BOOK35R

Notes:
"HFIR#2" on spine

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

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

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
August 7, 1999
HFIR LOG
1/6/46 →
4/5/66

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

Installed 6-0 and 6-1 with 0.375 in. spacers.
No SHER element at this time.

1224
Water at 21.2 cm. Full critical

Added SHER element with 2 fuel pins and 2 and 3 natural brass strips.

Fuel = 2.25, Spots = 27.56

1101
Water at 15.4 cm. + Period #9

T = 115.5 cm. 9.88

Water at 13.1 cm. Critical

Core = -2.25 + 22.54 + 15.1 - 150.2 + 9.88

Added 6-53 strips. Natural + fuel in (6-53
2 natural strips and 6-53 strips.
Fuel = 2.75, Poiseum = 35.60

1338
Water at 21.2 cm. + Period #9

T = 158.1 cm. 9.88

Water at 15.4 cm. Critical

Drown
Core = -2.75 + 35.6 + 15.1 - 19.0 9.88 + 9.88
Nov. 3, 4 fuel plates in the SPERT element, ends 6 swimming strips (2, 3, 7, 8, 5, 10) and 1 natural strip (0V). Fuel 190, 226 cm. 172.5 Y.

1607

Wet at 14.05 cm. + Period #4

T=86.8 cm. 11.6 Y.

1610

Wet at 14.45 cm. Critical

Draw

Wet at 35.67 cm. 4 fuel plates, 6 swimming strips and 1 natural strip.
## INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
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<td>R-2</td>
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</table>

- EMERGENCY: 700V Alarm ✔ cont. ✔ 500V
- PFA-2: 1200V Low ✔ cont. ✔ 900V

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

DUMP WELL PROBE LIGHT ✔

## START-UP CHECK LIST

- Equipment checked by J. C. Personnel check by J. C.
- Instruments and safeties checked and reset by J. C.
- Source in checked by J. C. Source No. M-43
- Emergency equipment in control room checked by J. C.
- Instruments in trip circuit: K1-2 PM 1-2
- Red light on by J. C. Time 080.5
- Start-up CK'd by J. C. O. C. Date 4/10/66

New done 4 fuel plates. 2 natural strips #2, #3, # and 6 enriched strips #2, #3, #, #, #, #.
4/10/60
0840  Water at 21.4 cm.  5 Period #1
T = 135.8°C  7.7%  
0855  Water at 14.7 cm.  Critical

Drown
Calc: 0.91 - 187.5°C - 8.0°C = 193.5K ± 19.4

Installed. 7-10 in. 6-9. No SPERT element onTeam Ships.

1015  Water at 21.2 cm.  Subcritical

Added SPERT element with 10 plates and heater strips #4 and #5.

1152  Water at 15.4 cm.  5 Period #2
T = 107.2°C  5.0%

1218  Water at 13.4 cm.  Critical
Calc: 2.90 + 27.5°C + 14.3°C = 59.4°C ± 8.4%

Added 4 #53 strips. Now have 12 final plates, included strips and #53 strips.

1:23  Water = 21.4 cm  7 Period #3
T = 125.5°C  6.25%
Critical = Water Height 15.7 cm
Calc: 2.90 ± 35.6°C ± 5.8% = 59.6°F ± 8.5°
Installed Core 75 x 70 \( \frac{3}{8} \)" species

Nailing wood will respond to order.

- 2 SPBT PLATES \( \frac{3}{4} \times 22.4 \times 0.245 \)
- 6 SS Strips
- 2 Natural B - SS Strips \# 20 to 3.

3:44 P - Water VI.4cm

Period = 4

Temp \( 76 \pm 1 \) C

\( T = 66.1 \pm 0.5 \) C

D0.5P Calibration, 16.35 cm. H20 Height.

\( C = -7.43 + 3.5 \times 24.17 - 200.08 \pm 8.7 \)
<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>DISTANCE</th>
<th>FT</th>
<th>START-UP RANGE</th>
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<td>5 x 10 ^7</td>
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<tr>
<td>PM-1</td>
<td>700 V</td>
<td>Alarm</td>
<td>Cont</td>
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<td>PM-2</td>
<td>1200 V</td>
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</tbody>
</table>

LOG IN CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by: RKAL Personnel check by EDIC

Instruments and safety checked and sealed by: AMO

Source in checked by: RKAL Source No. M-43

Emergency equipment in control room checked by EDIC

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

Red light on by RKAL Time: 0815

Start-up OK'd by EDIC Date: 6-13-66
0825  Repeat of experiment described on page 7.
6-10 0.6  Case A 7-0 27-1

0907  Water ht = 21.25 cm  Water temp. °C
         + Res.
         T = 467.19  mec = 2.13
         Cms = -2 + 0.1256 + 2.3 = 202.1 ± 7.5°

