φ

1453 Water hit = 120.0 cm

System slightly sub critical.
Drawn

10/11/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	1"	✓	10 x 10 ⁻¹²
	"	Foot ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3 x 10 ⁻¹²
	"	Foot ✓	"	✓	"
R-1					
R-2					
PM-1	700V ✓	Alarm ✓	cont	✓	500V
PM-2	1200V ✓	Low ✓		✓	900V
	"	Alarm ✓		✓	1200V
LOG-N CALIBRATE ✓		OPERATE ✓	SOURCE No. B-80		
DUMP WELL PROBE LIGHT _____					

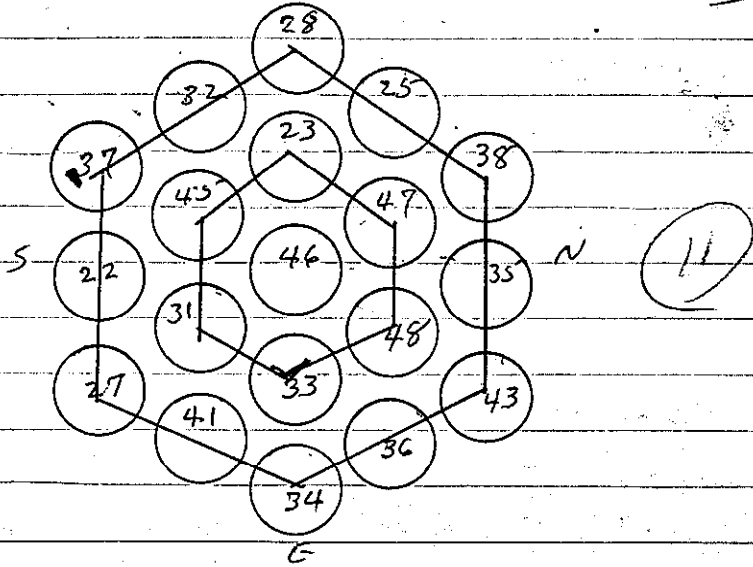
START-UP CHECK-LIST

Equipment checked by AKH Personnel check by FID.C
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked by FID.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 1340
 Start-up OK'd by FID.C AKH Date 10-11-65

AKH

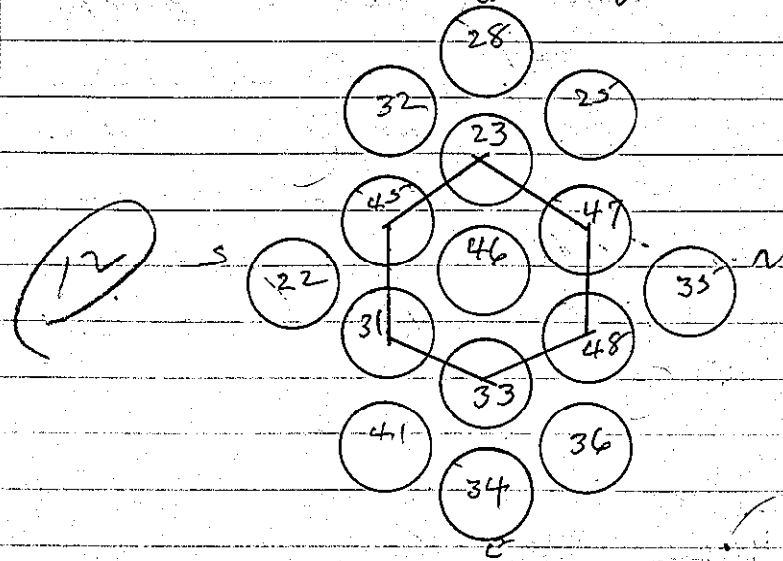
144

10-11-65 now have 19 units in triangular array
as shown below - w separation 1.50"



1415 Water ht - 59.65 cm
system just critical.
Drain

1500 now have 15 units in triangular array
as shown below - w separation 1.50"



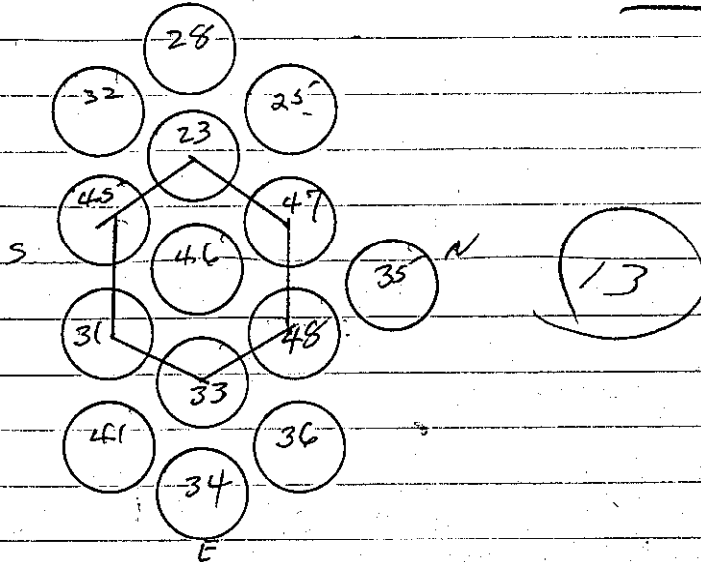
next page

10/11/65

145

1527 Water ht = 82.85 cm
Kepten just critical
Drain.

1540 now have 14 units in triangular array
as shown below w separation 1.50"



1605 Water ht = 92.30 cm
Kepten just critical.
Drain.

146

10/12/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	1"	✓	10 x 10 ⁻¹²
		Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3 x 10 ⁻¹²
		Fast ✓	"	✓	"
R-1					
P-2					
PM-1	700 ✓	Alarm ✓	cont	✓	500 ✓
PM-2	1200 ✓	Low ✓	10"	✓	1200 ✓
		Alarm ✓	1"	✓	"
LOG N CALIBRATE _____			OPERATE ✓	SOURCE No.	B-80.4
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

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

Instruments and safeties checked and reset by RKH

Source in checked by RKH Source No. M-93

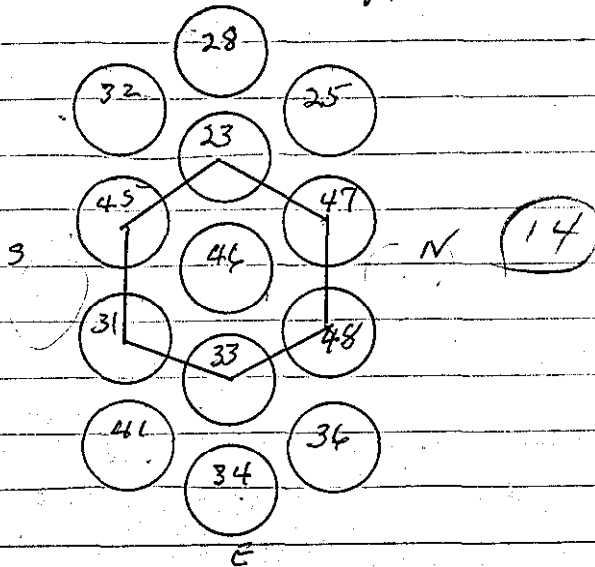
Emergency equipment in control room checked by F.P.C.

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

Red light on by RKH Time 0810

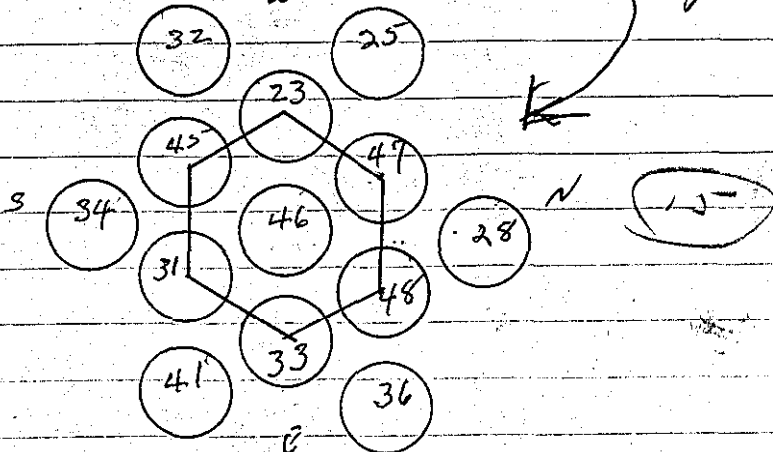
Start-up OK'd by F.P.C. RKH Date 10-12-65

10/12/65 now have 13 units in triangular array
 0800 as shown below - w Separation 1.50"



0845 Water ht = 116.40 cm
 hepten very slightly sub critical
 - Per. $\tau = -215.13 \text{ cm} = -7.5 \text{ f}$

1200 Still have 13 units in triangular array - Changed
 slug # 28 and 34 to another location. Separation 1.50"



Water ht = 120.70 cm
 hepten sub critical
 - Per = 108.6 cm = 22.0 f

10/13/65

10/13/65

INSTRUMENT CHECK

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

LOG N CALIBRATE OPERATE SOURCE No. B-80

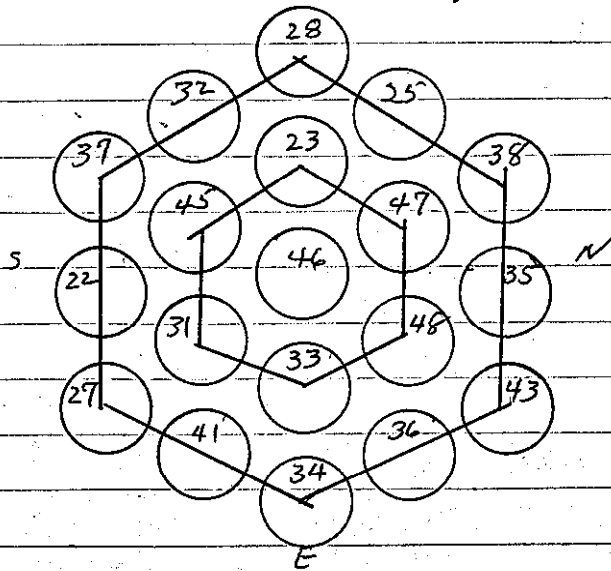
DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-93
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0850
 Start-up OK'd by F.D.C. AKH Date 10-13-65

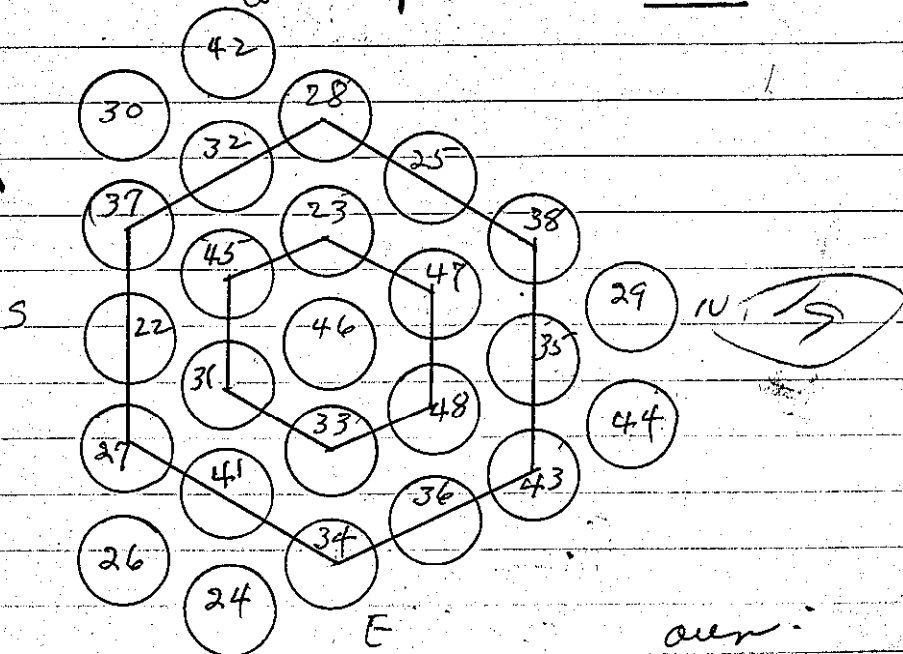
10/13/65
08:50

New home 19 units in triangular array
as shown below - w Separation 2.00"

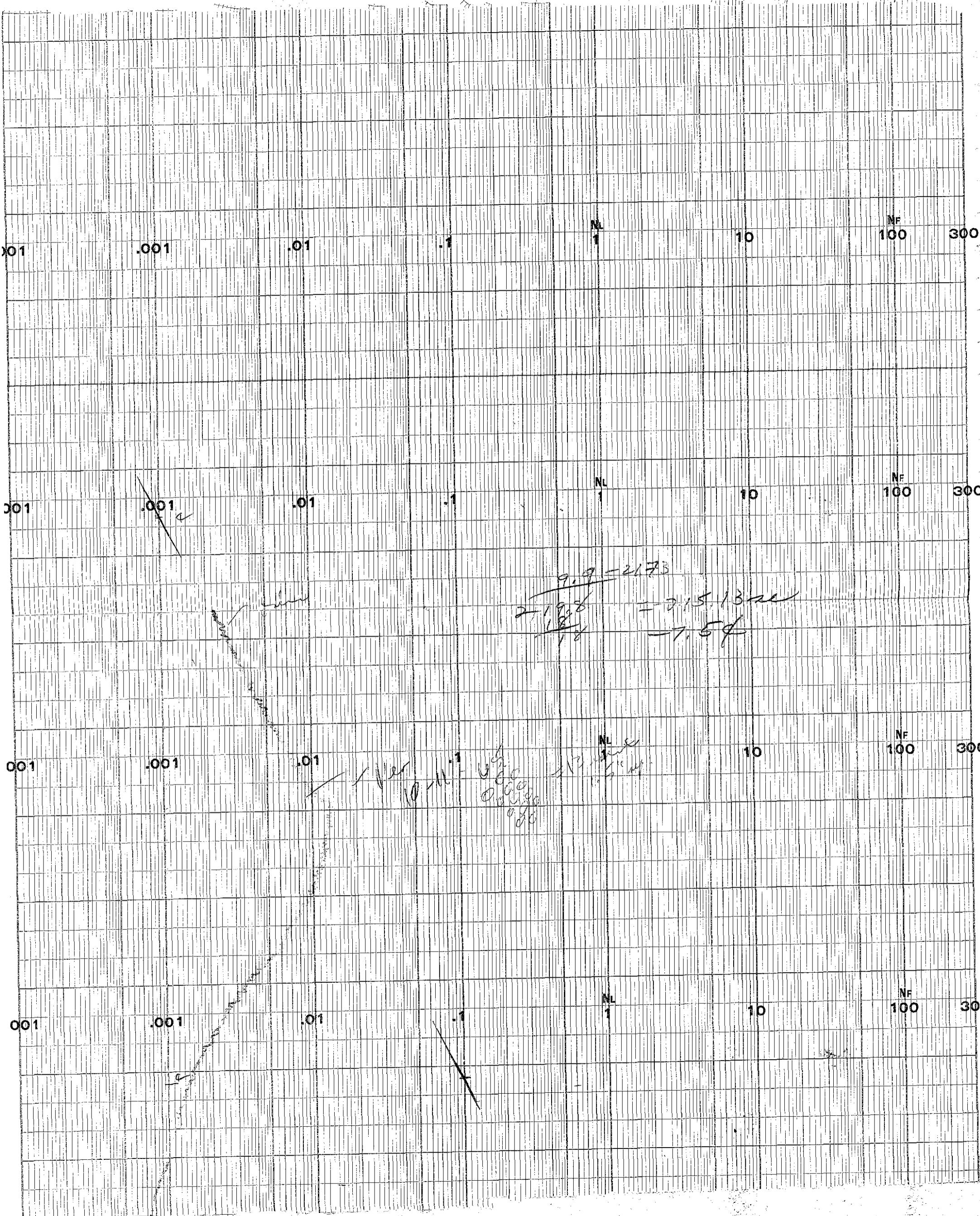


0925 Water ht = 121.30 cm
kept sub critical.
Drain.

10:30 New home 25 units in triangular array
as shown below - w Separation 2.00"



over:



.0001

.001

.01

.1

NL

10

NF
100

30

10-6-65

2-2-73

= 154.28 mc

= 11.7 d

.0001

.001

.01

.1

NL

10

NF
100

30

Handwritten scribbles and illegible text.

.0001

.001

.01

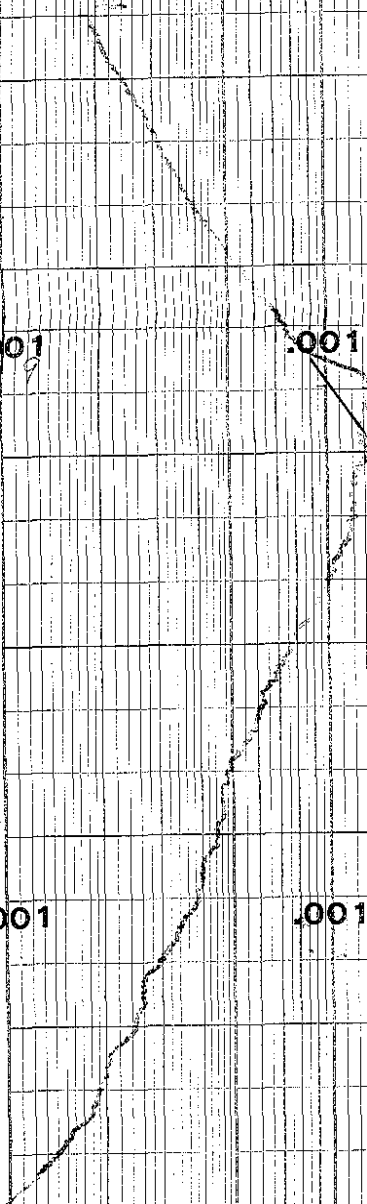
.1

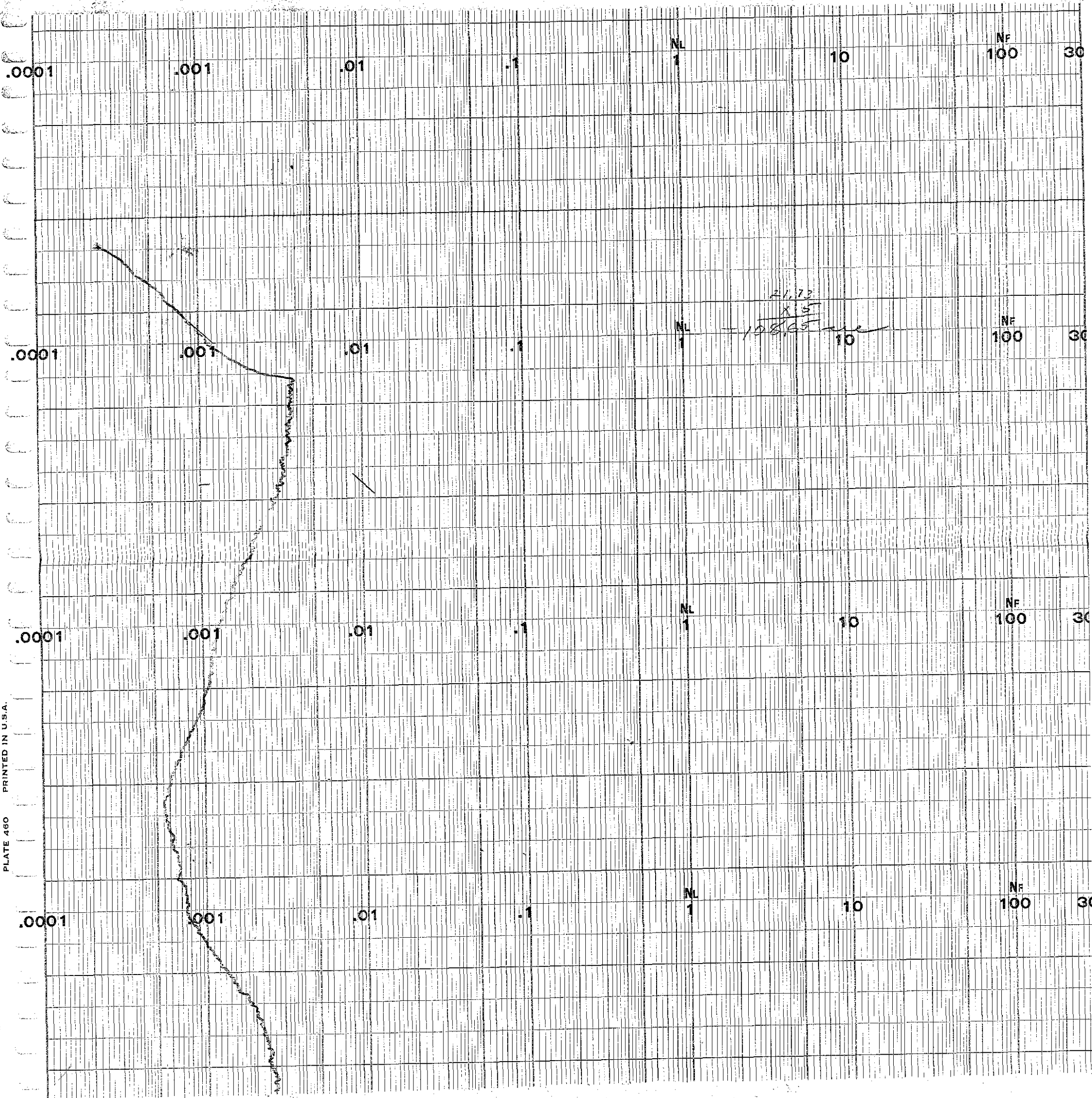
NL

10

NF
100

30





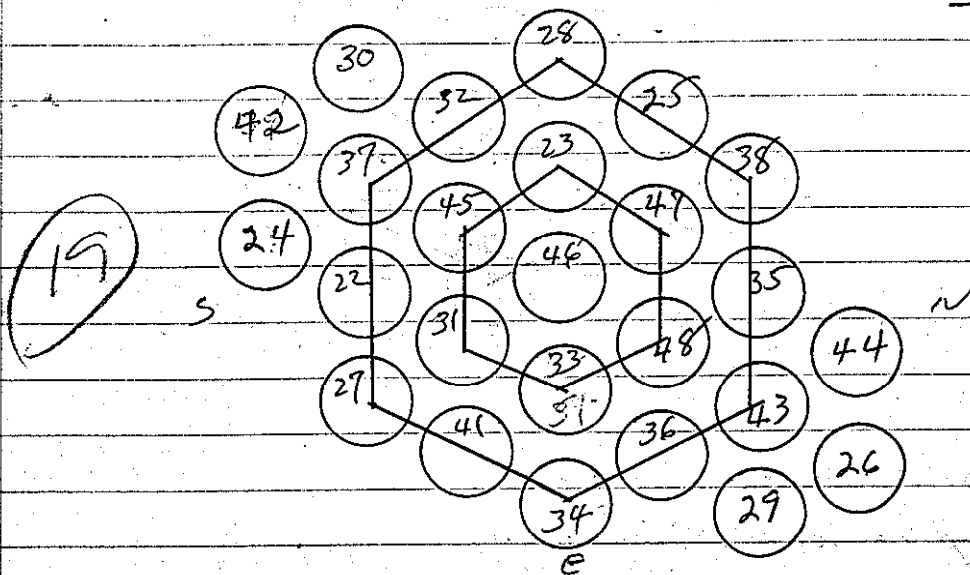
150
10/13/65

Water ht = 119.00 cm

System sub critical

Drain

12:30 Now have 25 units in triangular array
as shown below - separation 2.00"



1345 Water ht = 119.80 cm

System sub critical

Drain

1500 Removed wooden spacers from array

1541 Water ht = 120.60

System sub critical

Drain

No increase in
multiplication

10-14-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SFT	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1/2"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"

R-1

R-2

PM-1 700v Alarm ✓ cont ✓ 500v

PM-2 1200v Low ✓ 12" ✓ 900v

" Alarm ✓ 1" ✓ "

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

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by EIDC

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. 19-93

Emergency equipment in control room checked by EIDC

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

Red light on by AKM Time 1250

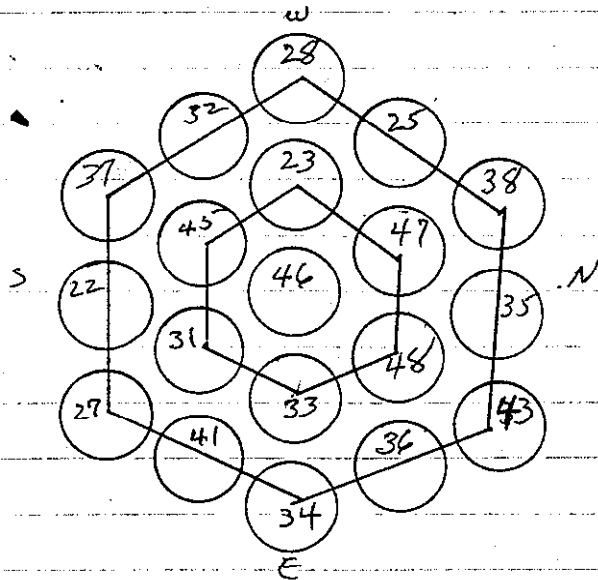
Start-up OK'd by EIDC AKM Date 10-14-65

152

10/14/65
1300

now have 19 units in triangular array
as shown below. Separation = 1.75"

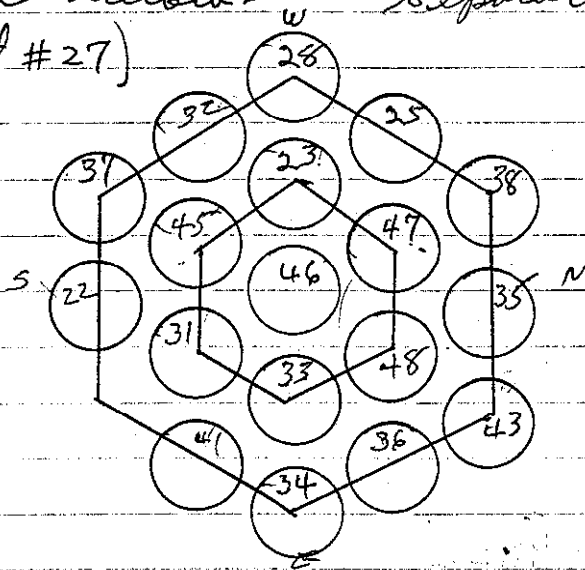
(16)



1327 Water ht = 88.85 cm
Kepten just critical
Drain.

1350 now have 18 units in triangular array
as shown below. Separation = 1.75"
(Removed unit # 27)

(17)



7/10/69

1425 Water ht = 99.15 cm
 System just critical.
 Drain:

1500 Remained wooden spacers from array: see page 154

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3×10^{-12}
	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
	"	Alarm ✓	1"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. 13-80

DUMP WELL PROBE LIGHT

154
10/15/65

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKM

Source in checked by AKM Source No. 14-43

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

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

Red light on by AKM Time 0805

Start-up OK'd by F.D.C. AKM Date 10-15-65

Same array as shown on bottom of page 152. Now
have wooden spacers removed.

0840 + Per

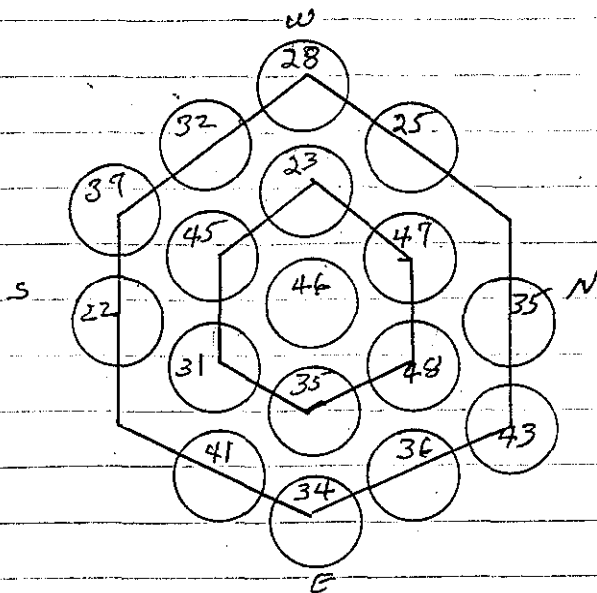
Water ht = 95.95 cm. ^{1.85 cm.}
T = 80.40 sec = 11.7 f = 6.3 f/cm²

1/4 with spacers = 99.15 0
" without " = 94.10
= 31.6 f 5.25

Water ht = 94.10 cm
System just critical
Drain.



10/15/65 Now have 17 units in triangular array.
Removed unit #38, as shown below. Separation = 1.75"



0946 Water ht = 121.40 cm

System sub critical. $-Par = -146.64 \text{ cm} = -12.6 \text{ f}$

0948 Drain:

1100 added unit #38 back to array: see page 152
for pos: Purpose is to reach critical ht.

Water ht = 93.65 cm

System just critical.

Drain:

12:30 added $\sim 1/2$ of wooden spacers in array: Purpose
is to check worth of wood in array: see page 154.
(No spacers were found in array) over:

12.59 + Pres; $\sigma = 71.71 \text{ m} = 12.7 \text{ f}$
 Water ht = 95.80 cm

13.03 Water ht = 93.70 cm
 System just critical.
 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Motor ✓	9"	✓	10×10^{-12}
	"	Ext ✓	"	✓	"
K-2	"	Motor ✓	"	✓	3×10^{-12}
	"	Ext ✓	"	✓	"
R-1					
R-2					
PM-1	700V ✓	Alarm ✓	cont	✓	500V
PM-2	200V ✓	Low ✓	cont	✓	900V
	"	Alarm ✓	cont	✓	"

LOG IN CALIBRATE _____ OPERATE _____ SOURCE No. _____

DUMP WELL PROBE LIGHT _____

10/18/65



START-UP CHECK LIST

Equipment checked by AKV Personnel check by AKV

Instruments and safeties checked and reset by AKV

Source in checked by AKV Source No. M-43

Emergency equipment in control room checked by AKV

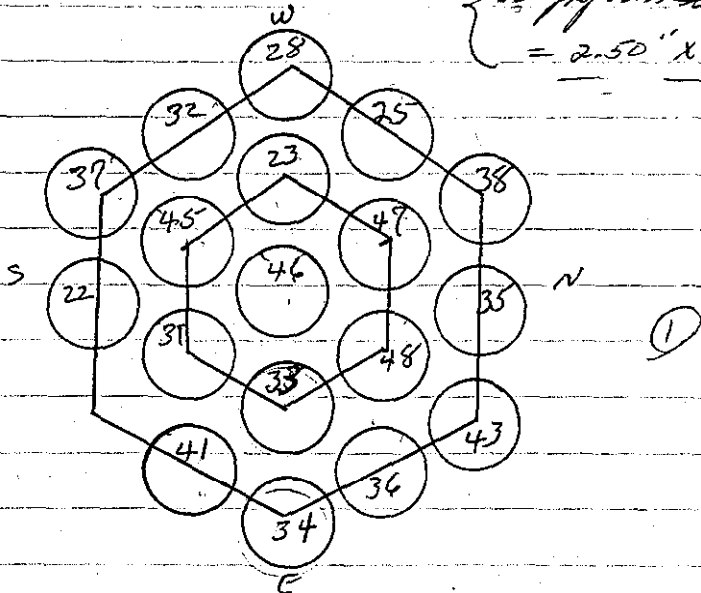
Instruments in trip circuit: K-1-2 DM-1-2

Red light on by D.C. Time 1450

Start-up OK'd by D.C. AKV Date 10-18-65

Eleven units have styrofoam inserts #s 28, 23, 46, 33, 34, 41, 31, 45, 32, 37, 22. Also washers spacers are in array. Separation = 1.75"

styrofoam inserts
= 2.50" x 40.00"



1.520 water ht = 120.0cm

kepten sub critical.

Draw

158
10/19/65

10/1

INSTRUMENT CHECK

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

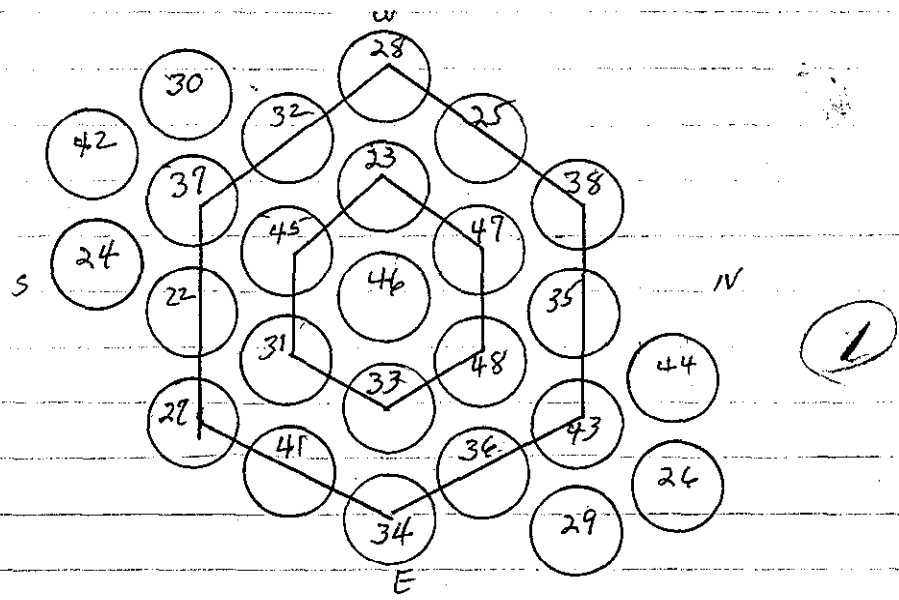
LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKM Personnel check by I.D.C.
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. TC-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 AKM Time 10:10
 Start-up CK'd by I.D.C. AKM Date 10-19-65

10/19/65



all units (25) have ~~styrofoam~~ styrofoam inserts: + wooden
 spacers: Separation = 1.75"
 styrofoam (2.5" x 40")

10.53 Water ht = 120.10 cm
 System sub critical
 Drain



10-20
9:54

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	UP GE
R-1	3×10^{-12}	Meter ✓	1"	-	10×10^{-12}
"	"	Fast ✓	"	-	"
R-2	"	Meter ✓	cont	-	3×10^{-12}
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	-	500V
PM-2	200V	Low ✓	14"	-	900V
"	"	Alarm ✓	1"	-	"
LOG N CALIBRATE ✓			OPERATE ✓	SOURCE No. B-80	
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

Equipment checked by AKK Personnel check by EIDC

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-43

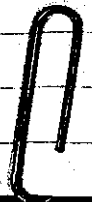
Emergency equipment in control room checked by EIDC

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

Red light on by AKK Time 0950

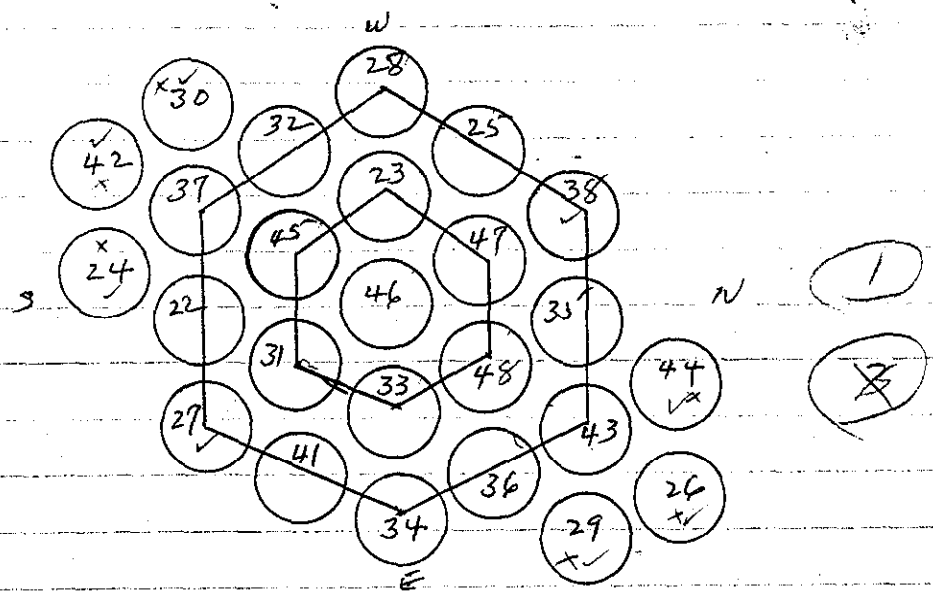
Start-up OK'd by EIDC AKK Date 10-20-65

10
10:
11:11



10-20-65

10:45 Now have 25 units in triangular array (as shown below)
All units have 2.50" x 40" styrofoam inserts
No wooden spacers. Separation = 1.00"



10:25 Water ht = 76.02 cm
System just critical
Drain

10:45 Removed units # 24 and 44 from array as shown above. Now have 23 units separated 1.00"

11:15 Water ht = 83.00
System just critical
Drain

(2)

162₁₀₋₂₀₋₆₅

12:30 Removed units # 42 & 26 from array. (See array Page 161). Now have 21 units. Separation = 1.00"

12:57 Water ht = 85.25 cm (X) (3)
System just critical.
Drain.

Drain water to ~ 68.0 cm Purpose to reach critical ht

13:11 Water ht = 85.30 cm (note) Found ^{water} ~~minors~~ _{nonoperable} line had dirt & rust which was cleaned out.
System just critical.
Drain.

13:45 Removed units # 29 & 30. Now have 19 units. Separation 1.00"

14:45 Water ht = 91.20 cm (X) (4) Water Temp. = 22.2°C
System just critical.
Drain.

15:00 Removed units # 27 & 38 now have 17 units. Separation = 1.00"

15:42 Water ht = ^{120.30 cm} ~~119.8~~ (X) (C)
System sub-critical.
Drain.

10-21-65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	1"	✓	10 K 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3 X 10 ⁻¹²
"	"	Fast ✓	"	✓	"
P-1					
P-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	74"	✓	900V
"	"	Alarm ✓	1"	✓	"

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

START-UP CHECK LIST

Equipment checked by AKM Personnel check by I.D.C
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by I.D.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 0905
 Start-up OK'd by I.D.C AKM Date 10-21-65

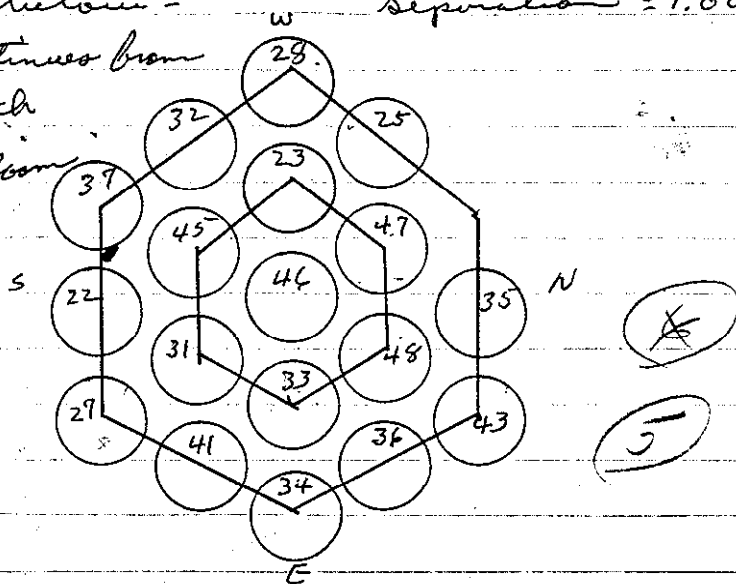
by
als

to

19/21/65
164

0800 Now have 18 units in triangular array
as shown below - separation = 1.00"

Experiment continues from
10-20-65 with
2.50" x 4.0" styrofoam
inserts.



0846 Water ht = 106.10 cm
System just critical
Drain:

1500 Same 18 unit array as shown above
except separation of units now 2.50"
and { styrofoam } inserts removed
2.5" x 4.0"

1530 Water ht = $\frac{120.55 \text{ cm}}{120.05}$
System slightly sub critical,
Drain:

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm	Cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	1"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

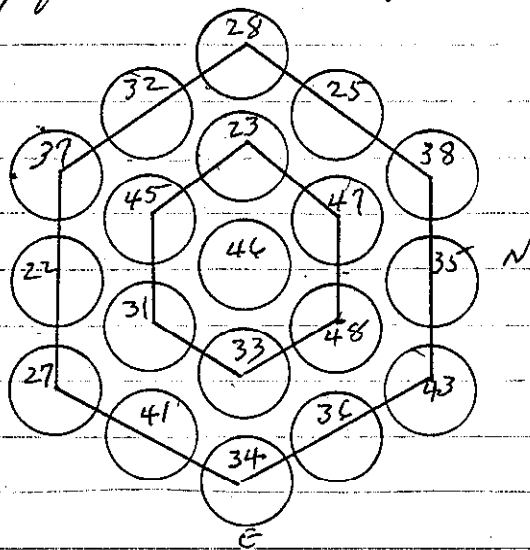
DUMP WELL PROBE LIGHT

START-UP CHECK-LIST

Equipment checked by AKM Personnel check by FID.C
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by FID.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 0810
 Start-up OK'd by FID.C AKM Date 10-22-65

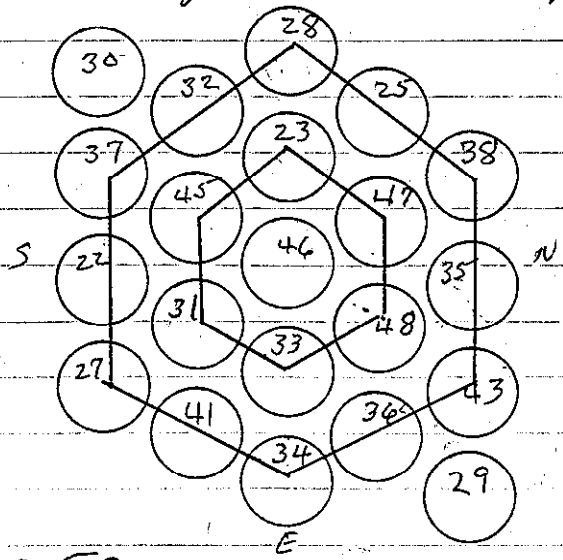
10/22/65
166

0800 now have 19 unit triangular array as shown below - No styrofoam inserts. Separation = $\frac{2.50''}{1.250''}$



0843 Water ht = 120.60 cm
System sub critical
Drain.

0920 now have 21 units in triangular array as shown below - No styrofoam ^{inserts} ~~boards~~. Separation = $\frac{2.50''}{1.250''}$

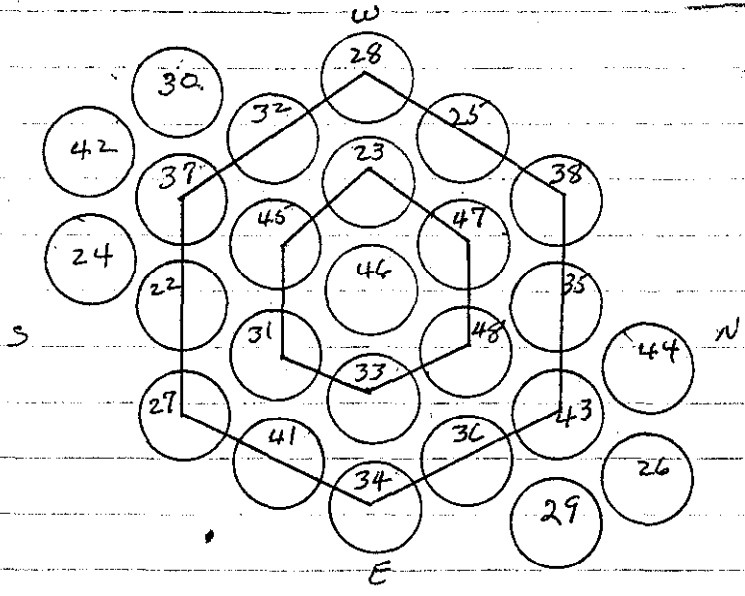


0945 Water ht = 120.50
System sub critical.
Drain.

10/22/65

167

10:20 Now have 25 units in triangular array, as shown below
no styrofoam inserts. Separation: $\frac{2.50''}{.250''}$



Water ht = 120.60 cm
Hydro. sub critical.
Drain.

10/25/65

10/2

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter <input checked="" type="checkbox"/>	4"	<input checked="" type="checkbox"/>	10×10^{-12}
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	3×10^{-12}
"	"	Fast <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
P-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	cont	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Low <input checked="" type="checkbox"/>	10"	<input checked="" type="checkbox"/>	900V
"	"	Alarm <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
LOG N CALIBRATE <input checked="" type="checkbox"/>		OPERATE <input checked="" type="checkbox"/>		SOURCE No. B-80	
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by AKK Personnel check by AKK

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-43

Emergency equipment in control room checked by AKK

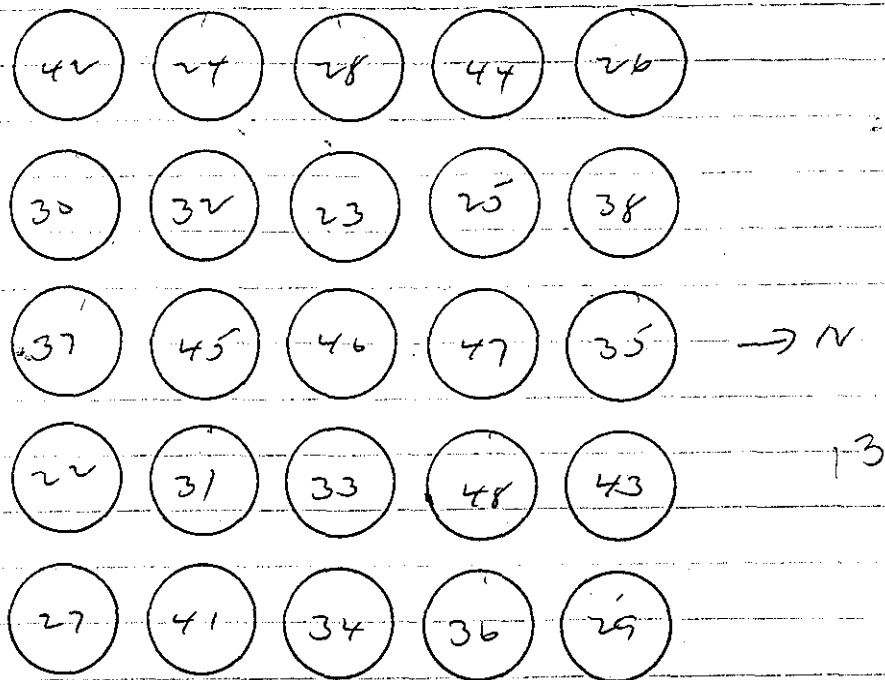
Instruments in trip circuit: R-1, K-2, PM-1, 2

Red light on by AKK Time 1245

Start-up OK'd by P.C. (AKK) Date 10-25-65

10/25/65

W ↑

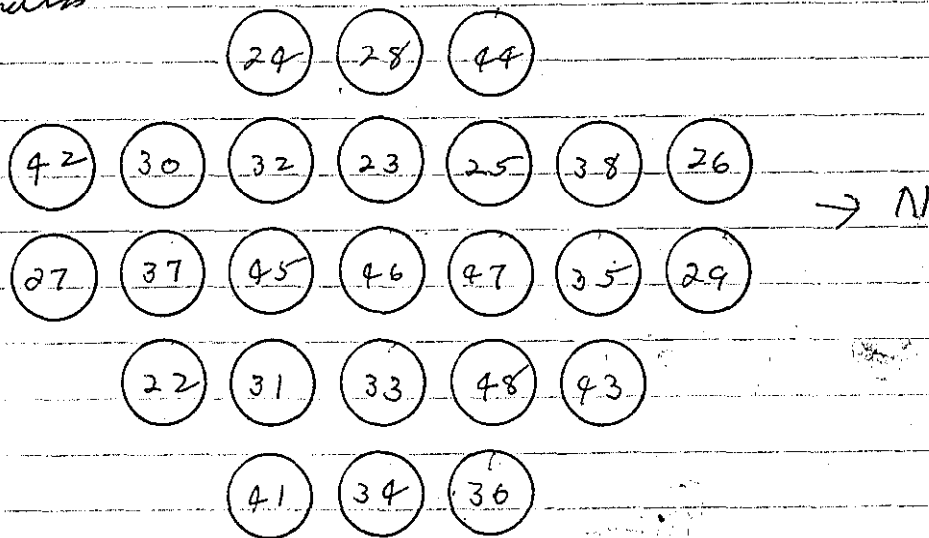


5 x 5 array as shown above: separation = 1.0"
(no styrofoam).