0937  Water ht = 17.20 cm
        System just critical
        Notes

0945  Case #5 7-0 27-1.
       Have 4 fuel plates, 3 natural strips, #2,3.
       And 6 enriched strips 2,3,7,8,9,10.

1125  Water ht = 21.30 cm  Water temp. °C
         + Res.
         T = 477.68  mec = 3.4
         Cms = -2 + 24.5

1135  Added water to 24.15 cm.
       No change in + Res.

1145  Water ht = 16.80 cm  System just critical: Drain.
1300  Outer core 17-0  
    Inner core 18-1  
2 sp. fuel plates  
2 natural boron strips 2 & 3  
6 stainless steel strips.

1336  Water h = 21.2 cm  
      +P  
      E = 12.49 cm = 11.6" 
      \nu 1 = 24.7  
      \alpha = 25.0

1342  Water h = 14.00 cm  
      Lightly just critical  
      Drain  
      \rho 1 = -240.0 + 35.6 + 11.6 = 192.6 \pm 8.54

1450  Flow has:  
    Outer core 18-0  
    Inner core 18-1  
2 sp. fuel plates  
2 natural boron strips 1 \& 3  
6 stainless steel strips.

1540  Water h = 18.12 cm  
      +P  
      E = 16.06 cm = 12.24  
      \nu 1 = 24.7  
      \alpha = 25.0
1550  Water h = 13.50 cm

System just critical

Drain

Repeat of + Pr:

1555  Water h = 21.30 cm

\( \sigma = 60.8 \text{ mm} = 14.3\% \)

1600  Water h = 13.50 cm

System just critical

Drain

\[ x = 240.07 + 33.6 \times 14.3 = 190.10 \% \pm 0.5\% \]
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Range</th>
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</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
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<td>R-1</td>
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<td>P-1</td>
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<tr>
<td>B-1/2</td>
<td>1800 V</td>
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</tbody>
</table>

LENS CALIBRATE OPERATE SOURCE NO. B-20

BUMP WEU PROBE LIGHT

START-UP CHECK-LIST

Equipment checked by RKAL Personnel check by E.A.E.
Instruments and safety equipment check by AKAL
Source in checked by RKAL No. M-73
Emergency equipment in control room checked by E.P.E.
Instruments in trip circuit: K-1-2, P-1-2
Red light on by RKAL Time 08:20
Start-up OK'd by E.L.C.RKAL Date 6-19-60
0820

water core # 8-0
liner core # 8-1
4 ft. 4 in. full plot

2 natural horn stage # 2+3.
6 ensiled horn stage # 23, 78, 910.

0855

Water ht = 17.10 cm.

Water temp °C

h1 = 29.3

T = 38.01 cm = 12.7 ft

2 = 29.5

0905

Water ht = 13.20 cm

latex just critical
Drain to — 8.5 cm. Report + Pr.

0912

Water ht = 19.30 cm.

Water temp °C

h1 = 29.3

T = 76.00 cm = 24.8 ft

2 = 29.5

0922

Water ht = 13.35

latex just critical
Drain

inc. = -391.0 + 167.5 2 + 14.0 = 189.45 ± 15.4 ft
1030  Outter core # 8.0
1040  Inner core 9.1
4 spoilt fuel pellets = 391.00 ft.
2 natural boron strips = 27.50 ft.  Total 418.50 ft.
6 enriched boron strips = 159.96 ft.
4 stainless steel strips = 5.00 ft.

1100  Water ht. = 21.20 cm
5
5 = 112.34 cm = 9.0 ft.

1113  Water ht. = 14.50 cm
game just critical
Drain.

core = -391.0 + 192.98 + 9.0 = 189.12 ft. 19.4 ft.

1245  Outter core # 8.0
Inner core # 9.1
2 spoilt fuel pellets = 240.00 ft.  total 264.00 ft.
2 natural boron strips = 27.50 ft.  = 85.00 ft.
6 stainless steel strips = 8.04 ft.

1313  Water ht. = 13.00 cm
4
5 = 31.91 cm = 11.1 ft.

Water temp. °

#1 = 24.5
2 = 25.0
1325 Water ht = 13.5 cm

Lysimeter jnt. initial

Drain

1335 added 4 more stainless steel strips:

* New line
  Outer core #8-0
  Inner core #9-1

3 spent fuel plates = 220,000 f
3 natural ceramic strips = 27,500 f
10 stainless steel strips = 13,400 f

14:08 Water ht = 21.20 cm

Water top c

C = 25.0

5 = 13.91 mm = 7.7 f

14:20 Water ht = 15.10 cm

Lysimeter jnt. initial

Drain

C = 25.0

100 = -20.00 + 90.96 f + 7.7 = 191.48 f ± 9.5
1505
Water Level
Cutter core #9-0
Driller core #9-1
2 spent fuel plates
2 natural boron strips
6 stainless steel strips