13.15 Water ht = 118.90 cm

System sub critical

Drain:



air

10/25/65
170

10/2

Waired 9 elements as shown on bottom of page
169. Separation still = 1.0"

1420 Water ht = 118.60"
System sub critical
Drain.

10/28/65

171

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	<input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	10×10^{-12}
"	"	<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Alarm <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	3×10^{-12}
"	"	Flt <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
PM-1	70.0V	Alarm <input checked="" type="checkbox"/>	Cont	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Low <input checked="" type="checkbox"/>	12"	<input checked="" type="checkbox"/>	900V
"	"	Alarm <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL FROGE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FIDIC

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

Emergency equipment in control room checked by FIDIC

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

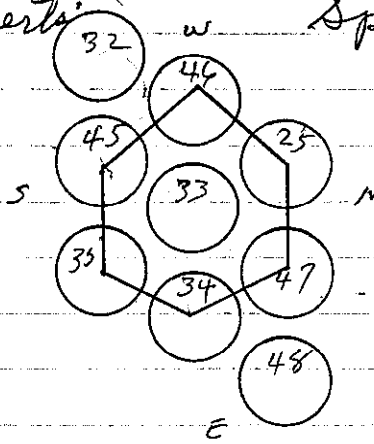
Red light on by AKH Time 1505

Start-up given by FIDIC AKH Date 10-28-65

19/28/65
172

10/29

15:05 Now have 9 units in triangular array with
styrofoam inserts. Spacing = 1.00"
1.55" x 40"



1540 Water at = 119.60 cm
system sub critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	1"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1700V	Low ✓	14"	✓	900V
"	"	Alarm ✓	1"	✓	"
LOG N. CALIBRATE		✓	OPERATE	✓	SOURCE No. 13-50
DUMP WELL PROSE LIGHT					

10/29/65

173

START-UP CHECK LIST

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

Instruments and safeties checked and reset by MMJ

Sources in checked by MMJ Source No. M-43

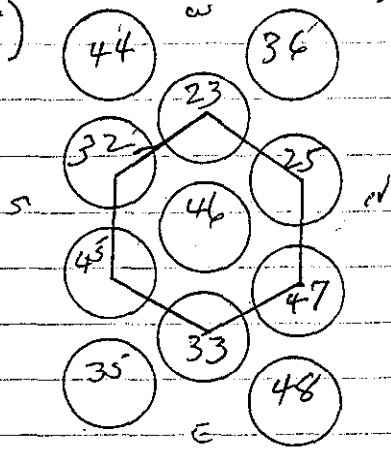
Emergency equipment in control room checked by F.D.C.

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

Red light on by MMJ Time 0815

Start-up OK'd by F.D.C. MMJ Date 10-29-65

Now have 11 units in triangular array with styrofoam inserts (3.5" x 4.0") Separation = 1.00"



Water ht = 120.10cm
Septer sub critical
Drain

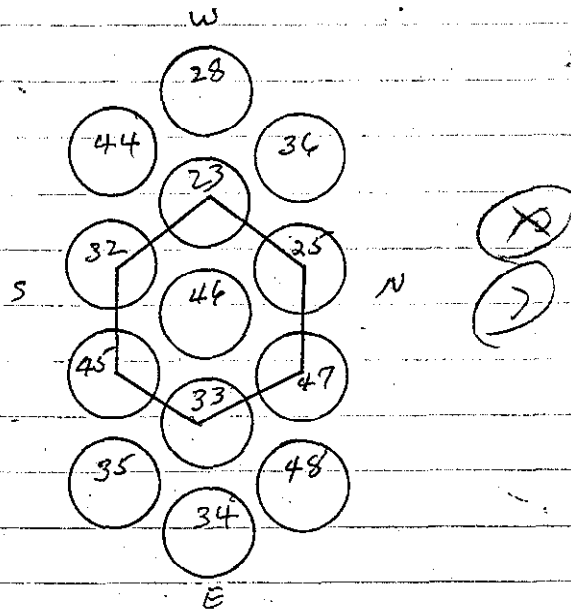


10/29/65

174

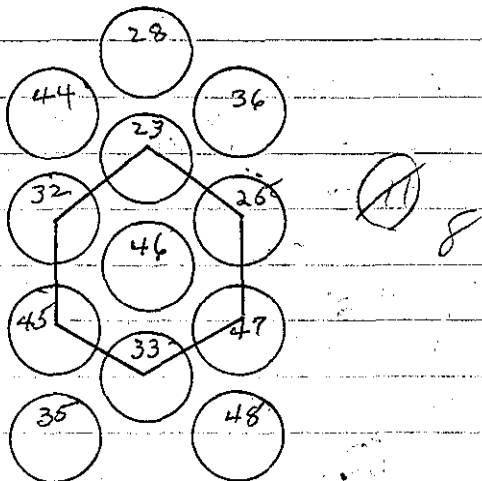
09:45

now have 13 units in triangular array with styrofoam inserts = 1.55" x 40". Separation = 1.00"



10:27 Water ht = 98.65 cm
System just critical.
Drain.

10:45 now have 12 units in triangular array with styrofoam inserts. Separation = 1.00"



11:17 water ht = 120.20
System sub critical
Drain

11/2/65

175

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
BI	3×10^{-12}	-	1"	✓	10×10^{-12}
"	"	-	"	✓	"
"	"	-	Cont	-	3×10^{-12}
"	"	-	"	✓	"
RAE	700V	-	Cont	✓	500V
RAE	1200V	-	14"	✓	900V
"	"	✓	1"	✓	"

LOG IN CALIBRATE OPERATE SOURCE No. B 80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by RAV Personnel check by E.I.C.

Instruments and safeties checked and reset by RAV

Source in checked by RAV Source No. M-43

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

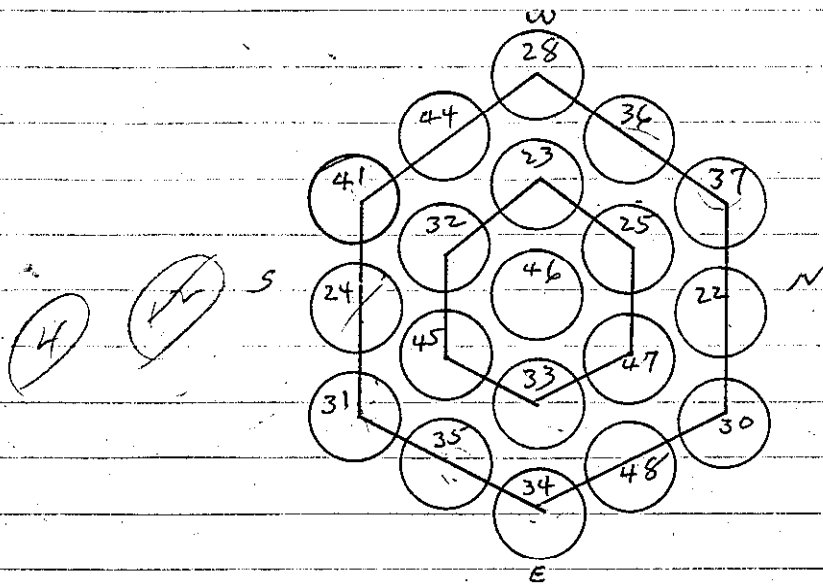
Instruments in trip circuit: K-1-2 PM-1-2

Red light on by RAV Time 1300

Start-up OK'd by E.I.C. RAV Date 11-2-65

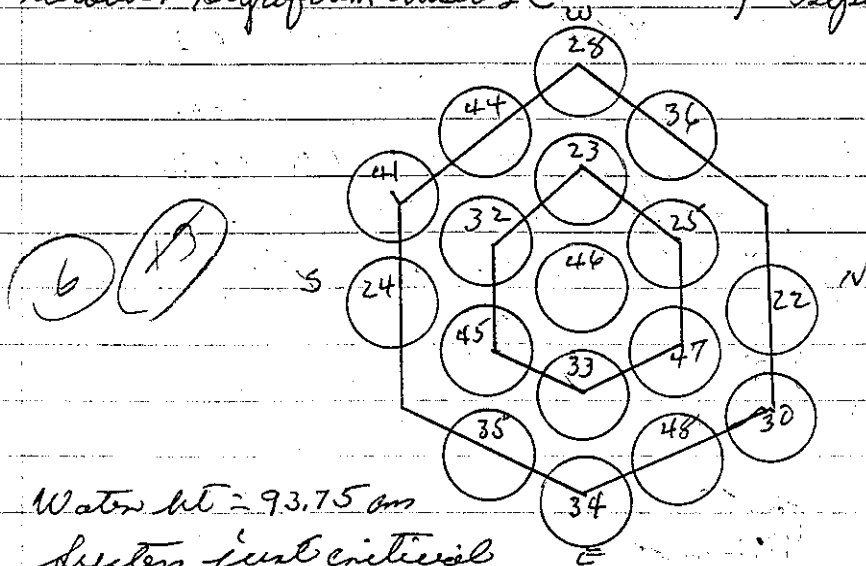
11/2/65
176

1300 Now have 19 units in triangular array with styrofoam inserts (1.55" x 40") Separation = 1.50"



1338 Water ht = 76.60 cm
System just critical
Drain.

1400 Now have 17 units in triangular array as shown below. Styrofoam inserts (1.55" x 40") separation = 1.50"



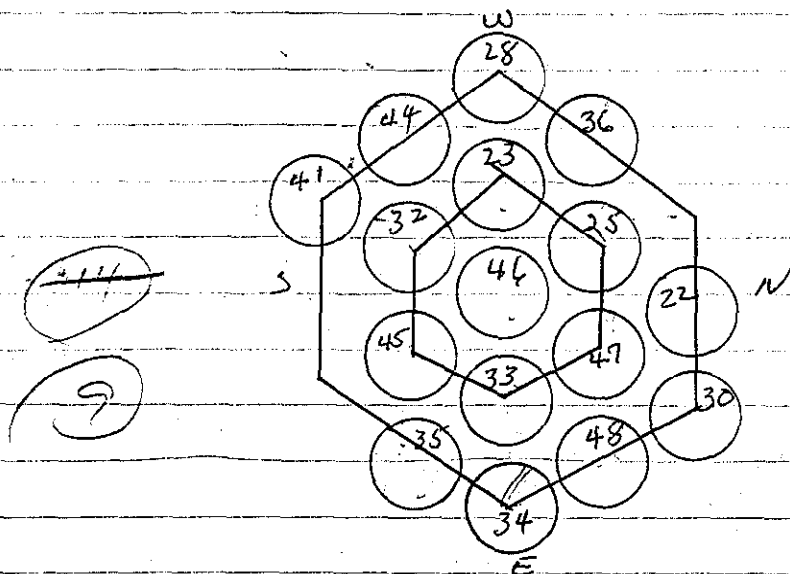
1438 Water ht = 93.75 cm
System just critical
Drain.

11/2/65

177

14:50

now have 16 units in triangular array as shown below - with styrofoam inserts (1.55" x 40") separation 1.50"



15:20

Water ht = 120.05 cm

System sub critical.

Drains

178
11/3/65

INSTRUMENT CHECK

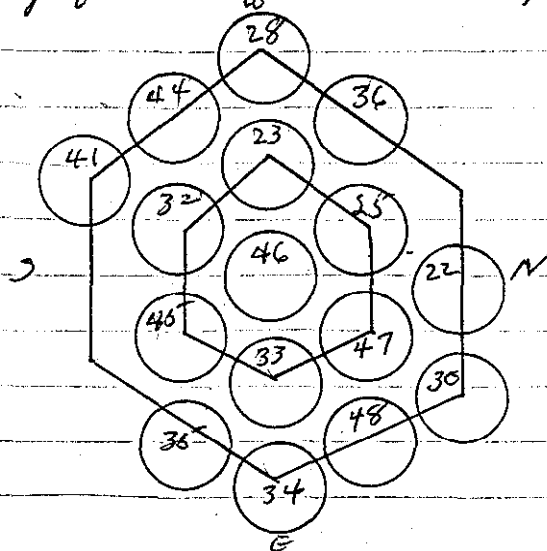
INSTRUMENT	RANGE	TRIP	SOURCE RESERVE	SET	START-UP RANGE
K1	3 x 10 ⁻¹²	✓	1"	✓	10 x 10 ⁻¹²
"	"	✓	1"	✓	"
K2	"	✓	1"	✓	"
"	"	✓	1"	✓	3 x 10 ⁻¹²
"	"				"
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	1"	✓	900V
"	"	Alarm ✓	1"	✓	"
LOG N CALIBRATE	✓	OPERATE	✓	SOURCE No.	B-80
DUMP WELL PROBE LIGHT					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by E.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 E.D.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 12:16
 Start-up OK'd by E.D.C AKM Date 11-3-65

11/3/65

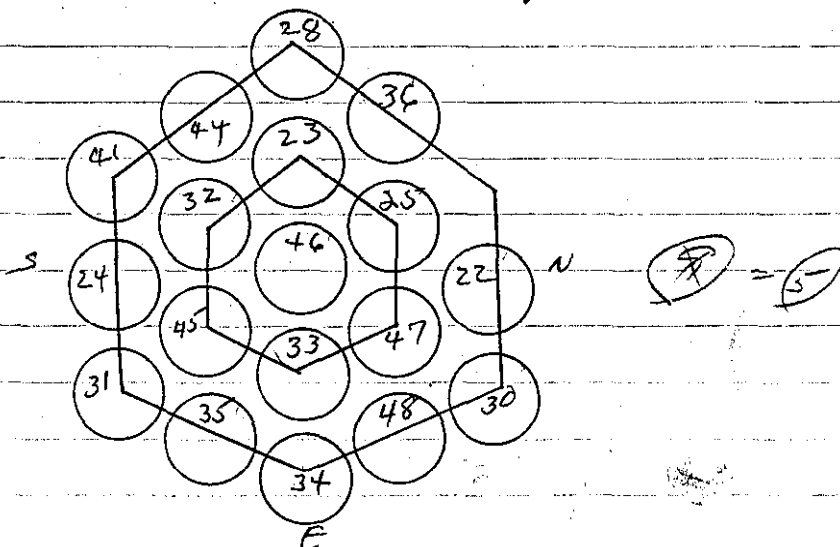
12:16 Now have 16 units in triangular array as shown below. With styrofoam inserts (1.55" x 40") Separation = 0.50"



12:50 Water ht = 120.70 cm

System sub critical
Drain.

13:15 Now have 18 units in triangular array as shown below with styrofoam inserts (1.53" x 40") Separation = 0.50"



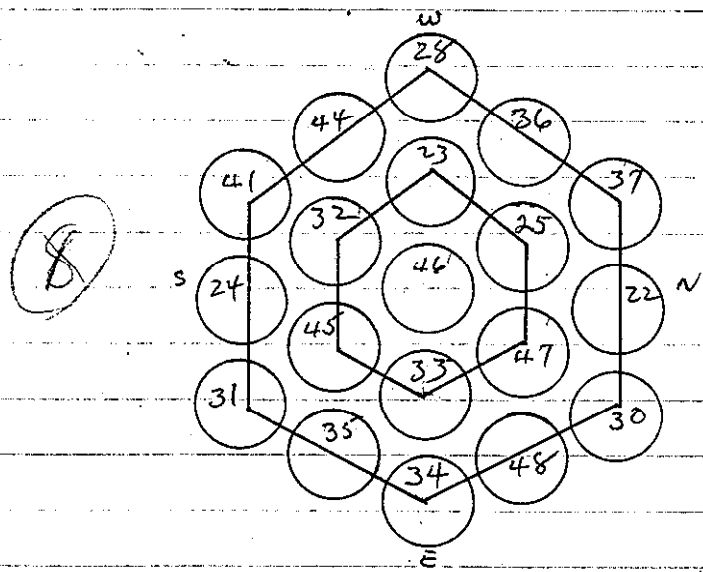
13:44 Water ht = 120.50 cm

System ^{sub} sub critical
Drain.

14/3/65
180

11/4

14:15 Now have 19 units in triangular array as shown below. with styrofoam inserts (1.55" x 40") separation = 0.50"



14:40 Water ht = 100.85 cm
System just Critical
Drain

11/4/65

181

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K1	3×10^{-12}	Meter ✓	1"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K2	"	Meter ✓	cont	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	12"	✓	900V
"	"	Alarm ✓	1"	✓	"

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

START-UP CHECK LIST

Equipment checked by AKA Personnel check by FIDC

Instruments and safeties checked and reset by AKA

Source in checked by AKA Source No. M-43

Emergency equipment in control room checked by FIDC

Instruments in trip circuit: K-12 PM-12

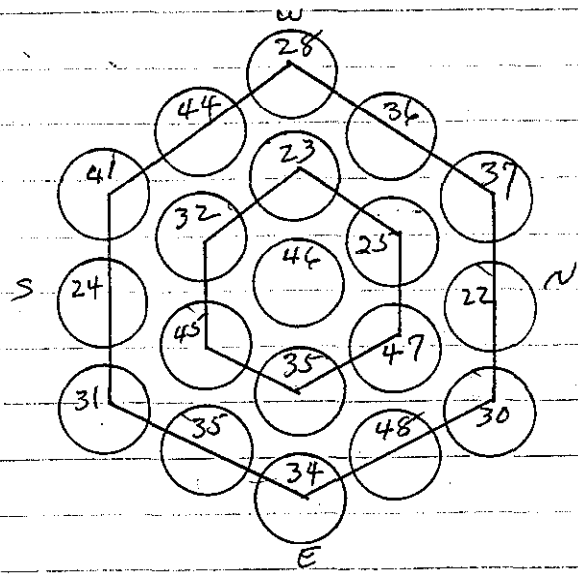
Red light on by AKA Time 1505

Start-up OK'd by FIDC AKA Date 11-4-65

11/4/65
182

11/5/

15:05 now have 19 units in triangular array as shown below. with styrofoam inserts (1" x ^{39"}~~40"~~) Separation = 0.50"



080

1541 Water ht = 70.40 cm
Hepten just critical
Darius

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	10×10^{-12}
	"	Foot <input type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	3×10^{-12}
	"	Foot <input checked="" type="checkbox"/>	"	<input type="checkbox"/>	"
	700V	Alarm <input checked="" type="checkbox"/>	Cont	<input checked="" type="checkbox"/>	500V
	1200V	Low <input checked="" type="checkbox"/>	14"	<input checked="" type="checkbox"/>	900V
	"	Alarm <input checked="" type="checkbox"/>	1"	<input checked="" type="checkbox"/>	"

08

LOG N CALIBRATE OPERATE SOURCE No. B-80

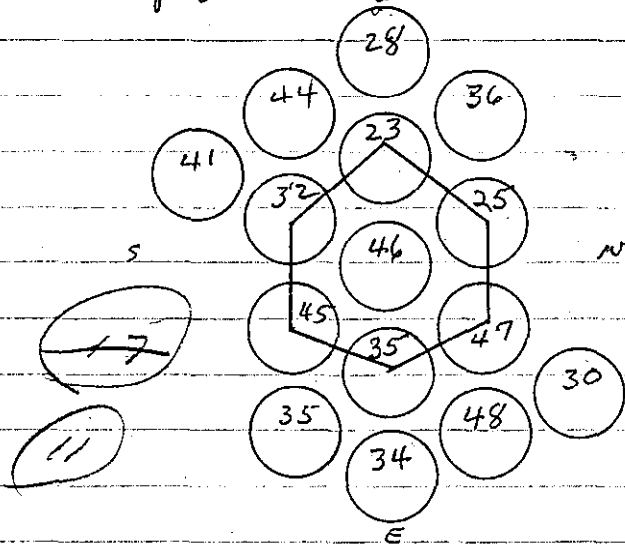
DUMP WELL PROBE LIGHT

11/5/65

START-UP CHECK LIST

Equipment checked by AKV Personnel check by FIDC
 Instruments and safeties checked and reset by AKV
 Source in checked by AKV Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKV Time 0803
 Start-up OK'd by FIDC AKV Date 11-5-65

0803 Now have 15 units in triangular array as shown below, with styrofoam inserts ($1'' \times 4''$), separation = 0.50"

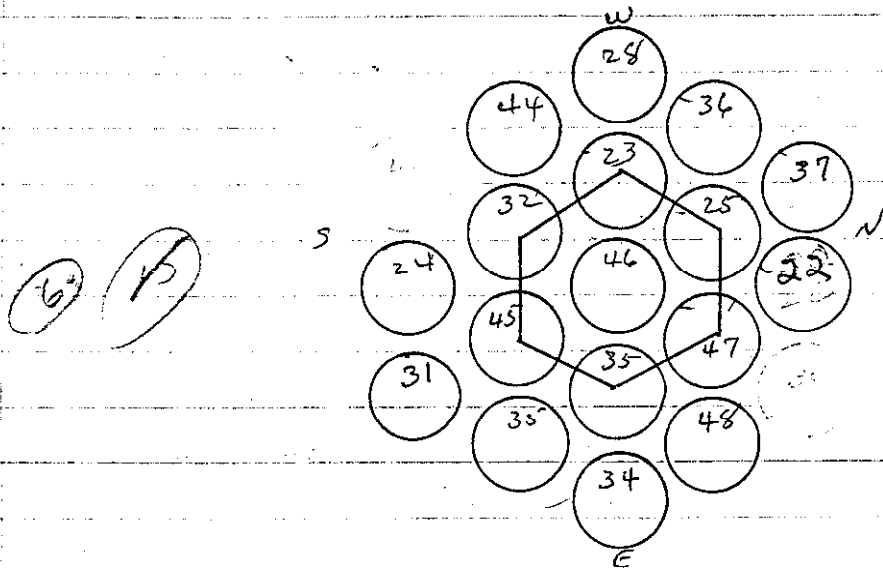


0836 Water ht = 120.20 cm
 System sub critical
 Drain.

11/5/65
184

0930

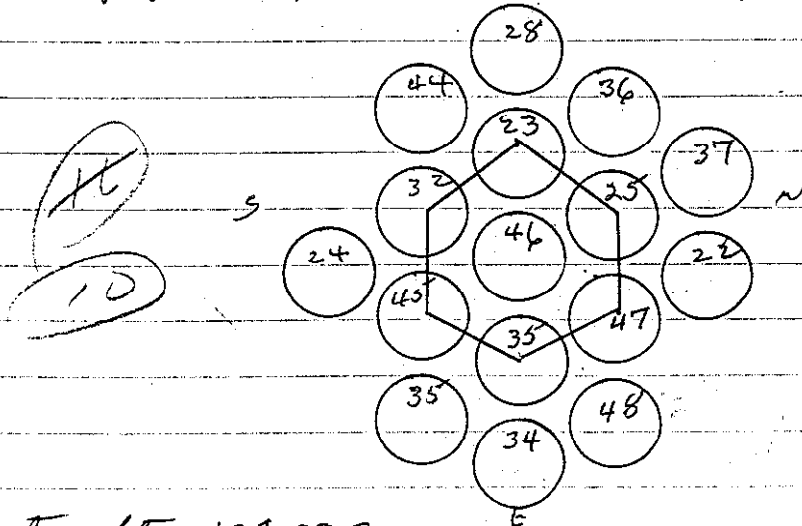
now have 17 units in triangular array as shown below, with styrofoam inserts (1" x 3 3/4") Separation = 0.50"



Water ht = 86.40 cm
system just critical
Drain.