1543 Water Alt = 21.20 cm

(6) P + Pw

\[ \Delta = 67.36 \text{ cm} = 12.3 \text{ ft} \]

1552 Water Alt = 13.65 cm

Note: Final Initial

\[ \Delta = -240.00 + 35.60 + 13.3 = 191.10 \text{ ft} \]
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>DISTANCE</th>
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<th>START-UP</th>
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LOG N. CALIBRATE OPERATE SOURCE No. B-50

DUMP WELL PROBE LIGHT

### START-UP CHECK LIST

- Equipment checked by [Name]
- Personnel check by [Name]
- Instruments and safety check and reset by [Name]
- Source in checked by [Name]
- Source No. M-93
- Emergency equipment in control room checked by [Name]
- Instruments in trip circuit: N-1-2 PM-1-2
- Red light on by [Name] Time 0802
- Start-up CK'd by [Name] Date 6-15-66

0805 Repeat of equipment described on page 16.
0830  Water ht = 21.30 cm

\[ \text{water temp } ^\circ C \]
\[ T = 12.3 \text{ cm} = 12.3 \text{ ft} \]

\[ \#1 = 29.5 \]
\[ \#2 = 29.7 \]

0845  Water ht = 13.75 cm

System just critical

\[ \text{core } = -240.00 + 235.20 + 12.5 \text{ ft} = 191.50 \text{ ft} = 9 \text{ ft} \]

0910  New core:

Output core \( \#9-0 \)

Input core \( \#9-1 \)

8 spare fuel plates

2 natural boron strips

6 enriched boron strips

\[ \text{core } = 157.5 \text{ ft} \]

0943  Water ht = 21.25 cm

\[ \text{water temp } ^\circ C \]
\[ \#1 = 24.5 \]
\[ \#2 = 24.7 \]

0952  Water ht = 13.80

System just critical

\[ \text{core } = -301 + 187.52 + 13.20 = 190.38 \text{ ft} = 154 \text{ ft} \]
INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
<th>SET</th>
<th>START-UP</th>
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LOG N CALIBRATE ___________  OPERATE ___________  SOURCE NO.  B-80 1
DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by AKLL  Personnel check by Eilo
Instruments and safeties checked and reset by AKLL
Source in checked by AKLL  Source No.  M-93
Emergency equipment in control room checked by Eilo

Instruments in trip circuit: K-1-2 PM-1-2
Red light on by AKLL  Time 08:15

Start-up OK'd by Eilo  KEL  Date 6-16-66
0830 New core.

Outer core 29-0

Inner core 29-1

4 spent fuel plates  371.00 f

1 natural boron strip  12.78 f

5 enriched boron strips  133.30 f

also have DN. Henry Ion Chamber mounted against outer core.
Purpose to attain worth of Ion Chamber rather mounted next to core.

0900 Water Ht = 21.20 cm ; Water temp °C

\[ T = 24.2\ °C \]

0915 Water Ht = 14.70 cm

Krypton just enriched

0915 Per ; to reduce power level

0930 Water Ht = 14.70 cm

\[ K \rightarrow 2 = 50\% \quad 10 \times 10^{-10} \]

Krypton just enriched

\[ K \rightarrow 1 = 47\% \quad 10 \times 10^{-10} \]

Start of power run for DN. Henry.
0957 Drain.

0959 120 MR at center of outer core.

1015 Remainder spent fuel plates and all poison strips. Your slave source M-93 and M-227 opposite Fry's ion chamber. Purpose is for such critical measurement for Fry. Intensity log M-45.32 - 0.254.42

1040 Water level 21,20 cm: SOURCES:

Log n = .012
K-1 = ~ 90% 3 x 10^-11
K-2 = ~ 9.3% 3 x 10^-12

1115 Remainder sources:

Background ions for Fry.

Log n = .0012
K-1 = ~ 15% 3 x 10^-12
K-2 = ~ 30% 3 x 10^-12

1205 Drain
1245
New sample.
Outer cone #7-0
Inner cone #7-1

Make samples #19-43 & #19-227 against Fry
Fan Chamber. Purpose is sub-critical measurement for Fry. Sub-critical by 202.7 + 40.5
= 244.2.

1313
Water temp = 21.20 °C, Same as:
Log m = 0.0095
K-1 = ~ 34% 3 x 10^-11
K-2 = ~ 35% 3 x 10^-12

Water temp =

1400
Drain.

1428
New sample.
Outer cone #6-0
Inner cone #6-1

Make samples #19-97 & #19-227 against Fry Fan
Chamber. Purpose is sub-critical measurement for Fry. Sub-critical by 185.6 + 40.5 = 226.