10:25

now have 16 units in triangular array as shown below with styrofoam spacers (1" x 3 3/4") Separation = 0.50"

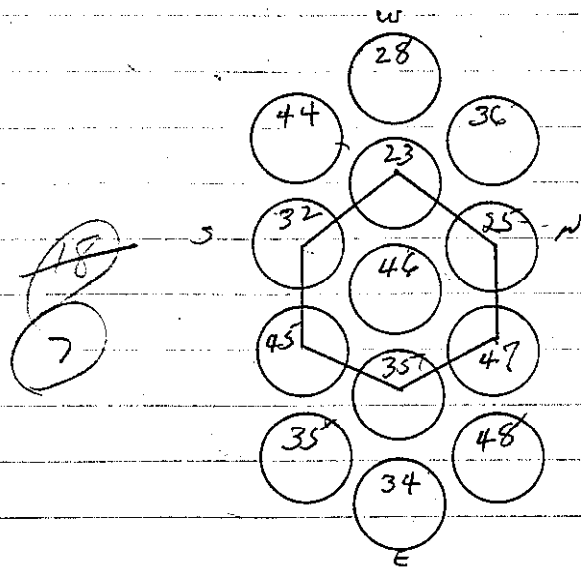


11:00

Water ht = 104.00 cm
system just critical
Drain.

14:45

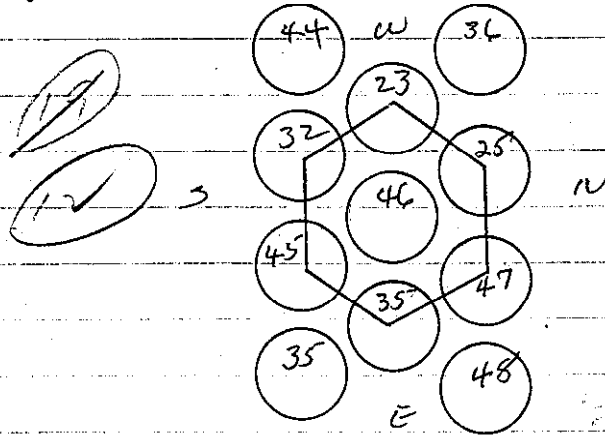
Now have 13 units in triangular array as shown below, with Styrofoam inserts (1" x 39"). Separation = 1.00"



Water ht = 73.80 cm
 System just critical
 Drain

15:30

Now have 11 units in triangular array as shown below with styrofoam inserts (1" x 39"). Separation = 1.00"



Water ht = 120.40
 System very very slightly sub critical
 Same as above - prev.
 $\delta = -945.26$ $u = -1.4 f$

186

11/8/65

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Water ✓	1"	✓	10 X 10 ⁻¹²
"	"	Exp ✓	"	✓	"
K-2	"	Water ✓	1"	✓	3 X 10 ⁻¹²
"	"	Exp ✓	"	✓	"
PM-1	700 V	Alarm ✓	Cont	✓	500 V
PM-2	1200 V	Low ✓	12"	✓	900 V
"	"	Alarm ✓	1"	✓	11

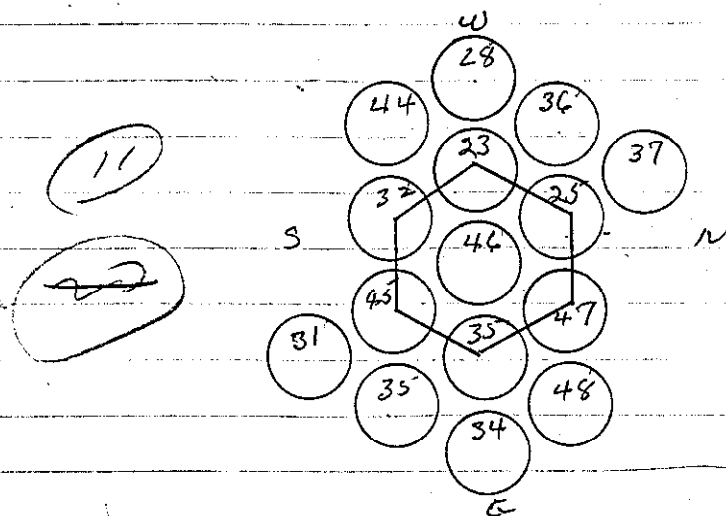
LOG N CALIBRATE OPERATE SOURCE No. B-50
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AMN Personnel check by T.P.C
 Instruments and safeties checked and reset by AMN
 Source in checked by AMN Source No. M-43
 Emergency equipment in control room checked by T.P.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AMN Time 1300
 Start-up OK'd by T.P.C AMN Date 11-8-65

11/8/65

now have 15 units in triangular array as shown below
with styrofoam inserts (1" x 39"). Separation = 1.50"



1335
+535

Water ht ~ 90 cm: then there appears to
be trouble with pump or feed valve,
could not add water: "Trouble found to be
in pump (plugged with plastic).

1530 ~~to~~ Water ht = 97.80 cm
system just critical.
Drain.

188
11/9/65

INSTRUMENT CHECK

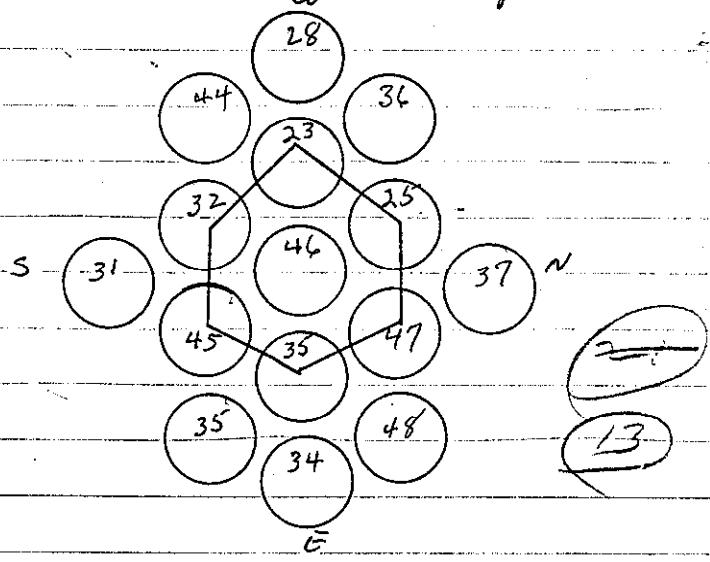
INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	1"	✓	10 X 10 ⁻¹²
"	"	Fct ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	3 X 10 ⁻¹²
"	"	Fct ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	Cont ✓	✓	500V
PM-2	1200V	Low ✓	12" ✓	✓	900V
"	"	Alarm ✓	1" ✓	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by FIDC
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 0805
 Start-up OK'd by FIDC AKM Date 11-9-65

0805 now have 15 units in triangular array. moved slugs #31 + 37 to a different position as shown below.

Styrofoam inserts (1" x 39") Separation = 1.50"

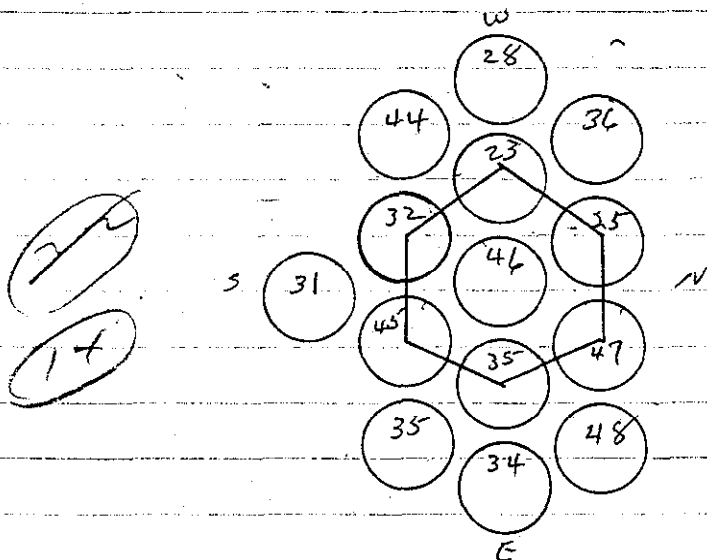


0833 Water ht = 91.20 cm $\Delta h = .40$ cm
 (1) + Prev. $C = 77.14 \text{ mm} = 17.0 \text{ } \phi = 30 \text{ } \mu\text{m}$.

0840 Water ht = 89.80 cm
 kepten just critical
 Drain.

11/9/65
190

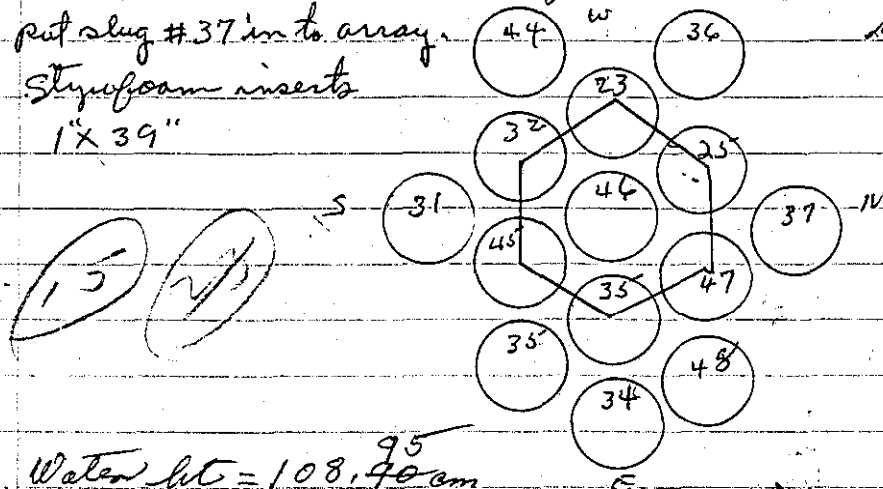
09:15 Now have 14 units in triangular array as shown below with Styrofoam inserts (1" x 39"). Separation = 1.50"



0940 Water ht = 105.20 cm
 (2) + Per. $\Delta h = 1.90$ cm $\tau = 93.44$ cm = 10.4 f = 5.5 f/cm

0948 Water ht = 103.30 cm
 System just critical
 Drains

10:15 14 units in Triangular array. Took plug # 28 out of array and put plug # 37 in to array. Separation = 1.50"
 Styrofoam inserts
 1" x 39"



1040 Water ht = 108.95 cm
 (3) + Per. $\Delta h = 3.70$ cm $\tau = 97.8$ cm = 10.1 f = 2.7 f/cm

7045 Water ht = 105.25 cm
 hysteresis just critical.
 Drain.

1255 Removed 1" x 3.9" styrofoam inserts from units in array as shown on bottom of page 190. Separation still 1.50"

Water ht = -
 (4) + Per 95.60 cm $D_h = 1.90 \text{ cm}$
 $C = 73.88 \text{ cm} = 12.44 = 6.54 \text{ cm}$

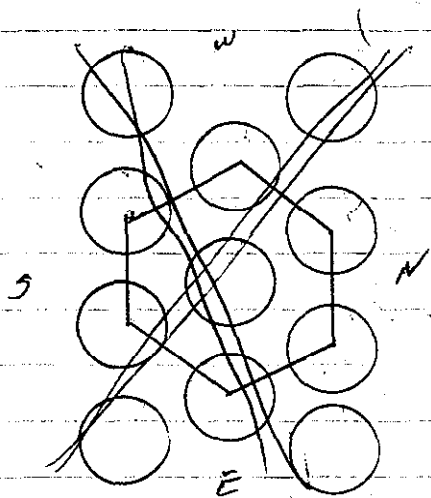
1320 Water ht = 93.70 cm
 hysteresis just critical
 Drain.

1348 Same array as shown on page 189. Styrofoam inserts removed. Separation still 1.50" (compared to array as shown at bottom of page 189 $h = 8.255 \text{ cm}$)

1410 Water ht = 83.60 cm. $D_h = 1.1 \text{ cm}$.
 (5) + Per
 $C = 82.57 \text{ cm} = 11.24 = 10.24 \text{ cm}$

1416 Water ht = 82.50 cm
 hysteresis just critical.
 Drain.

1540 Sample taken from unit #43. = 3.6 grams.



2-2-66

U(1.95) Slugs
6.2 in. DD, 2.6 in. ID

193

INSTRUMENT CHECK

INSTRUMENT	RANGE	TYPE	SCALE	TEST	READING
K-1	3x10 ⁻¹²	Flow	2" 7"	✓	3x10 ⁻¹²
"	"	Flow	"	—	"
K-2	"	Flow	3 1/2"	—	"
"	"	Flow	"	✓	"
R-1					
R-2					
PM-1	700V	Temp	cent	—	5000
PM-2	1900V	Temp	14"	—	9000
"	"	Temp	3"	—	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL FROSE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by D.C

Instruments and collection checked and reset by AKH

Sources in checked by AKH Source No. M-93

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

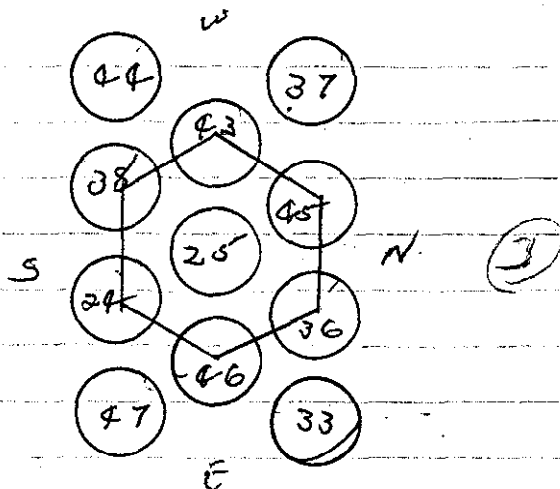
Instruments in calibration: K-1-2 PM-1-2

Red light on by AKH Time 0810

Start-up OK'd by D.C. AKH Date 2-2-66

Water Zero: Top of grating = 0.1 cm.

(OVER)



0815 Have 11 units in triangular array as shown above, separation = 1.00"

0900 Water ht = ^{9.5} 108.40 cm
 hepten just critical. (N/E)

0903 ⁽¹⁾ + Per $\tau = 196.66 \mu = 5.64 = 10.2 \text{ } \mu/\text{cm}$.
 Water ht = 109.50 cm

0913 ⁽²⁾ - Per
 Water ht = 108.50 cm

Water temp.
 = 26.0°C

0920 Drain:

after draining, and checked array and found that water ht was not as shown above. Found that sight glass was plugged some what with pleffone and dirt.

1400 Recheck of zero: Top of grating water ht = 0.1 cm on back scale.

Feed rate = 4.5 cm/min

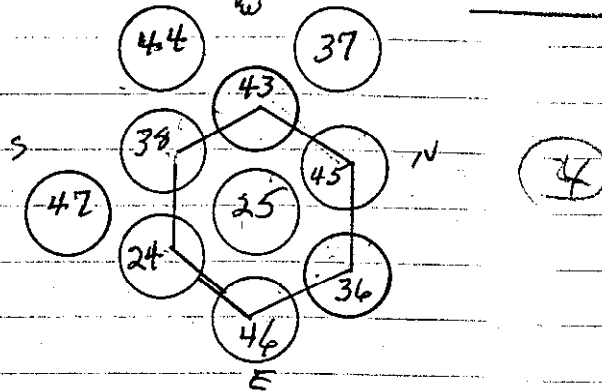
Disp = 4.80 cm/min

Drain = 4.80 cm/min

1439 Water ht = 82.15 cm $H_c = 82.1$

→ system just critical.

1530 now have 10 units in triangular array as shown below. Deposition = 1.00⁸¹⁰



1608 Water ht = 93.65 cm $H_c = 93.6$

system just critical
Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Master ✓	1/2	✓	3 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Master ✓	1"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1700V	Low ✓	14"	✓	900V
"	"	Alarm ✓	2"	✓	"

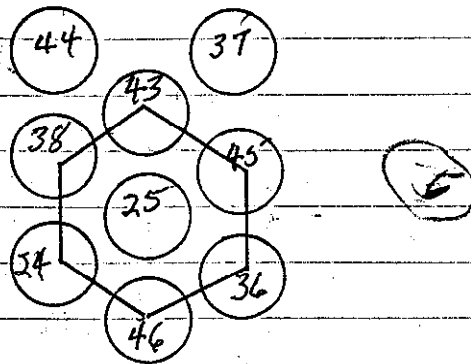
LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

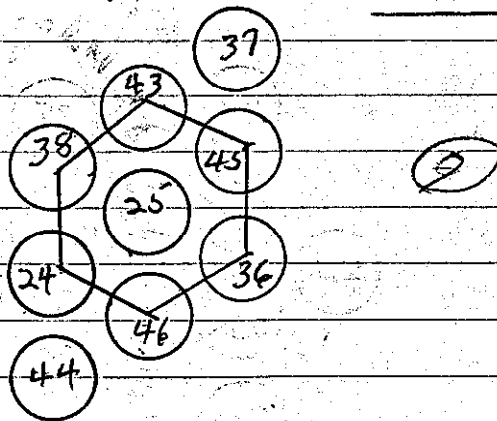
Equipment checked by AKH Personnel check by F.D.C
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. 1793
 Emergency equipment in control room checked by F.D.C
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0815
 Start-up OK'd by F.D.C AKH Date 2-3-66

0815 now have 9 units in triangular array as shown below. Separation 1.00"



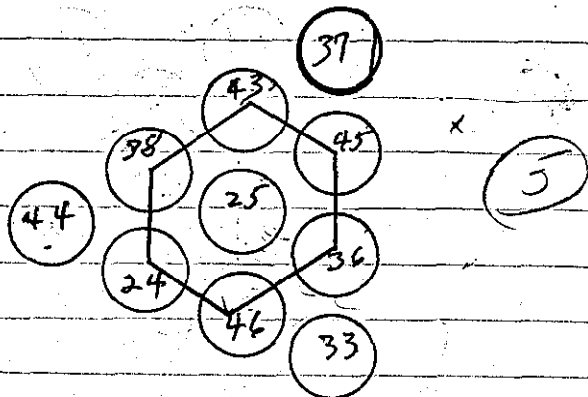
0901 Water ht = 120.90 cm
System sub critical
Drain.

0915 Have 9 units in triangular array as shown below - Separation = 1.00"



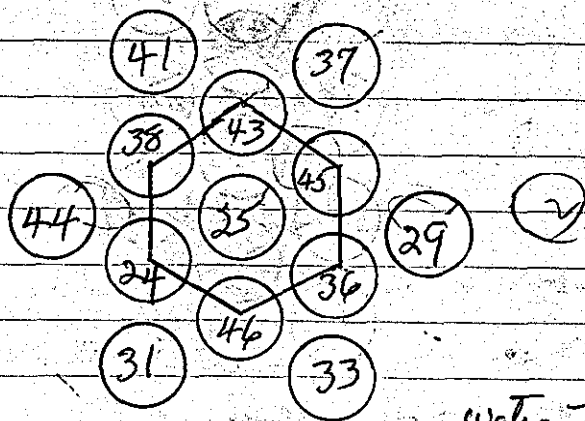
0954 Water ht = 120.10 cm
System very sub critical
Drain.

10:30 now have 10 units in triangular array
as shown below. Separation 21.00"



10:55 Water ht = 120.0 cm Water Temp = 26.0°C
System sub critical
Per. = 153.19 sec = 11.8 f

15:20 now have 13 units in triangular array
as shown below. Separation: 0.50"



15:50 Water ht = 119.90 cm
System sub critical
DRAIN.

Water Temp.
= 26.0°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
113	10 ⁻¹²	✓	cont	✓	10 x 10 ⁻¹²
"	"	✓	"	✓	"
"	"	✓	1/2"	✓	"
"	"	✓	"	✓	"
7000		✓	cont	✓	5000
12000		✓	1 1/2"	✓	9000
"		✓	2"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

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

Instruments in trip circuit: R-1-2 P19-1-2

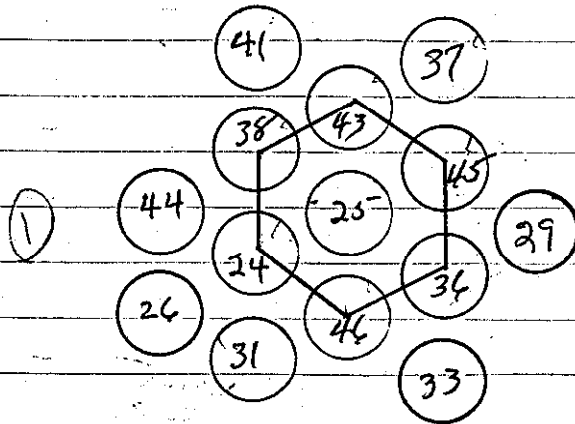
Red light on by AKH Time 0825

Start-up OK'd by F.I.P.C AKH Date 2-4-66

over

200

08:30 Have 14 units in triangular array as shown below - separation = 0.50"

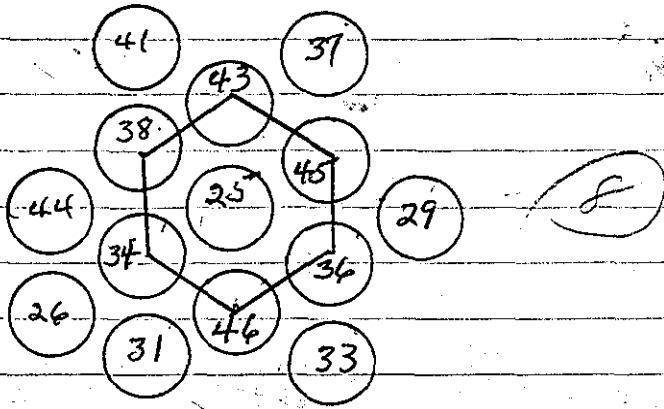


Water ht = 99.60 cm $D_h = 1.20$ cm.
+ Per.

Water Temp.
= 26.2°C

09:36 Water ht = 93.40 cm $H_c = 93.3$
hyeter just critical
Drain.

15:20 Have 14 units in triangular array as shown below. Separation = 1.50"



1547 Water ht = 77.05 cm
system just critical
Drain.

Water Temp
= 26.2 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	cont	—	10 X 10 ⁻¹²
"	"	Fast ✓	17	—	"
K-2	"	Meter ✓	cont	—	"
"	"	Fast ✓	"	—	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	cont	✓	500 V
PM-2	1200 V	Low ✓	14"	✓	900 V
"	"	Alarm ✓	2"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT _____					

0

09

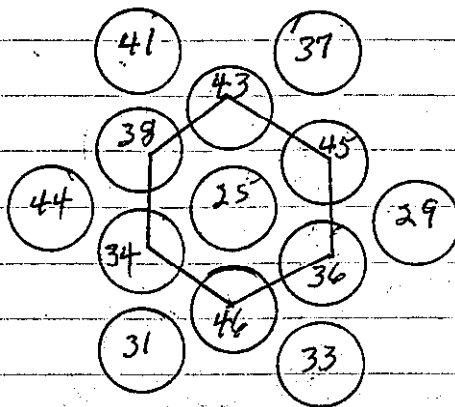
START-UP CHECK LIST

Equipment checked by AKM Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. M-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 0808
 Start-up OK'd by F.D.C. AKM Date 2-8-66

0

0815

Now have 13 units in triangular array as shown below. Separation = 1.58"



9

Water temp.
= 72°F

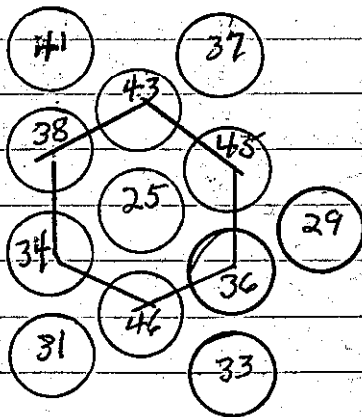
0837

Water ht = 91.55 cm
System just critical
Onset.

Read with mercury
thermo.

0905

Now have 12 units in triangular array as shown below. Separation = 1.50"

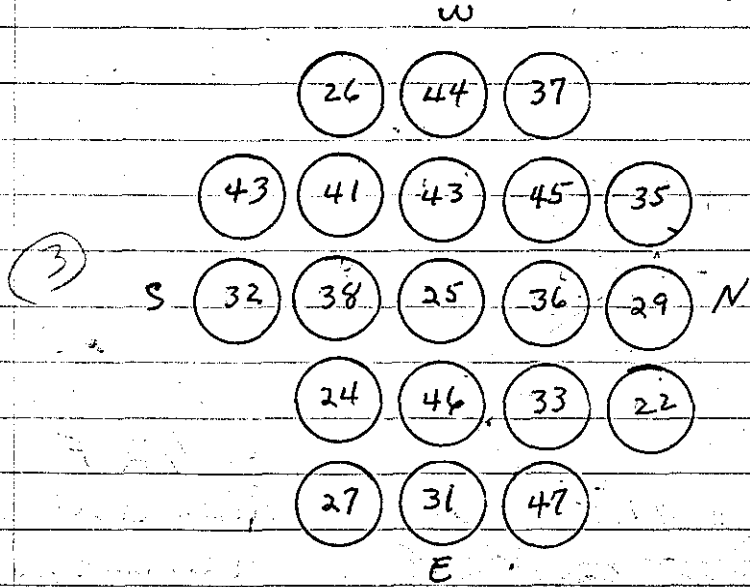


10

0930

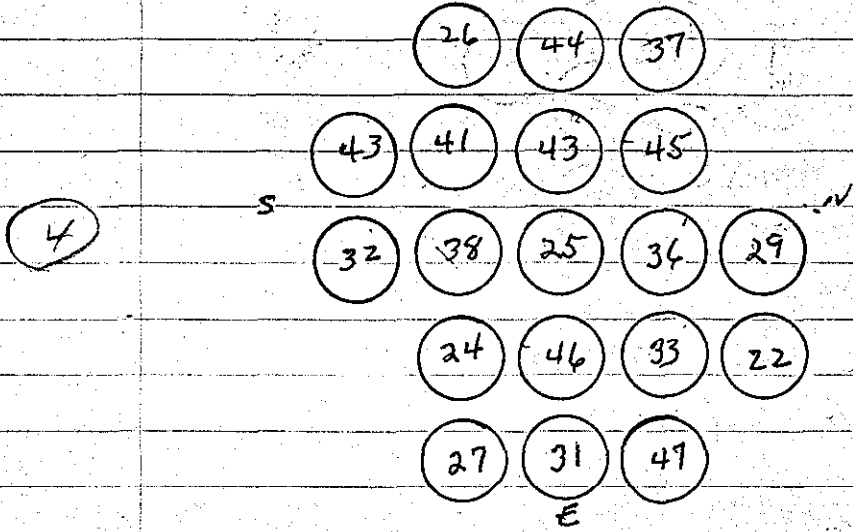
Water ht = 120.10 cm
System sub critical
Onset.

14:15 Now have 20 units in square array as shown below - separation = 0.50"



1437 Water ht = 65.80 cm
 hysteresis just critical
 Chain

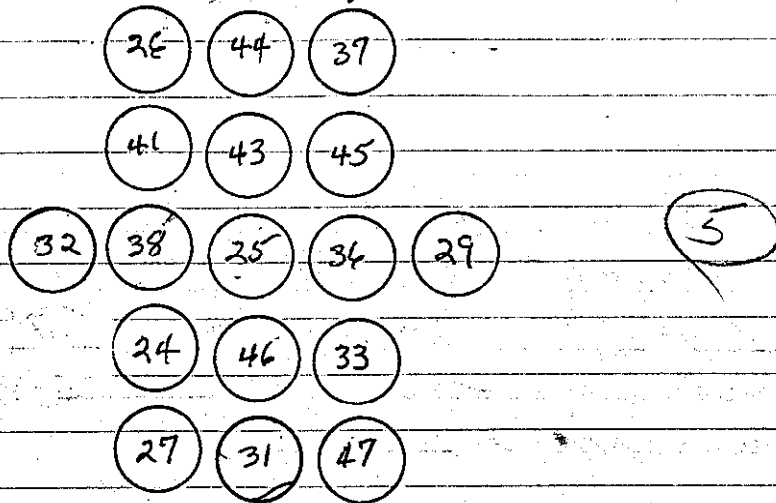
1445 Now have 19 units in square array as shown below separation = 0.50"



water temp.
 = 73.5°F

15:15 Water ht = 71.90 cm
 System just critical
 Drain.

15:30 now have 17 units in square array as
 shown below. Separation = 0.50"



15:58 Water ht = 89.00 cm
 System just critical
 Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	cont	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1/2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	7000	Alarm ✓	cont	✓	5000
PM-2	12000	Low ✓	1 1/2"	✓	9000
"	"	Alarm ✓	2"	✓	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT _____					

09

START-UP CHECK LIST

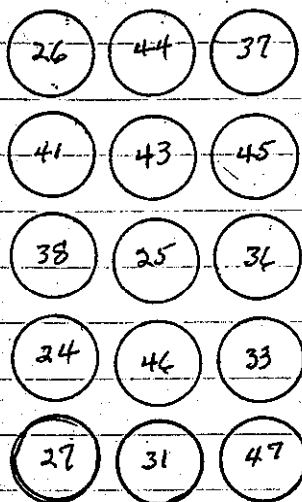
Equipment checked by AKH Personnel check by F.I.D.C
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-93
 Emergency equipment in control room checked by F.I.D.C
 Instruments in trip circuit: R-1-2 PM-1-2
 Red light on by AKH Time 0825
 Start-up OK'd by F.I.D.C AKH Date 2-8-66

09

0

0825

now have 15 units in square array as shown below. Separation = 0.50".



water temp.
= 72° F

0900

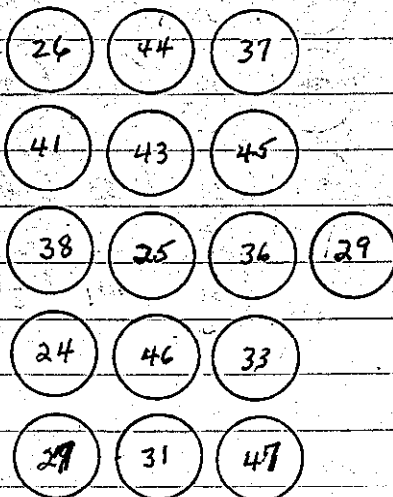
Water ht = 120.00 cm

System sub critical

Drain

0920

now have 16 units in ~~square~~ square array as shown below. Separation = 0.50".



0951

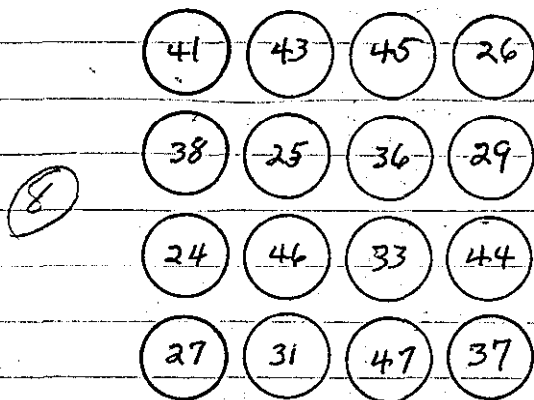
Water ht = 104.00 cm

System just critical

Drain

0925

Now have 16 units in square array
as shown below. Separation = 0.50".



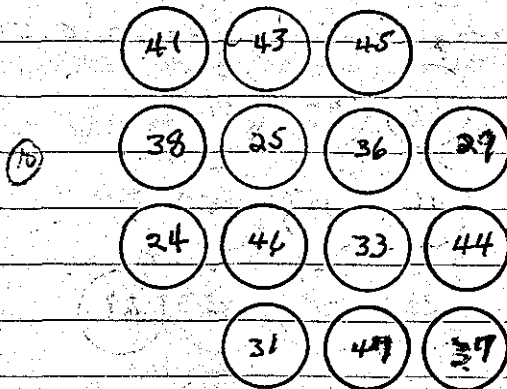
10:50

Critical water height 83.2 cm.

Drain

11:15

Moved 2 corner units as shown below.
Now have 14 units in square array. Separation 0.50".



1143

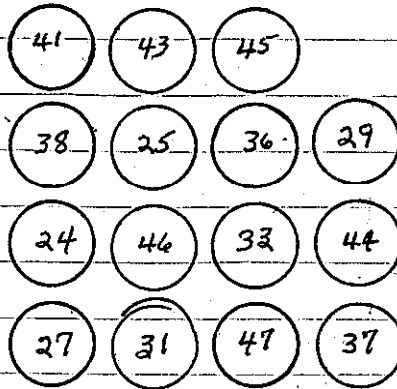
Water ht = 119.30 cm

System sub critical. System sub critical

Drain:

1300

Put 1 corner unit back ^{in array} as shown below.
 now have 15 units in square array. Separation 0.50"



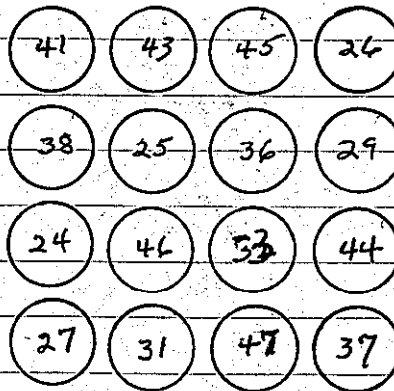
1328

Water ht = 95.30 cm

System just critical
Drain.

1525

now have 16 units in contact in square array. Separation = 0.0"



1553

Water ht = 119.70 cm

System sub critical
Drain

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	cont	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	2"	✓	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

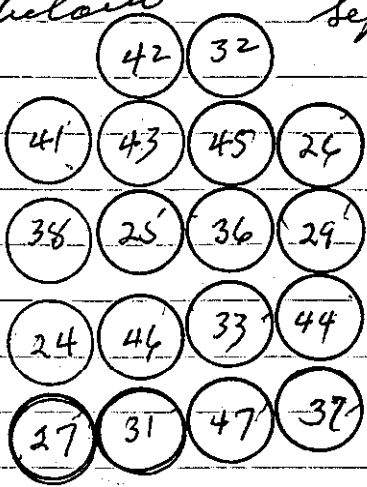
Emergency equipment in control room checked by F.D.C.

Instruments in trip circuit: K-1-2 P17-1-2

Red light on by AKH Time 0820

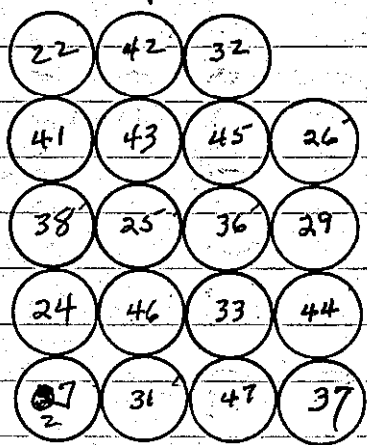
Start-up OK'd by F.D.C. AKH Date 2-9-66

08:30 Now have 18 units at contact in square array as shown below Separation 0.0"



09:08 Water ht = 119.60 cm
System slightly sub critical.
Drain.

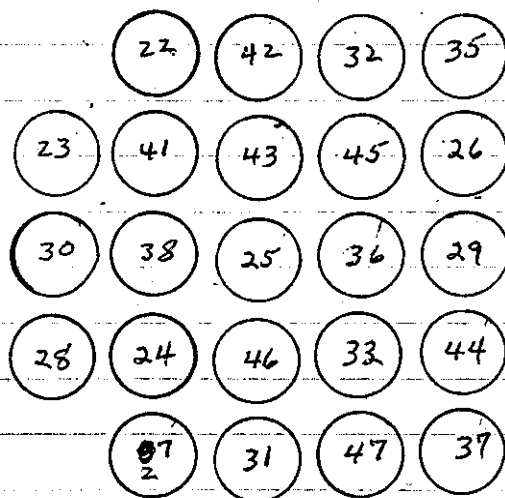
09:30 Now have 19 units at contact in square array as shown below. Separation = 0.0"



Water Temp
73.0°F

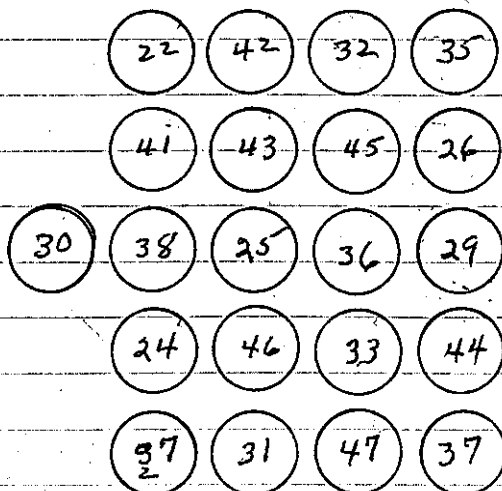
10:05 Critical water height = 99.90 cm.
Drain

14:20 Now have 23 units in square array
as shown below. Separation = 1.00".



1456 Water ht = 75.35 cm
system just critical.
Drains

15:20 Now have 21 units in square array as
shown below. Separation = 1.00".



1550 Water ht = 85.80 cm
system just critical.
Drains

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1/2"	✓	10×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	2"	✓	"

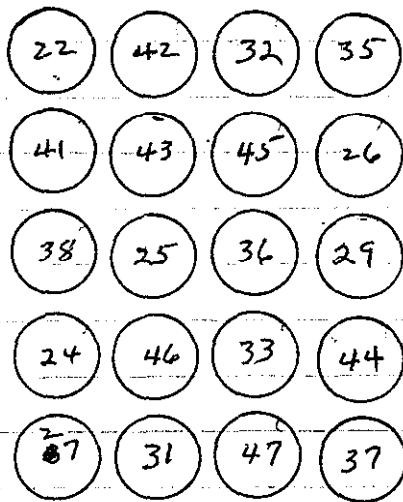
LOG N CALIBRATE OPERATE SOURCE No. B-80
 DUMP WELL PROBE LIGHT 7

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FIDC
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments-in-trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0810
 Start-up OK'd by FIDC AKH Date 2-10-66

0815

New have 20 units in square array as shown below. Separation = 1.00".



0850

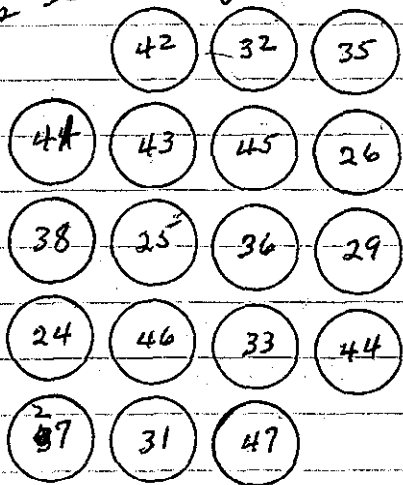
Water ht = 90.20

System just critical

Drain:

0915

New ^{have} 18 units in square array as shown below.



Separation = 1.00"

15

Temp = 73°F

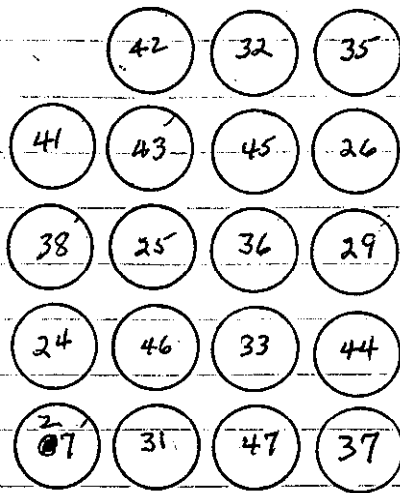
0942

Water ht = 120.00 cm

System slightly sub critical.

Drain:

0950 New home 19 units in square array as shown below. Separation = 1.00".



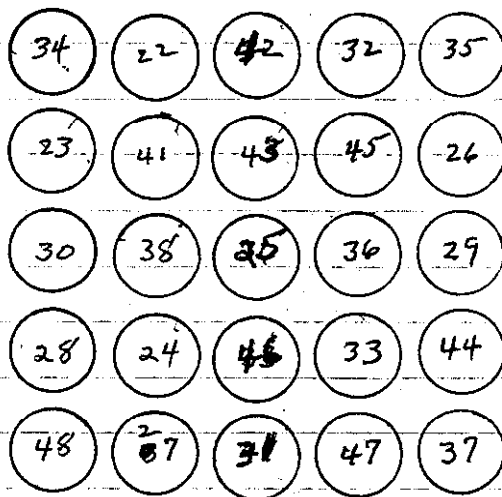
1030 Water ht = 98.90cm
 system just critical
 Drain.

216

15:20

now have 25 units in square array as shown below. Separation = 1.15 inches.

14



1547

Water ht = 86.15 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	1"	✓	10 X 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 ✓	Alarm	cont	✓	500 ✓
PM-2	1200 ✓	Low ✓	14"	✓	900 ✓
"	"	Alarm ✓	2"	✓	"

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

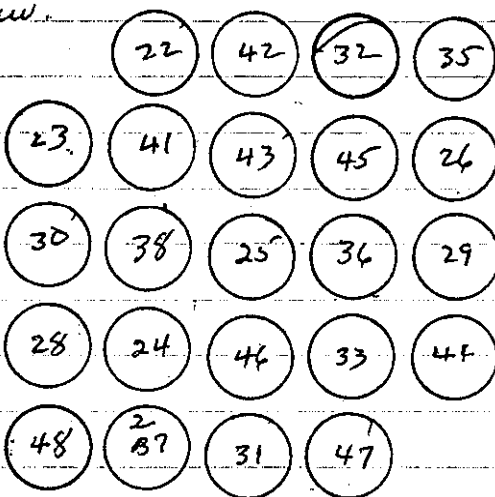
START-UP CHECK LIST

Equipment checked by AKH Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKH Time 0809
 Start-up OK'd by F.D.C. AKH Date 2-11-66

0815

New hole 23 units in square array as shown below. Separation = 1.15''

(17)



0845

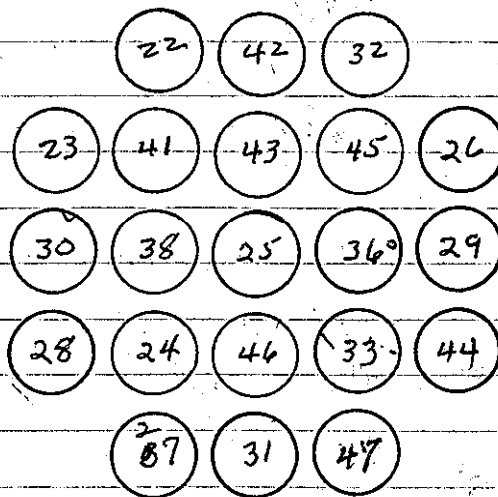
Water ht = 93.65 cm

System just critical
Drain.

0915

New hole 21 units in square array as shown below. Separation = 1.15''

(15)



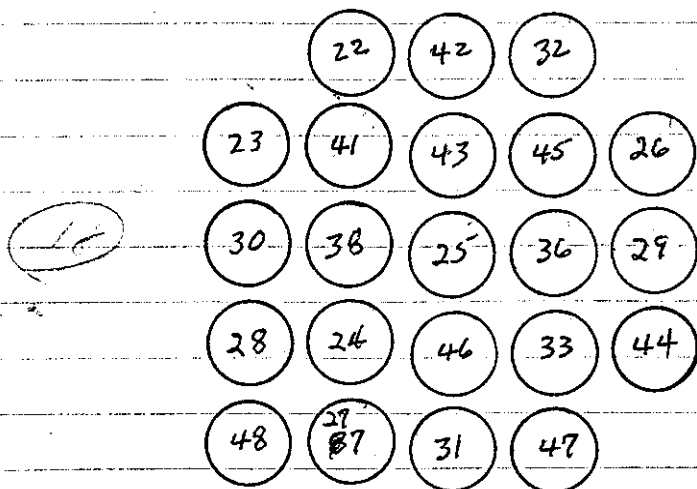
Water Temp
= 73.0°F

0942

Water ht = 120.0 cm

System ^{slightly} sub critical

10:00 now have 22 units in square array as
shown below separation = 1.15"



10:42 Water ht = 101.60 cm
system just critical
Drain.

220 Non 20" S.S. pipe: $\frac{20}{77}$ mil wall. Volume = 68,421 e.

$U(3)O_2F_2$ Solution INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	High ✓	1"	✓	3×10^{-12}
"	"	" ✓	"	✓	"
K-2	"	High ✓	1"	✓	"
"	"	" ✓	"	✓	"
R-1					
R-2					
PM-1	700V	High ✓	Cont	✓	500V
PM-2	1200V	Low ✓	14" + 2"	✓	900V
"	"	High ✓	3"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT		✓			

START-UP CHECK LIST

Equipment checked by AKM Personnel check by AKM
 Instruments and safeties checked and reset by AKM
 Source in checked by 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 0810
 Start-up OK'd by F.D.C AKM Date 2-24-66

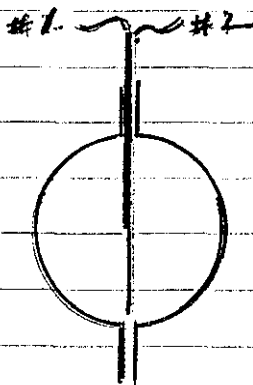
Solution Zero = 26.0 cm. Loop zero = 4.8 cm.
 Feed rate = 32.7 cm. to 35.3 cm = 2.6 cm/min.
 1/2" drain = 66.1 cm. to 61.4 cm. = 4.7 cm/30 SEC = 9.4 cm/min.
 3" drain = 61.4 cm. to 44.2 cm. = 16.6 cm/15 SEC = 66.4 cm/min.

0934 Solution ht = 78.40 cm ^{2.6 cm in top spout} $\log \tau = .018$ slope = 5.20 cm.
 System slightly sub critical.
 $P_{cr} = -129.29 \text{ sec} = -15.5 \text{ f}$
 $q_h = 52.40 \text{ cm}$

0945 Drain to below zero:

1044 Solution ht = 92.30 cm ^{13.7 cm in top spout.} $\log \tau = .015$ slope = 5.20 cm
 System still sub critical.
 $P_{cr} = -118.4 \text{ sec} = -18.3 \text{ f}$
 $q_h = 66.30 \text{ cm}$

1055 Drain:



Added 2 Thermocouples #1 + #2 as shown above. Plus 1 pc. of plastic 1" x 3" x 13" to side of sphere, in order to increase reactivity.

over.

1322 Solution ht = 91.90 cm. Log $n = .012$

Removed plepiglass skin and covers:
 system still sub critical.

- Per. = $\sim 108.65 \text{ sec} = -22.2 \text{ f}$

$q_h = 65.90 \text{ cm}$

Temp: #1 = 26.2°C

#2 = 27.0°C

1329

Drain:

2-25-66
66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Fest ✓	"	✓	"
K-2	"	Meter ✓	1"	✓	10×10^{-12}
"	"	Fest ✓	"	✓	"
H-1					
P-3					
PM-1	700V	Alarm ✓	Cont	✓	500V
PM-2	1200V	Low ✓	19"	✓	900V
"	"	Alarm ✓	3"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-60
DUMP WELL-PROBE LIGHT		✓			

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FID.C
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. M-43
 Emergency equipment in control room checked FID.C
 Instruments in trip circuit: K-1-2 P.M-1-2
 Red light on by AKH Time 0805
 Start-up OK'd by FID.C AKH Date 2-25-66

27
0925 Solution ht = 92.50 ± 20
 ~ 16.70 cm in top apparatus
 Temp °C
 #1 = 19.5 avg = 20.05°C
 #2 = 20.6
 #6 - air temp in room = 16.5°C
 O.K.

$h_{top} = 5.25 \text{ cm}$
 $\log \eta = .065$

0935

solution ht = 92.20 cm

Temp. #1 = 19.6

same out.

$$\textcircled{1} - \text{Per. } \tau = -488.93 = -2.9 f$$

 $h_b = 66.20 \text{ cm}$
 $\#2 = 20.5$
 $\#6 \text{ air} = 16.5^\circ$
 $\text{avg} = 20.05^\circ$

0944

same in.

Temp #1 = 19.6 °C

 $\text{avg } 20.05^\circ \quad \#2 = 20.5^\circ$
 $\#6 \text{ air} = 16.4^\circ$

1010

solution ht = 91.85 cm

 $\log \eta = .080$

Temp ° #1 = 19.5

same out.

 $20.0^\circ \quad \#2 = 20.5$

$$\textcircled{2} - \text{Per. } \tau = -506.31 \text{ cm} = -2.7 f$$

 $h_b = 65.85 \text{ cm}$
 $\#6 \text{ air} = 16.6$

1020

same in.

Temp #1 = 19.5

 $20^\circ \quad \#2 = 20.5$
 $\#6 \text{ air} = 16.5$

1136

solution ht = 93.00 cm

 $\log \eta = .10$

same out.

Temp #1 = 19.2

$$\textcircled{3} - \text{Per. } \tau = -823.57 \text{ cm} = -1.7 f$$

 $h_b = 67.00 \text{ cm}$
 $\#2 = 20.1$
 $\#6 \text{ air} = 17.0$
 $\text{avg} = 19.65 \text{ or } 19.7^\circ$

1145

same in.

2-25-66

225

1200 Drain solution from ^{upper} spouts to 75.90 cm.

Temp #1 = 19.2 °C
avg = 19.7 °C #2 = 20.1 °C
#6 air = 16.7 °C

1215 Solution ht = 75.90 Log $\eta = .085$

same out.

$\rho - \rho_{air} = -528.04 \text{ au} = -2.7 f$

$\eta_h = 49.90 \text{ cm}$

Temp #1 = 19.1

#2 = 20.1

#6 air = 16.5

avg = 19.6 °C

1227 Same in:

Conductivity avg 18.65 °C

1255 Pulled thermocouples #1 + 2 up out of solution into tubing above sphere.

1302 Solution ht = 75.90 $\eta_h = 49.90$

same out:

~~1305~~ kept super critical.

1312 kept just critical.

Solution ht = 75.00 cm.

$\eta_h = 49.00 \text{ cm}$

75.05 cm +
74.95 cm -

over.

1319 Drain solution to ~ 73.0 cm in order to reduce power level.

1322⁵ solution ht = 75.85 cm.
 + Per $\tau = 162.98$ sec = 6.7 ϕ
 $\frac{1}{2} h_2 = 49.85$ cm

1325 Drain to ~ 73.6 cm to reduce power level.

1338⁶ solution ht = 93.00 cm
 + Per $\tau = 128.21$ sec = 8.1 ϕ
 $\frac{1}{2} h_2 = 67.00$ cm

1347 solution ht = 75.00 cm
 system just critical.
 $\frac{1}{2} h_2 = 49.00$ cm

1349 Drain to ~ 73.4 cm to reduce power level.

1355⁷ solution ht = 116.25²⁰ cm
 + Per $\tau = 118.86$ sec = 8.6 ϕ
 $\frac{1}{2} h_2 = 90.20$

Temp.
 #6 air = 17.5°C

1401 Drain to ~ 72.80 cm.

1415 Overped

2-28-66

227

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	2"	✓	"

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

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

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

Red light on by AKH Time 0820

Start-up OK'd by F.I.C. AKH Date 2-28-66

Put thermocouples # 1 + 2 back in use.
Seals = 4.8 cm
over.

25C

228

Solution Zero = 26.00 cm.

0917 Solution ht = 75.80 cm

 $\Delta h = 1.05 \text{ cm}$

heaps = 5.25

Temp = $^{\circ}\text{C}$

(1) + Per.

$$T = 106.48 \text{ m} = 9.4 \text{ f} = 8.95 \text{ f/cm}$$

$$q_h = 49.80 \text{ cm}$$

17.4 μ 1 = 17.5

12 = 17.6

Gain = 13.0

heaps = 5.25 cm

0927 Solution ht = 74.75 cm

Temp = $^{\circ}\text{C}$

heaps just critical

$$q_h = 48.75 \text{ cm}$$

avg = 17.45

1 = 17.4

2 = 17.5

Gain = 13.1

0932 Removed thermocouples μ 1 & 2 from vessel.

0938 Solution ht = 75.10 cm

 $\Delta h = .80 \text{ cm}$

(2) + Per

$$T = 85.83 \text{ m} = 11.1 \text{ f} = 13.88 \text{ f/cm}$$

$$q_h = 49.10 \text{ cm}$$

0946 Solution = 74.30 cm $q_h = 49.30 \text{ cm}$

heaps just critical

Drain to ~ 51.00 i.

solution samples taken.

1005. Drain.

2-28-66

229

Y-12
Req # 684494

X-10
Req # A-611

$\epsilon = 140.0 \text{ g}$

$\epsilon = 130.0 \text{ g}$

$T = 18.8$

$T = 19.7$

$N = 121.2$

$N = 110.3$

sub for:

1 - $\text{g/g} = 4.47200$

2 - spec

3 - $\text{onay} = 4.91$

4 - $\text{sp. gr} = 2.0267$

5 - Temp. @ 25°C

$= 906.37 \text{ g}^2/2$

sub for:

1 - $\text{g/g} =$

2 - $\text{sp. gr.} = 2.0316$ at 22.5°C

3 - density = 2.0269 at 22.5°C

4 - Temp. "

net/gal
905.105

1230

added 6 (0.062" x 2.0" x 20.0") support ribs^{vent} to
spher. These are \sim center of fixed ribs.
Also put thermocouples #1 & 2 in vessel.

1323

solution ht = 75.55 cm $z_h = 1.10 \text{ cm}$

3 + per

$\epsilon = 74.91 \text{ me} = 12.3 \text{ g} = 11.18 \text{ g/cm}$

Temp = 0°C

#1 = 17.6

$z_h = 49.55 \text{ cm}$

avg = 18.4

6 (air) = 13.9

1330

solution ht = 74.45 cm

system just critical

Drain to \sim 66.0 cm.

$z_h = 48.45 \text{ cm}$

seen.

1335 Removed thermocouples # 1 & 2 from vessel.

1341 Solution ht = 74.90 cm $d_h = .95$ cm
 + Per
 $\bar{c} = 67.36$ cm = 13.3 ϕ = 14.0 ϕ cm.
 $\phi_h = 48.90$

1350 Solution ht = 73.95 cm
 System just critical
 Drain. $\phi_h = 47.95$ cm

1430 Removed the 2 long rings and the 6 vertical ribs.

1513
~~1557~~ Solution ht = 62.6 cm. Temp \bar{c} II - 1 = 18.1
 Removed thermocouples
 # 1 & 2 from vessel. $\bar{c} = 19.1$
 $\text{avg} = 18.6$
 $\text{gain} = 13.1$

1525 Solution ht = 75.25 cm $d_h = .75$ cm.
 + Per $\phi_h = 49.25$ cm
 $\bar{c} = 85.83$ cm = 11.1 ϕ = 14.8 ϕ cm

1534 Solution ht = 74.50 cm $\phi_h = 49.50$ cm
 System just critical
 Drain.

{ at

3-4-66

20" sphere

231

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Motor -	1"	-	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Motor ✓	"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm -	cont	-	500V
PM-2	1200V	Low ✓	1 1/2"	✓	900 + 300
"	"	Alarm	3"	✓	✓

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

Calibration zero = 26.00 cm. slope = 4.8 cm.

START-UP CHECK LIST

Equipment checked by AKW Personnel check by FIRC

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

Source in checked by AKW Source No. M-43

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

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

Red light on by AKW Time 0820

Start-up OK'd by F.I.D.C. AKW Date 3-4-66

0800 Added 6 triangular (A) pe to top half of sphere. In order to double wall thickness. Pe made same on sphere. Thickness of pe = avg. thickness of 6 pe = 20.58 mils. (Note 4 measurement made of each pe.) Mass of 6 pe = 1.582 Kg. over.

{ 1.100 }
after run.

232

3-4-66

Also have thermocouple #1 & 2 in vessel.

0910 Solution ht = ~61 cm:

Temp °C = #1 = 17.2 avg = 17.0°

#2 = 16.8

#6 (air) = 13.5

0913 Removed thermocouples #1 & 2 from vessel.

0922 Solution ht = 74.80 cm $\Delta h = 1.0$ cm
 (1) + per $c/h = 48.80$ cm

$\tau = 59.78$ sec = 12.5 $\frac{1}{s}$ = 14.5 $\frac{1}{cm}$

0930 Solution ht = 73.80 cm $c/h = 47.80$ cm
 system just critical.

0931 Drain solution to 30.0 cm.

0945 Removed triangular piece (b) from vessel. Placed thermocouples #1 & 2 back in vessel.

1011 Solution ht = ~61.5 cm

Temp °C = #1 = 18.5 avg = 18.0°

#2 = 17.5

#6 (air) =

3-4-68

233

1018 Removed thermocouple #1 & 2 from vessel.

1020 Solution ht = 75.25 cm. $D_h = 1.85$ cm.
(Z + P) $C_h = 49.35$ cm

$$t = 106.48 \text{ sec.} = 9.9 \text{ } \phi = 11.05 \text{ } \phi/\text{cm}$$

1032 Solution ht = 74.40 cm $C_h = 48.40$ cm
system just critical
Drain.

234

3-8-66

3-8-

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Foot ✓	1"	✓	"
K-2	"	Meter ✓	1"	✓	"
"	"	Foot ✓	1"	✓	"
R-1					
R-2					
PM-1	900 V	Alarm ✓	cont	-	500 V
PM-2	1200 V	Low ✓	14"	✓	900 V
"	"	Alarm ✓	3"	✓	"

LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

08

090

09

09

START-UP CHECK LIST

Equipment checked by AKH Personnel check by FIDC

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

Emergency equipment in control room checked by FIDC

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

Red light on by AKH Time 0815

Start-up OK'd by FIDC AKH Date 3-8-66

09

09

09

10

Trial exposure of ²³⁵U foils on 20" sphere #43 in Cd, 44 bore

3-860

235

Zero = 20.00 cm:

0856 Solution ht = 61.20 cm

Temp ° #1 = 16.0

2 = 16.2

6 (air) = 12.5

0900 Removed thermocouple #1 + 2

0907 Solution ht = 74.40 cm ³⁵ Dh = .45 cm
① + Pos

0918 Solution ht = 73.90 cm

system just critical
c/h = 47.90 cm

freq # = .5

K2 = 53% of 10×10^{-9}

K1 = 46% of 3×10^{-9}

0921 Slightly + Pos sol ht = 73.90 cm

0926 Slightly - Neg sol ht = 73.90 cm

0928 Drain ~ 45 cm.

above fails too cold.

10:25 Added #48 loose, (57 + 62) for 8 min loose, #46 cd,
(54 + 49) cd (56 next to long side of cone). Also put on
string #1 fail #17 loose, on string #2 fail #13 loose.
also put in thermocouple #1 + 2 in ^{on long tube.}

over:

236

3-8-66

10 35 Solution ht = ~ 61.5 cm

Temp ° #1 = 15.7

#2 = 16.0

#6 (air) 17.0

Removed thermocouple #1 + 2.

10 45 Solution ht = 74.50 cm.
(2) + Per

10 58 Solution ht = 74.00 cm

System just critical.

Log $\eta = 4.5$ $K-1 = 40.3 \times 10^{-8}$ $K-2 = 40.10 \times 10^{-9}$ 11 23 Removed 1 fail^{#13} (by string) to check count rates.11 59 Drain to ~ 9.5 cm. Removed fails. vessel
at contact reads 1.3 R.

12 55 Vessel at contact reads 750 mrad/hr.

13 40 Vessel at contact reads 400 mrad/hr.

1495 Read at contact reads 223 small hr.
Drain solution back into manifold.

238

3-10-66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13	10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700 V	Alarm ✓	cont	✓	500 V
PM-2	1200 V	Low ✓	14"	✓	900 V
"	"	Alarm ✓	3"	✓	"
LOG-N-CALIBRATE ✓		OPERATE ✓	SOURCE No. B-80		
DUMP WELL PROBE LIGHT ✓					

START-UP CHECK LIST

Equipment checked by AKM Personnel check by E.P.C.Instruments and safeties checked and reset by AKMSource in checked by AKM Source No. M-43Emergency equipment in control room checked by F.P.C.Instruments in trip circuit: K-1-2 PM-1-2Red light on by AKM Time 0815Start-up OK'd by F.P.C. AKM Date 3-10-66

Purpose is to expose 0 fails in 20.0" sphere.

3-10-66

0917 solution ht = 74.80 cm
+ P₂

0929 solution ht = 74.40⁵⁰ cm
hepton just critical.

Log $\eta = 5.5$
 $K-1 = 54\% \cdot 3 \times 10^{-8}$
 $K-2 = 48\% \cdot 3 \times 10^{-8}$

1029 shut down:

4-15-66

Sent hold samples (same on on 2-28-66) # 1-A
& 2-A. for check.

Req I 684297

Req II A-612

γ-12 - # 1-A

γ-10 # 2-A

out for:

out for

mg/ml

1 - g/g = .447300

1 - g/g = 909.695

2 - sp. gr. -

526.40

2 - sp. gr. = 2.0334

3 - assay - % = 5.05

3. density =

4 - sp. gr. = 2.0264

4. Temp. =

5. Temp. 26.8°C

1-A

2-A

C = 147.6

C = 133.0 g

H = 18.8

T = 19.1 g

N = 128.8

N = 113.9 g

3-14-66

Water sample from Well.
ask for. Req # 684495.1. g/g

2. spec (pys 90)

3. Total solids.

5-6-66

Water sample from Bid hid.
ask for. Req # 6845011. $g/g = .00000202$

2. spec (pys 90)

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE	OFF	START-UP RANGE
K13 X10 ⁻¹²		<input checked="" type="checkbox"/>	2"	<input checked="" type="checkbox"/>	70 X10 ⁻¹²
"		<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-	"	<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
"		<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
700 V		<input checked="" type="checkbox"/>	Cont	<input checked="" type="checkbox"/>	500 V
1200 V		<input checked="" type="checkbox"/>	14"	<input checked="" type="checkbox"/>	900 V
"		<input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
LOG IN CALIBRATE	<input checked="" type="checkbox"/>	OPERATE	<input checked="" type="checkbox"/>	SOURCE No.	B-80
DUMP WELL FROSE LIGHT	<input checked="" type="checkbox"/>				

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. M-43

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

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

Relight on by AKH Time 12:30

Start-up OK'd by F.D.C. AKH Date 5-10-66

Zero scale made 0.0 when H₂O is at top of gage:
 Feed rate = 4.2 cm/min.
 Dump rate = 10.0 cm/min.
 Drain rate = 10.0 cm/min.

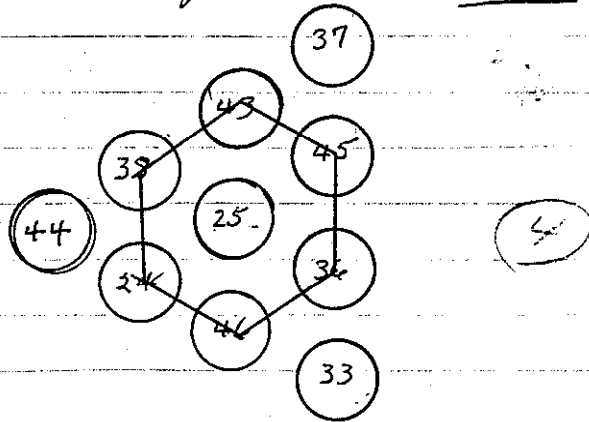
5-10-66

U(1.95) slug.

5.2" O.D. 2.6" I.D.

243

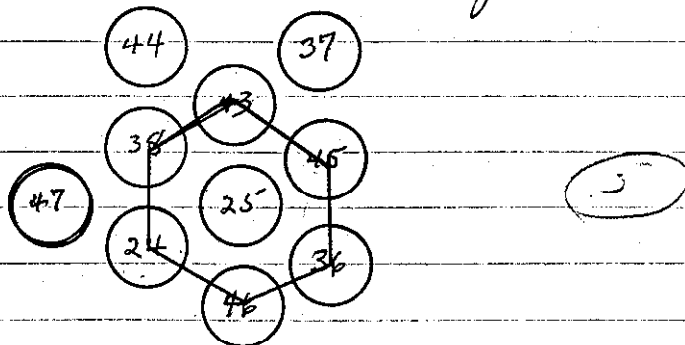
12:45 Have 10 units in triangular array, as shown below. Separation = 1.00"



1340 Water ht = 120.0 cm

System sub critical: Power level not high enough to measure - Per. Drain.

1435 Have 10 units in triangular array as shown below. Separation = 1.00"



1515 Water ht = 104.30 cm.

System just critical Drain.

Temp F°
72.0

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Meter ✓	2"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	—	"
"	"	Fast ✓	"	—	"
P-1					
P-2					
PM-1	700 V	Alarm ✓	cont	—	500 V
PM-2	1250 V	Low ✓	29"	—	900 V
		Alarm ✓	6"	—	"

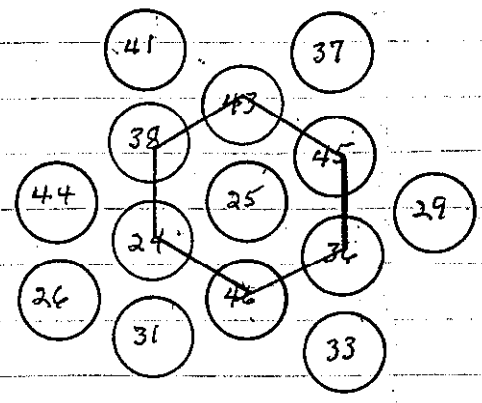
LOG 'N CALIBRATE OPERATE SOURCE No. B-80
 DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKH Personnel check by I.A.C.
 Instruments and safeties checked and reset by AKH
 Source is checked by AKH Source No. M-43
 Emergency equipment in control area checked by I.O.S.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by M.H.L. Time 1045
 Start-up OK'd by I.O.C. AKH Date 5-11-66

10:45

now have 14 units in triangular array
as shown below - separation = 0.50"



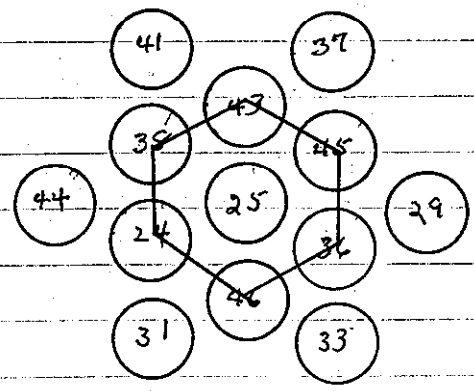
11:25

Water ht = 80.0 cm
system just critical
Drain.

Temp °F = 75.0

12:30

now have 13 units in triangular array
as shown below. separation = 0.50"



1:10

Water ht = 120.0 cm
system sub critical. - Pen; $\bar{v} = -202.1 \text{ cm}$
Drain. = - 8.1 ϕ

Temp °F = 73.0

INSTRUMENT CHECK

08

INSTRUMENT	RANGE	TRIP	SOURCE	START-UP RANGE
K-1	3×10^{-12}	✓	2"	10×10^{-12}
"	"	✓	"	"
K-2	"	✓	"	"
"	"	✓	"	"
R-1				
R-2				
PA-1	700 ✓	✓	cont ✓	500V
PM-2	1200V ✓	✓	24" ✓	900V
"	"	Alarm ✓	6" ✓	"
LOG N CALIBRATE ✓		OPERAT. ✓	SOURCE No.	B-88
DUMP WELL PROBE LIGHT _____				

START-UP CHECK LIST

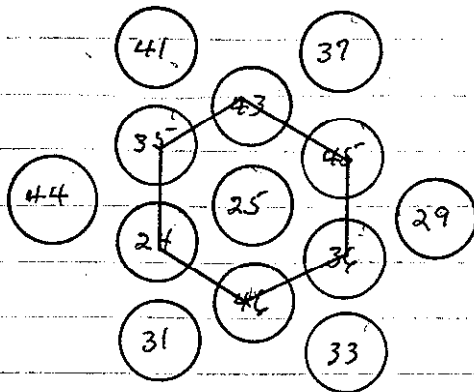
Equipment checked by AKK Personnel check by I.D.C.
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK Source No. M-93
 Emergency equipment in control room checked by I.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKK Time 0840
 Start-up OK'd by I.D.C. AKK Date 5-12-66

10

1.1

0840

Now have 13 units in triangular array
as shown below. Separation = 1.50"



Temp °F = 73.0

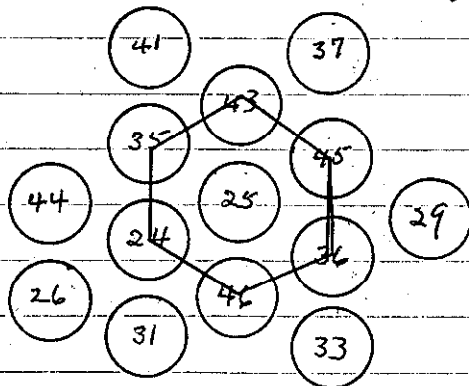
0940

Water ht = 120.0 cm

System sub critical, - Por. $\epsilon = -134.7 \mu = -14.4\%$
Drain.

10 35

Now have 14 units in triangular array as shown
below. Separation = 1.50"



Temp °F = 74.0

1104

Water ht = 81.75 cm

System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	10×10^{-12}
"	"	Foot ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Foot ✓	"	✓	"
P-1					
P-2					
PM-1	700 V	Alarm ✓	Cont	✓	500 V
PM-2	1200 V	Low ✓	24"	✓	900 V
"	"	Alarm ✓	6"	✓	"
LOG N. CALIBRATE		✓	OPERATE	✓	SOURCE No. <u>P-80</u>
DUMP WELL PROBE LIGHT		_____	_____	_____	_____

0.9

10

START-UP CHECK-LIST

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

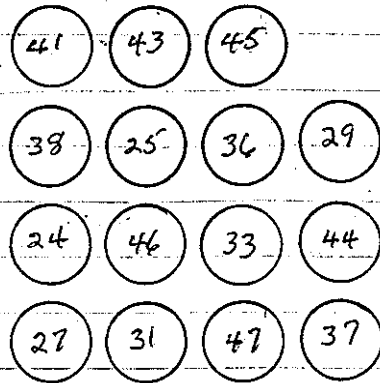
Instruments in trip circuit: K-1-2 PM-1-2

Red light on by AKK Time 0850

Start-up OK'd by F.O.C. AKK, Date 5-13-66

10

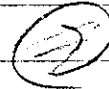
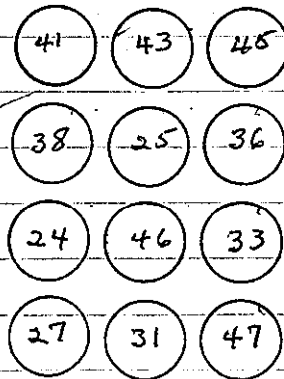
08:50 New hole 15 units in square array as shown below Separation = 0.50"



Temp $F^{\circ} = 75.0$

09:27 Water ht = 68.90 cm
System just critical
Drain.

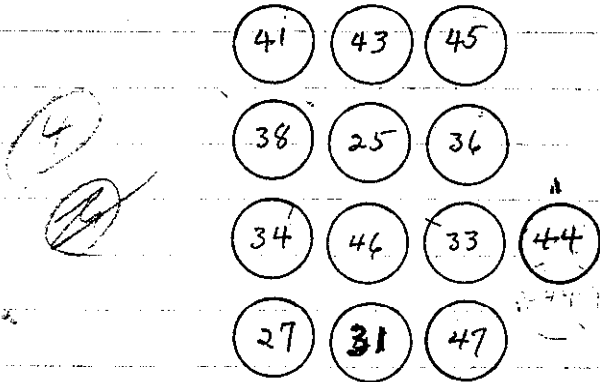
10:10 New hole 12 units in square array as shown below. Separation = 0.50"



10:45 Water ht = 120.0 cm
System sub critical
Drain.

250

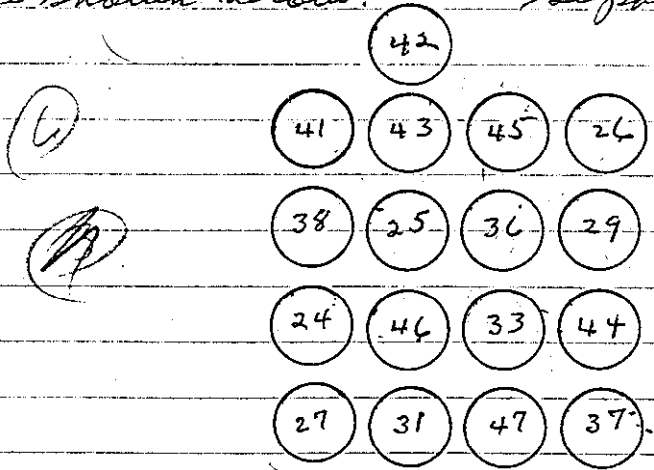
11:10 now have 13 units in square array as shown below. Separation = 0.50"



Temp $^{\circ}C = 24.2^{\circ}C$

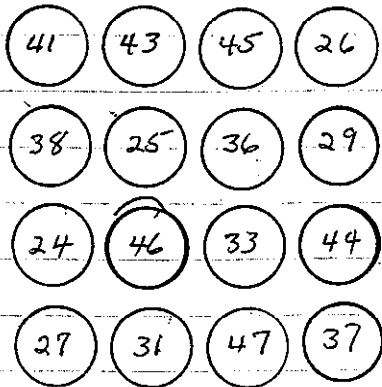
11:40 Water ht = 101.35 cm.
System just critical
Drain.

14:20 now have 17 units in square array as shown below. Separation = 1.00"



14:58 Water ht = 80.80 cm
System just critical
Drain.

15:25⁻ Hole 4x4 array 16 units in square array as shown below. Separation = 1.00"



1607 Water ht = 86.40 cm
 System just critical
 Drain:

Temp °C = 23.0

INSTRUMENT CHECK

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

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKH

Source in checked by AKH Source No. 14-93

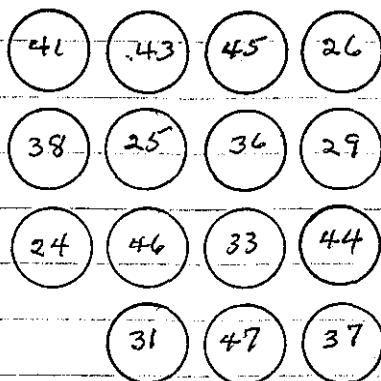
Emergency equipment in control room checked by F.I.C.

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

Red light on by AKH Time 0810

Start-up OK'd by F.I.C. AKH Date 5-16-66

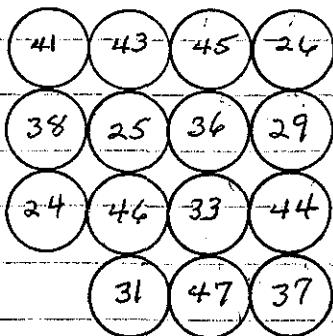
0910 Now have 15 units in square array as shown below. Separation = 1.00"



Temp. = °C 22.5

0908 Water ht = 105.20 cm.
System just critical
Drain.

1220 Now 15 units in square array at contact as shown below - Separation = 0.0"



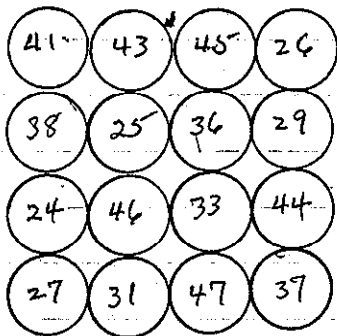
Temp. °C = 22.0

1303 Water ht = 120.0 cm
System sub critical
Drain.

254

1330

How 16 units in square array at contact as shown below. Separation = 0.0"



v

temp. °C = 22.0

1408

Water ht = 104.90 cm
System just critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 X 10 ⁻¹²	Meter ✓	2"	✓	10 X 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	12"	✓	900V
"	"	Alarm ✓	2"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

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

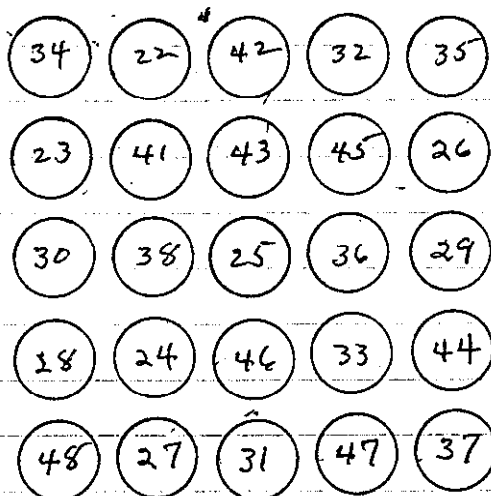
Instruments in trip circuit: K-1-2 PM-1-2

Red light on by AKK Time 1230

Start-up OK'd by F.I.C. AKK Date 5-17-66

256

12:30 Now have 5x5 array 25 elements as shown below. Separation = 1.50"



1325 Water ht = 120.20 cm
System sub critical
Drain.

Temp. °C = 22.0
log η = .00050

1510 Now 5x5 array 25 elements same as above
Except separation now ~~is~~ 1.40"

1550 Water ht = 120.10 cm
System sub critical
Drain.

log η = .00085

Temp. °C = 22.0

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	10×10^{-12}
"	"	Ext ✓	"	✓	"
K-2	"	Meter ✓	2"	✓	"
"	"	Ext ✓	"	✓	"
R-11					
R-12					
PM-1	7005	Alarm ✓	cont	✓	5005
PM-2	12005	Low ✓	12"	✓	9005
"	"	Alarm ✓	2"	✓	"
LCC-N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT _____					

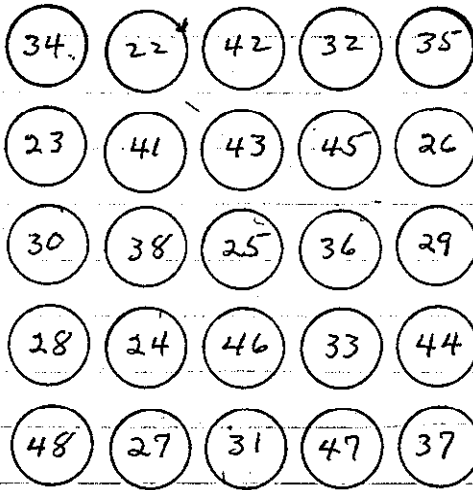
START-UP CHECK LIST

Equipment checked by AKA Personnel check by E.I.C.
 Instruments and safeties checked and reset by AKA
 Source in checked by AKA Source No. M-93
 Emergency equipment in control room checked by E.I.C.
 Instruments in trip circuit: N-1-2 PM-1-2
 Red light on by AKA Time 0905
 Start-up OK'd by E.I.C. AKA Date 5-18-66

258

0915 Home 5x5 array 25 units with a separation of 1.30". As shown below. Separation = 1.30"

(6)



1004 Water ht = 88.60 cm
system just critical
Drain.

Water Temp °C
= 22.0

1025 Removed #48 from array. Now have 24 units. Separation = 1.30"

(10)

1108 Water ht = 94.40 cm
system just critical
Drain.

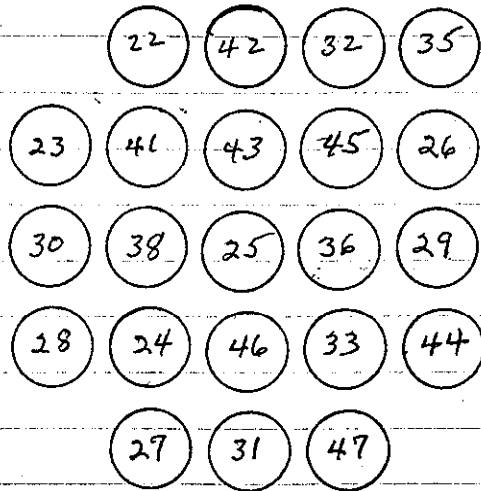
Water Temp °C
= 22.0

1220 Now have units #48 and 34 removed from above array. Total elements 23. Separation = 1.30"

1300 Water ht = 101.50 cm
system just critical
Drain.

Temp °C = 22.0

1330 new have 22 units as shown below
 Separation = 1.30"



1410 Water ht = 120.0 cm.

Temp = 22.0

System sub critical
 Drain.

INSTRUMENT CHECK

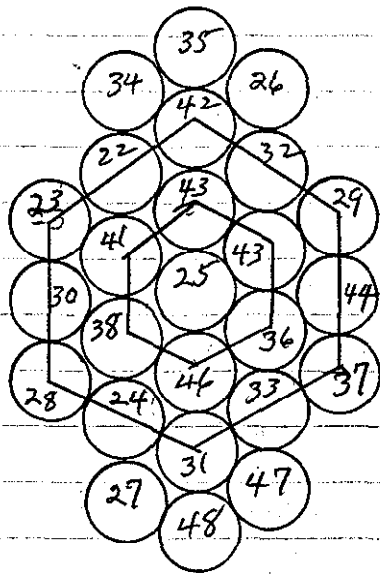
INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Motor -	2"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Motor -	"	✓	"
"	"	Fast ✓	"	✓	"
R-1					
PMA-1	7000	Alarm ✓	Cont	✓	5000
PMA-2	12500	Low ✓	24	-	9000
"	"	Alarm ✓	3"	✓	"
LOG N CALIBRATE		-	OPERATE	-	SOURCE No. D-80
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

Equipment checked by AKK Personnel check by F.D.C.
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK Source No. M-43
 Emergency equipment in control room checked by F.D.C.
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKK Time 1015
 Start-up OK'd by F.D.C. AKK Date 5-19-60

12:20

Now have 25 units in triangular array
 units at contact as shown below. Separation = 0.0"



1305 Water ht = 120.0 cm

Temp ° = 22.3

System sub critical
 Drain:

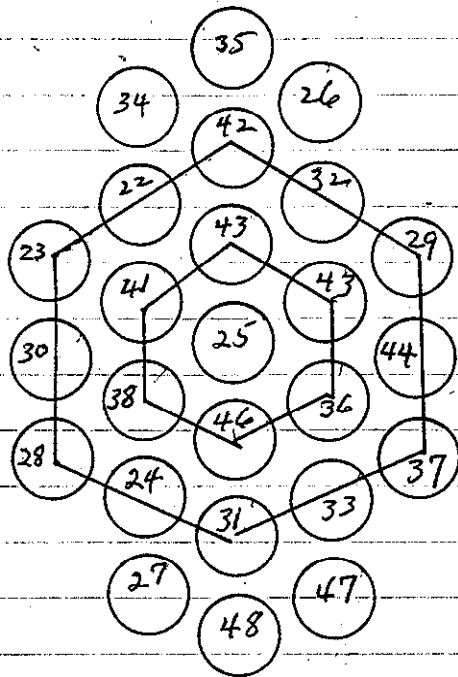
INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	2"	✓	10×10^{-12}
"	"	F. ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	F. ✓	"	✓	"
R-1					
R-2					
PA-1	700V	Alarm ✓		✓	500V
SM-1	1200V	Low ✓	14"	✓	900V
"	"	Alarm ✓	2"	✓	"
LOG N' CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT ✓					

START-UP CHECK LIST

Equipment checked by RAH Personnel check by FIDC
 Instruments and safeties checked and reset by RAH
 Source in checked by RAH Source No. M-43
 Emergency equipment in control room checked by FIDC
 Instruments in trip circuits K-1-2 PM-1-2
 Red light on by RAH Time 1500
 Start-up OK'd by FIDC RAH Date 5-20-66

15:10 new bore 25 units in triangular array as shown below. Separation = 1.75"



(F)

1535 Water ht = 65.60 cm
 system just critical
 Drain

Temp °C
 = 22.0 °C

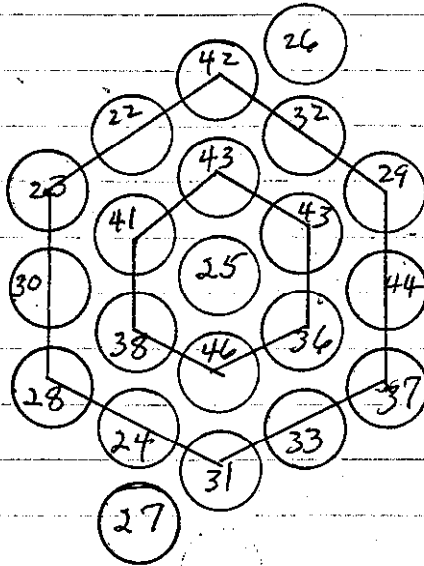
INSTRUMENT CHECK

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

START-UP CHECK LIST

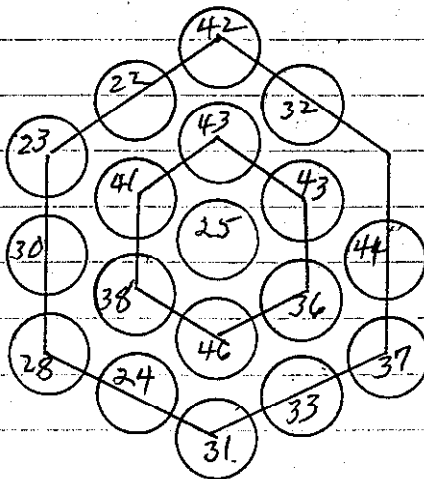
Equipment checked by AKM Personnel check by TIDC
 Instruments and safeties checked and reset by AKM
 Source in checked by AKM Source No. 14-93
 Emergency equipment in control room checked by TIDC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKM Time 0805
 Start-up OK'd by TIDC AKM Date _____

0805 now have 21 units in triangular array as shown below. Separation = 1.75"



0840 Water ht = 74.00 cm Temp °C = 21.5
System just critical Drain.

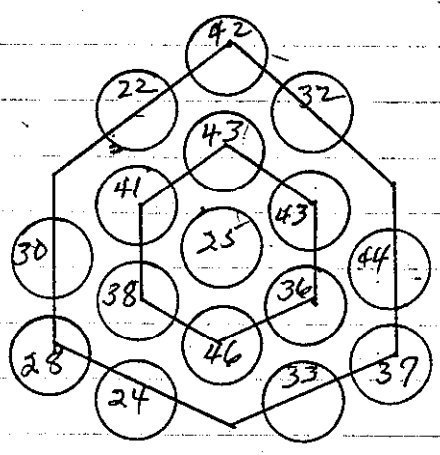
0930 Now 18 units in triangular array as shown below. Separation = 1.75"



Temp °C = 22.0

0957 Water ht = 86.90 cm
System just critical Drain.

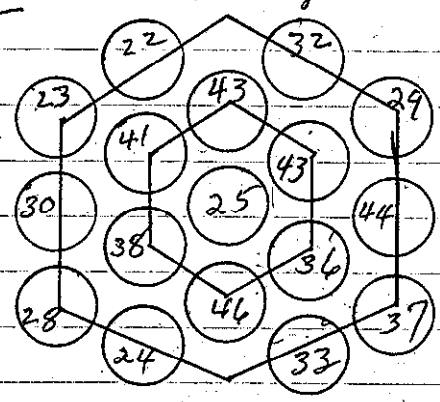
10:25 now have 16 units in triangular array as shown below. Separation = $1.75''$



Temp $^{\circ}C = 22.0$

11:00 Water ht = 120.0 cm.
System sub critical
Onset

14:00 Now have 17 units in triangular array as shown below. Separation = $1.75''$



(11)

Temp $^{\circ}C = 22.0$

14:40 Water ht = 119.70 cm
System sub critical
- Per: $\Gamma = -212.95 \text{ cm} = -7.5 \text{ f}$

INSTRUMENT CHECK

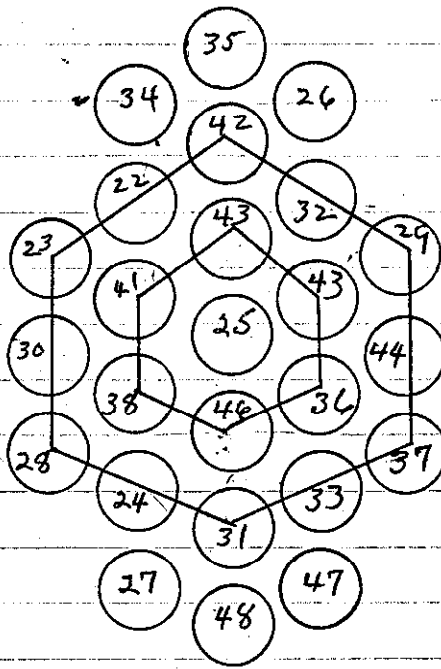
INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3 x 10 ⁻¹²	Motor ✓	2"	✓	10 x 10 ⁻¹²
"	"	Fast ✓	"	✓	"
K-2	"	Motor ✓	"	✓	"
"	"	Fast ✓	"	✓	"
PM-1	700V	Alarm ✓	cont	✓	500V
PM-2	1200V	Low ✓	18"	✓	900V
"	"	Alarm ✓	3"	✓	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROSE LIGHT _____					

START-UP CHECK LIST

Equipment checked by AKK Personnel check by EIDC
 Instruments and safeties checked and reset by AKK
 Source in checked by AKK Source No. M-43
 Emergency equipment in control room checked by EIDC
 Instruments in trip circuit: K-1-2 PM-1-2
 Red light on by AKK Time 0910
 Start-up OK'd by EIDC AKK Date 5-25-66

268

0920 now have 25 units in triangular array as shown below. Separation = 1.96"



Temp. °C = 22.0

0955 Water hts = 120.30 cm. Septum slightly sub critical
- Per: $t = -254.2 \mu = -6.14$

1002 Drains:

End data operating
experience
9/13/66

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter -	2"	✓	3.10
"	"	Foot -	"	✓	"
K-2	"	Meter -	"	-	"
"	"	-	"	-	"
R-1					
R-2					
PM-1	700V	Alarm -	cont	-	500V
PM-2	1200V	Low -	12"	✓	900V
"	"	Alarm -	3"	✓	"

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

DUMP WELL FROGE LIGHT _____

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKW

Source in checked by AKW Source No. M-43

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

Instruments in trip checked: K-1-K-2 PM-1+2

Red light on by AKW Time 0815

Start-up OK'd by F.I.D.C. AKW Date 3-4-68

$v(3.85)$ slugs.

$$O.D. = 7.2 \text{ inches} = 18.29 \text{ cm.}$$

$$I.D. = 2.6 \text{ inches} = 6.60 \text{ cm.}$$

$$\text{Length} = 30.0 \text{ inches} = 76.20 \text{ cm.}$$

$$\text{avg mass (per rod)} = 12.555 \text{ kg.}$$

$$\text{Feed rate} = 3.50 \text{ cm/min.}$$

$$3 \text{ " dump rate} = 8.90 \text{ cm/min.}$$

$$3 \text{ " drain rate} = 9.00 \text{ cm/min.}$$

$Z_{no} = 0.0 \text{ cm}$ on barb scale: (bottom of slug).

Z_{top} ref. = 91.4 cm

Square & rounded array's

1 have an 3×3 array; Square array; Rods in contact.

$$0945 \text{ Water ht} = 48.90 \text{ cm}$$

System just critical
Drawn.

over:

3.85%

2.5 pellets

8.985 ton

$$\text{Total mass (V)} = 17,977 \text{ lb.}$$

$$\text{avg wt (per vol)} = 719.09 \text{ lb.}$$

$$\text{Total mass (V) Kg} = 8,115.25 \text{ Kg}$$

$$\text{avg mass (per vol) Kg} = 326.11 \text{ Kg}$$

$$\text{Total mass 0.235} = 313,883 \text{ Kg}$$

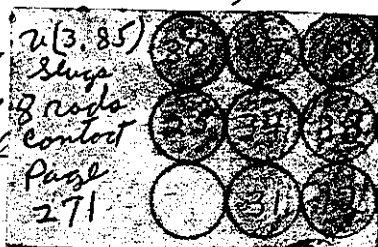
$$\text{avg mass (per vol) }^{0.235} = 12,555 \text{ Kg}$$

draw

Removed 1 rod. (#24). Have a 3x3 array, with
1 rod removed from corner. Total of 8 rods.

1255 Water ht = 57.30 cm

System just critical
Drain.



Removed 3 rods. (#^s 30, 15, 12). Have a 3x3 array with
4 rods removed. 1 from each corner. Total of 5 rods.

1422 Water ht = 91.50 cm

System sub critical
Drain.

Temp ° = 25.0 °

Added 1 rod (#24) Have a 3x3 array with 3
rods removed. 1 from each of 3 corners. Total of
6 rods.

1530 Water ht = 91.60 cm - ~~X~~ - ~~X~~ - ~~X~~ - ~~X~~ Temp °
System sub critical 25.1 °
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13	10-12"	Meter ✓	2"	-	10 K10-12
"	"	Fast ✓	"	-	"
K-14	"	Meter ✓	2"	-	"
"	"	Fast ✓	"	-	"
PK-1	700V	Alarm ✓	Cont	-	500V
PK-2	1200V	Low ✓	10"	-	900V
"	"	Alarm ✓	1"	-	"
LOG N CALIBRATE ✓		OPERATE ✓		SOURCE No. B-80	
DUMP WELL PROBE LIGHT ✓					

START-UP CHECK LIST

Equipment checked by AKK: Personnel check by F.D.C
F.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 F.D.C
 Instruments in trip circuit: K-1-2 PK-1-2
 Red light on by AKK Time 0810
 Start-up CK'd by F.D.C AKK Date 3-5-68

square & rounded array's
side in contact

added 1 rod, (#15) Have an 3x3 array, with 2 rods
removed. 1 each from opposite corners. Total of
7 rods.

0922 Water ht = 92.00 cm Temp ° 25.0 °
System sub critical - $P_{cr} = -67.0$ mm
Drain.

Now have an 3x3 array, with 2 rods removed
from 1 face. Total of 7 rods. Draw

1050 Water ht = 91.90 cm 3 Temp °
System sub critical
Drain.



.50" separation. (edge-edge)

Now have an 2x3 array. Total of 6 rods.

Water ht = 91.60 cm Temp °
1 - P_{cr} 25.1 °
 $\tau = -902.0$ mm = -3.6 f

1422 Drain

Draw

(4)



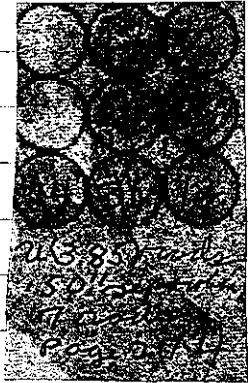
Draw

.50" separation edge-edge.

Added 1 rad. Now have an 3x3 array, with 2 rods removed from 1 face. Total of 7 rods.

Water ht = 70.00 cm $\Delta h = 1.15$ cm Temp $^{\circ}C$
 + pres 25.1 $^{\circ}C$
 $t = 73.88$ cm = 12.44 = 10.84 cm

1547 Water ht = 68.85 cm
 System just critical
 Drain



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13X10-12		Meter ✓	1"	✓	10x10 ⁻¹²
"		Fast ✓	"	✓	"
K 2	"	Meter ✓	2"	✓	"
"		Fast ✓	"	✓	"
P-1					

1700V Alarm ✓ Δh ✓ 500V
 1200V Low ✓ 10" ✓ 900V
 " Alarm ✓ 3" ✓ "

LOG-N-CALIBRATE ✓ OPERATE ✓ SOURCE No. 8-82

DUMP WELL PROBE LIGHT ✓

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-43

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

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

Red light on by AKK Time 0840

Start-up OK'd by F.D.C. AKK Date 3-6-68

.50" separation edge-edge.

Repeat of experiment described on page 274.
Have an 3x3 array with 2 rods removed from 1
face. Total of 7 rods.

Water ht = 69.95 cm $\Delta h = .75$ Temp °C
+ Per 24.5 °C
 $\tau = 158.63 \text{ sec} = 2.8 \phi = 9.0 \phi / \text{cm}$

0955 Water ht = 69.20 cm
System just critical
Drain.

.75" separation edge-edge.
Have an 3x3 array, with 1 rod removed from 1
corner. Total of 8 rods.

Water ht = ??? Temp °C
+ Per 25.0 °C
 $\tau = 43.46 \text{ sec} = 18.0 \phi$

1315 Water ht = 50.70 cm
System just critical
Drain. over.

.75" separation edge-edge.

Removed 1 rad. (#25). Now have on 3x3 array with 2 rads removed from each corner 1 face. Total of 7 rads.

Water ht = 69.70 cm. $sh = .20$ Temp °C
³+Per = 25.0°C
 $\tau = 614.96 \text{ sec} = 2.04 = 10.0 \text{ f/cm}$

1421 Water ht = 69.50 cm
 System just critical
 Drain:

Removed 1 rad (#24). Now have on 2x3 array, Total of 6 rads.

Water ht = 91.90 cm Temp °C
⁴-Per = 25.0°C
 $\tau = -619.30 \text{ sec} = -2.2 \text{ f}$

1548 Drain:



Draw

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13	10^{-12}	Meter <input checked="" type="checkbox"/>	2"	<input checked="" type="checkbox"/>	3×10^{-12}
"		Foot <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
K-2	"	Meter <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
"		Foot <input checked="" type="checkbox"/>	"	<input checked="" type="checkbox"/>	"
R-1					
R-2					
PM-1	700V	Alarm <input checked="" type="checkbox"/>	cont	<input checked="" type="checkbox"/>	500V
PM-2	1200V	Alarm <input checked="" type="checkbox"/>	10"	<input checked="" type="checkbox"/>	900V
"		Alarm <input checked="" type="checkbox"/>	3"	<input checked="" type="checkbox"/>	"

LOG 'N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROSE LIGHT

START-UP CHECK LIST

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

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-43

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

Instruments in tray checked: K-1-2 PM-1-2

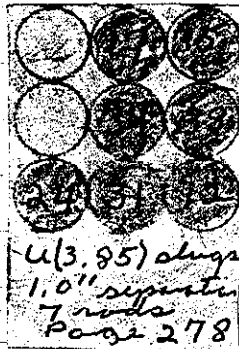
Red lights on by AKK Time 1005

Start-up OK'd by E.D.C. AKK Date 3-7-68

1.0" separation edge - edge.

Have an 3x3 array, with 2 rods removed from
1 face. Total of 7 rods.

Water ht = 91.80 cm
- Pen
C = -347.68 cm = -4.24



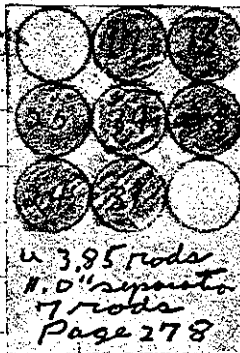
Temp °C
24.0°C

1100 Drain:

Have an 3x3 array with 2 rods removed, 1 each
from opposite corners. Total of 7 rods.

dia = 2.0 cm

Water ht = 81.70 cm
+ Pen
C = 99.96 cm = 9.94 = 4.954 cm



Temp °C
24.5°C

1306 Water ht = 79.70 cm
System just critical
Drain.

u 3.95 rods
1.0" separation
7 rods
Page 278

INSTRUMENT CHECK

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

START-UP CHECK LIST

Equipment checked by F.D.C. R.K.H. Personnel check by F.D.C.
 Instruments and gauges checked and reset by R.K.H.
 Source in checked by R.K.H. Ser. no. 14-93
 Emergency equipment in control room checked by F.D.C.
 Instruments in this circuit: N-1-2 P M-1-2
 Red light on by R.K.H. Time 0855
 Start-up OK'd by F.D.C. R.K.H. Date 3-11-68

over

Have an 9×9 array. Total of 16 rods.

0940 Water ht. = 49.20 cm (7)
 System just critical
 Drain.

Removed 2 rods. 1 from opposite corners. Total of 14 rods.

1050 Water ht. = 53.25 cm (7) Temp $^{\circ}\text{C}$
 23.5 $^{\circ}\text{C}$
 System just critical
 Drain.

Removed 2 rods. Have an 9×9 array, with 1 rods removed from each corner. Total of 12 rods.

(8)
 Water ht. = 60.40 cm. Temp $^{\circ}\text{C}$
 System just critical 23.5 $^{\circ}\text{C}$
 Drain.

Removed 2 rods. Have an 4x4 array, with 2 rods removed from 2 opposite corners, and 1 rod removed from 2 opposite corners. Total of 10 rods.

1349 Water ht = 91.60 cm
System sub critical
Drain.

Added 1 rod. Have an 4x4 array, with 2 rods removed from 1 corner, and 1 rod removed from 3 corners. Total of 11 rods.

Water ht = 70.30 cm. $dh = .35$ cm
+ Per
 $\epsilon = 260.76 \text{ cm} = 4.44 = 12.64 \text{ cm}$

Temp $^{\circ}$
 23.5°

1510 Water ht = 69.95
System just critical
Drain.



⑤

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-13 X 10 ⁻¹²		Meter	2"	-	3 X 10 ⁻¹²
"		Fast	"	-	"
K-2 "		Meter	"	-	"
"		Fast	"	-	"
R-1					
PM-1 700 V		Alarm	Cont	-	500 V
PM-2 1200 V		Low	10"	-	900 V
"		Alarm	3"	-	"

LOG N' CALIBRATE _____ OPERATE _____ SOURCE No. _____
 DUMP WELL PROBE LIGHT _____ /

START-UP CHECK LIST

Equipment checked by F.D.C. / A.K.H. Personnel check by F.D.C.
 Instruments and safeties checked and reset by A.K.H.
 Source is checked by A.K.H. Source No. M-93
 Emergency equipment in control room checked by F.D.C.
 Instruments in this circuit: K-1-2 PM-1-2
 How many on PM-1-2 Time 1005
 Started on F.D.C. / M.K.H. Date 3-13-68

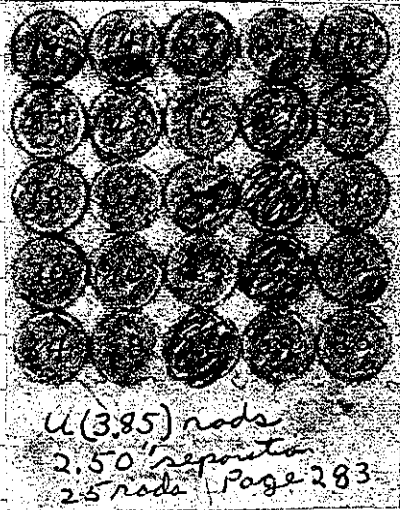
2.50" separation edge - edge.

283

Have an 5 x 5 array, total of 25 rods.

1100 Water ht = 92.10 cm
System sub critical
Crisis

Temp °C
21.6 °C



INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3x10 ⁻¹²	Meter ✓	2"	✓	3x10 ⁻¹²
"	"	Foot ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Foot ✓	"	✓	"
R-1					
R-2					
PM-1	7000	Alarm ✓	10"	✓	5000
PM-2	12000	Low ✓	3"	✓	9000
"	"	Alarm ✓	3"	✓	9000
LOG N CALIBRATE		✓	OPERATE		✓
DUMP WELL PROBE LIGHT		✓	SOURCE No.		B-80

START-UP CHECK LIST

Equipment checked by F.I.C. A.K.V. Personnel check by F.I.C.Instruments and safeties checked and reset by A.K.V.Source checked by A.K.V. Source No. 1A-93Emergency equipment in control room checked by F.I.C.Instruments in trip circuit: N-1-2 PM-1-2Red light on by A.K.V. Time 1040Start-up OK'd by F.I.C. A.K.V. Date 3-14-68

2.0" separation edge-edge.

Have an 5x5 array. Total of 25 rods.

1123 Water ht = 92.40 cm

System sub critical
Train

Temp °C

21.5°C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter ✓	2"	✓	3X10 ⁻¹²
"	"	Fest ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Fest ✓	"	✓	"
R-1					
R-2					
PM-1	700 ✓	Alarm ✓	Cont 500 ✓	✓	500 ✓
PM-2	1200 ✓	Low -	10"	-	900 ✓
"	"	Alarm ✓	3"	✓	"
LOG N CALIBRATE		✓	OPERATE	✓	SOURCE No. B-80
DUMP WELL PROBE LIGHT _____					

START-UP CHECK LIST

Equipment checked by E.P.C. Personnel check by AKK

Instruments and safeties checked and reset by AKK

Source in checked by AKK Source No. M-93

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

Instruments in trip circuit: K-1-7 PM-1-2

Red light on by AKK Time 1230

Start-up OK'd by I.D.C. AKK Date 3-15-68

1.875" separation edge-edge.

Have an 5x5 array. Total of 25 rods.

Water ht = 69.70 cm $\Delta h = .50$ cm Temp $^{\circ}$ C
 + Per 27.2 $^{\circ}$ C
 $T = 130.38 \text{ sec} = 9.04 = 16.0 \text{ H/cm}$

1.3.13 Water ht = 68.70 cm (11)

System just critical

Drain.

Removed 1 rod. Have an 5x5 array, with 1 rod removed from corner. Total 24 rods.

Water ht = 70.90 cm $\Delta h = 1.20$ cm. Temp $^{\circ}$ C
 + Per 27.0 $^{\circ}$ C
 $T = 56.50 \text{ sec} = 15.104 = 12.6 \text{ H/cm}$

1.5.26 Water ht = 69.70 cm (12)

System just critical

Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE	
K-1	3×10^{-12}	Meter	50"	-	3×10^{-12}	
"	"	"	"	"	"	
K-2	"	Meter	1.5"	-	"	
"	"	"	"	"	"	
R-1a						
R-2						
PM-1	700V	Alarm	50"	-	500V	
PM-2	1300V	Low	2F"	-	900V	
"	"	Alarm	6"	-	"	
LOG N CALIBRATE		<input checked="" type="checkbox"/>	OPERATE		<input checked="" type="checkbox"/>	SOURCE No. <u>B-50</u>
DUMP WELL PROBE LIGHT <input type="checkbox"/>						

START-UP CHECK LIST

Equipment checked by R.K.H. Personnel check by R.H.H.

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

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

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

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

Red light on by R.H.H. Time 0825

Start-up OK'd by R.H.H. E.B.V. Date 3-15-68

1.875" separation edge - edge.
(See p - 286.)

Remained 3 rods. Have an 5x5 array with 4 rods
remained, 1 from each corner. Total of 21 rods.

Water ht = 76.40 cm $\Delta h = 1.70$ cm
 $\frac{1}{1.875}$
 $\tau = 56.50 \mu = 15.14 = 8.94 \text{ /cm}$

(13)

0917 Water ht = 74.70 cm

Temp °C

System just critical
 Drain

21.5 °C

Remained 1 rod. Have an 5x5 array with 5 rods
remained. 2 rods from 1 corner, and 1 rod each
from 3 corners. Total of 20 rods.

Water ht = 81.20 cm $\Delta h = 2.20$ cm
 $\frac{2}{1.875}$
 $\tau = 30.42 \mu = 22.54 = 10.24 \text{ /cm}$

1045 Water ht = 79.00 cm

Temp °C

System just critical
 Drain

21.5 °C

(14)



U (3.95) rods
 1.875" separation E-E
 20 rods
 page 289

Remained 1 rod. Have an 5x5 array with 2 rods removed from 2 corners and 1 rod removed from 2 corners. Total of 19 rods.

1125 Water ht = 91.40 cm
 System sub critical
 Chain. (15)

Temp °C
 21.5 °C

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	✓	2"	✓	3×10^{-12}
"	"	✓	"	✓	"
K-2	"	✓	"	✓	"
"	"	✓	"	✓	"
P-1					
P-2					
P-3	700V	✓	6"	✓	500V
P-4	7200V	✓	10"	✓	400V
"		7.2m	2"	✓	"
LOG 'N' CALIBRATE		✓	OPERATE		✓
DUMP WELL PROBE LIGHT			SOURCE No.		B-20

START-UP CHECK LIST

Equipment checked by AKW Personnel check by F.D.C.Instruments and safeties checked and reset by AKWSource in checked by AKW Source No. M-45Emergency equipment in control room checked by F.D.C.Instruments in trip circuit: K-1-2 PM-1-2Red light on by AKW Time 0840Start-up OK'd by F.D.C. AKW Date 3-19-68

Triangular Array 2.

0.0" separation. (control)

Have an triangular array. 1 full ring, plus
2 rods, 1 each on opposite faces. Total of 9 rods.

0940 Water ht = 91.50 cm

System sub critical
Drain

Added 1 rod. Now have 1 full ring, plus 1 rod
on every other face in 2nd ring. Total of 10 rods.

③

1050 Water ht = 91.50 cm

System sub critical
Drain

added 2 rods. Have 1 full ring, plus 1 rod
on 5 faces in 2nd ring. Total of 12 rods.

$$D_h = .30 \text{ cm}$$

Water ht = 64.00 cm

+ Per

$$C = 302.09 \text{ cm} = 5.54 = 18.34 \text{ cm}$$

Temp °C
21.5 °C

(1)

1345 Water ht = 63.70 cm

System just critical
Drain.

Removed 1 rod. Have 1 full ring, plus 1 rod
on 4 faces in 2nd ring. Total of 11 rods.

$$D_h = .75 \text{ cm}$$

Water ht = 77.90 cm

+ Per

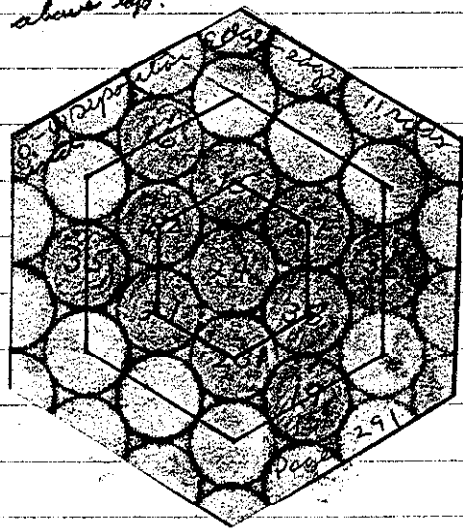
$$C = 110.82 \text{ cm} = 9.14 = 12.14 \text{ cm}$$

Temp °C
21.5 °C

1439 Water ht = 77.15 cm = .45 cm above Top:

System just critical
Drain.

(2)



INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter	2"	✓	3X10 ⁻¹²
"	"	Fast	"	✓	"
K-2	"	Meter	"	✓	"
"	"	Fast	"	✓	"
R-1	"	"	"	✓	"
PM-1	700V	Alarm	500V	✓	500V
PM-2	1800V	Low	8"	✓	900V
"	"	Alarm	3"	✓	"
LOG N CALIBRATE	✓	OPERATE	SOURCE No. B-80		

DUMP WELL PROBE LIGHT

INSTRUMENT CHECK

START-UP CHECK LIST

Equipment checked by AKH Personnel check by E.D.C.
 Instruments and safeties checked and reset by AKH
 Source in checked by AKH Source No. 14-43
 Emergency equipment in control room checked by E.D.C.
 Instruments in trip circuit: N-1-2 PM-1-2
 HSA checked by AKH Time 1005
 Start-up OK'd by E.D.C. AKH Date 7-20-68

Triangular Array:
2.0" separation edge-edge.

Have 1 full ring, plus 1 rod on each face in 2nd ring. Total of 12⁽³⁾ rods.

1045 Water ht = 45.65 cm (9)
System just critical
Drain.

Removed 3 rods. Have 1 full ring, plus 1 rod on every other face in 2nd ring. Total of 10 rods.

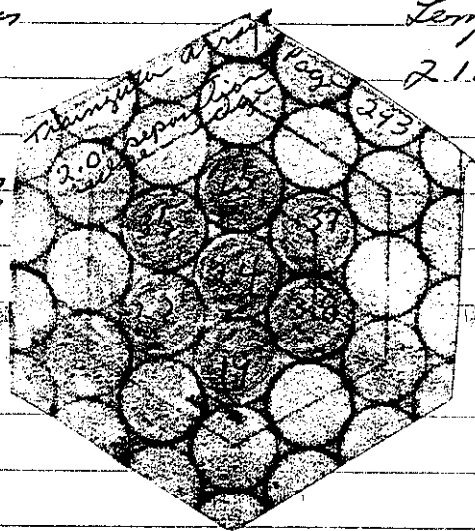
1130 Water ht = 54.70 cm (3)
System just critical
Drain.

Removed 3 rods. Have 1 full ring. Total of 7 rods.

Water ht = 73.00 cm $d_r = 1.0$ cm. Temp $^{\circ}$
' then 21.5°
 $\sigma = 71.71 \text{ cm} = 12.74 = 12.74 \text{ cm}$

1340 Water ht = 72.00 cm
System just critical
Drain.

(4)



over.

Removed 1 rad from 1st ring. Now have 6 rads.

Water ht = 91.50 cm

(5)

System sub critical
Drain.

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3×10^{-12}	Meter ✓	1"	✓	3×10^{-12}
"	"	Fast ✓	"	✓	"
K-2	"	Meter ✓	"	✓	"
"	"	Fast ✓	"	✓	"

R-1
R-2

PM-1	7000	Alarm ✓	cont	✓	5000
PM-2	12000	Low ✓	8"	✓	8000
	61000	Alarm ✓	3"	✓	"

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 RKASource in checked by RKA Source No. M-93Emergency equipment in control room checked by E.D.C.Instruments in trip circuit: K-1-2 PM-1-2Red light on by RKA Time 0825Start-up OK'd by E.D.C. RKA Date 3-21-68

Triangular array.

.50" separation edge - edge.

Have a triangular array. 1 full ring. Total of 7 rods.

0910 Water ht = 44.10 cm. (4) Temp °
 System just critical 21.5°
 Drain.

Removed 3 rods. Now have ⁴ rods in an
 triangular array.

10.15 Water ht = 91.80 cm
 System sub critical
 Drain.

over.

added 1 rod. Now have 5 rods in an
triangular array.

1110 Water ht = 91.60 cm
system sub critical
Drain.

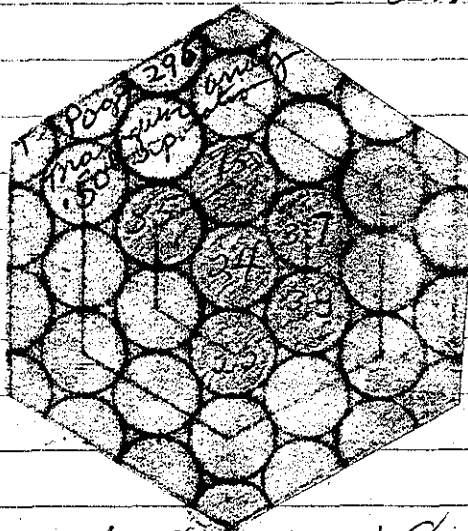


added 1 rod. Now have 6 rods in an
triangular array. (1 rod removed from ring).

Water ht = 63.40 cm $d_r = .60$ cm Temp $^{\circ}C$
' + Pev 21.6 $^{\circ}C$
 $t = 126.03 \text{ sec} = 8.24 = 13.64 \text{ cm}$

1308 Water ht = 62.80 cm
system just critical
Drain.

(5)



~~Triangular array. 1 ring (with 4 rods) removed.
1 from opposite face. Total of 5 rods.~~

~~Water ht = 91.50 cm
1510 System sub critical Wrong page. (a letter
Drain. of 289)~~

INSTRUMENT CHECK

INSTRUMENT	RANGE	TRIP	SOURCE DISTANCE	SET	START-UP RANGE
K-1	3X10 ⁻¹²	Meter ✓	1"	-	3 X 10 ⁻¹²
"	"	Fast ✓	"	-	"
K-2	"	Meter ✓	1"	-	"
"	"	Fast ✓	"	-	"
R-1					
R-2					
PM-1	700V	Alarm ✓	cut	-	500V
PM-2	1200V	Low ✓	8"	-	900V
"	"	Alarm ✓	3"	-	"
LOG N CALIBRATE		<input checked="" type="checkbox"/>	OPERATE	<input checked="" type="checkbox"/>	SOURCE No. 0-80
DUMP WELL PROBE LIGHT <input type="checkbox"/>					

START-UP CHECK LIST

Equipment checked by F.P.C. BKJ Personnel check by BKJ
 Instruments and safeties checked and reset by BKJ
 Source in checked by BKJ Source No. M-93
 Emergency equipment in control room checked by F.P.C.
 Instruments factory circuit: K-1-2 M-1-2
 Red light on by BKJ Time 12-25
 Start-up OK'd by F.P.C. BKJ Date 3-23-68

Triangular array.
 .75" separation edge-edge.

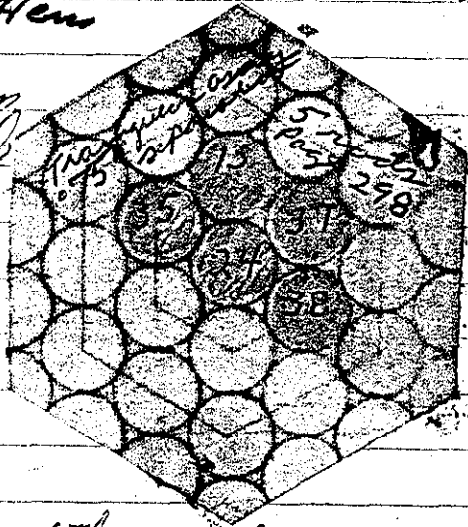
Have 4 rods in an triangular array.

1300 Water ht = 93.00 cm
 System sub critical (8) ⁰⁰
 Drain.

Added 1 rod. Now have 5 rods in an triangular array.

Water ht = 71.50 cm $\Delta h = .80$ cm
 + Per Temp °C
 $\tau = 108.65 \text{ sec} = 9.37 = 11.64 \text{ sec}$ 21.5 °C

1355 Water ht = 70.70 cm
 System just critical (6)
 Drain.



Triangular array, 1 ring with 2 rods removed, 1 from opposite faces. Total of 5 rods.

1510 Water ht = 91.50 cm
 System sub critical (7)
 Drain.