1452
Water temp = 21.30 °C, Same as:
Log m = 0.0095
K-1 = ~ 34% 3 x 10^-11
K-2 = ~ 35% 3 x 10^-12

#1 = 24.7
2 = 25.0
15.40 March Fry's for Chamber up to 3.0. Other conditions same as described on bottom page 2.

1612 Drain
### Instrument Check

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGEx10^-15</th>
<th>TEMP</th>
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</table>

**Calibration:**
- Ranges: 3 x 10^-15, 3 x 10^-15, 1000, 5000, 7000, 10000
- Status: Cont., Good

**Check:**
- Equipment checked by E. J. DC
- Instrument check read reset by E. J. DC
- Source checked by E. J. DC
- Emergency equipment in control room checked by E. J. DC
- Instruments in this circuit checked by E. J. DC

**Red light on by:**
- E. J. DC
- Time: 09:15

**Start-up code by:**
- E. J. DC
- Date: 7/13/00
113/66

HP 12 cores 9 and 6... spend 3 in L21.

Set fuel rate: 2.4 cfm/min.

Became very vibration-induced leak. Core 1. 16K in unit 1. 9 core. Core pumping air.

1045: 24400 (black scale). Critical

Drain.

Blew & cleaned core. Put new core down
on suction side. 9 Core. Tightened bolts.

Used 2 drain valves. Throttle valve system.

Losing water was drained. Throttle
was air being pumped.

Water at 47.1 cfm (black scale) when over
fuel plates in cooler annulus. (2 cfm)

Field out 3.4 cfm/min.

Drain rate: 20 cfm/min.

Heat exchanger: 1.3 " separation.

1513

Wtr md 43.1 cfm + 10% +/-

Insert 15/10.8 sec x 9.0 cpm

1515

Wtr md 44.1 cfm. Very slight + poing

Wtr md 44.1 cfm. Very slight - poing

1518 (291.8 cfm. Very slight + poing) 1. 7.5 ft.

1517 17.51 1.46 8.59 2.32 at this

Segment:
7/13/66

Cementers were graded 3.0 in.

1555

Water at 51.0 cwt. + limer
T = 85.4 new ~ 11.2 °F

1600

Water at 48.5 cwt...Critical.

Drain
START-UP CHECK LIST

Equipment checked by [Signature] Personnel check by [Signature]

Instruments and safety checked and reset by [Signature]

Source in checked by [Signature] Source No. 19-73

Emergency equipment in control room checked by [Signature]

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

Red light on by [Signature] Time 0530

Start-up OK'd by [Signature] Date 7/14/60

Elements 5 and 6 separated 3.55 in.
Check feed rate: 3.4 cm/min
Wtr in at 58.7 cm. Subcritical
Full source for hea. period

Drain

T = 197.1 sec. - 8.2°F

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

1354
Wtr in at 43.7 cm. + press nd
T = 73.9 sec. 10.5°F

1400
Wtr in at 43.5 cm. Critical.
Drain

Now spaced 4.035 in.

1445
Wtr in at 48.4 cm. + press nd
T = 481.1 sec. 16.8°F
7/14/60

14.55' WTR 27.6 cm. Critical.

Drain

Elements from spread 5.045 in.

15.75' WTR 27.5 cm. 1 Panel #4.

To 400, Line 3.0 ft

15.56' WTR 25.5 cm. Critical.

Drain
## INSTRUMENT CHECK

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<th>START-UP RANGE</th>
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</thead>
<tbody>
<tr>
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<td></td>
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<tr>
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</table>

LOG N CALIBRATE OPERATE SOURCE No. 3-62

DUMP WELL PROBE LIGHT

## START-UP CHECK LIST

Equipment checked by E[ ] Personnel check by IDC

Instruments and safeties checked and reset by E[ ]

Source in checked by E[ ] Source No. 4-73

Emergency equipment in control room checked by IDC

Instruments in trip circuit: E[ ] PM-1, PM-2

Red light on by E[ ] Time 14:00

Start-up OK'd by E[ ] IDC Date 7/5/74
Now place 6 elements in triangular array
Side to side separation = 5.0"

14:55 Water at 45.5 cm, + Rameal #1
T = 96.3 °C - 14.3K

15:03 Water at 44.9 cm, Critical
Drain

15:30 Now place 6 elements in triangular array
Side to side separation = 5.0"

15:48 Water at 44.5 cm, + Rameal #2
T = 74.4 °C - 12.4 K

15:53 Water at 44.1 cm, Critical
Drain
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>SET</th>
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<tbody>
<tr>
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<td>3 x 2&quot;</td>
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LOG IN: CALIBRATED: [ ] CALIBRATION Date: SOURCE NO: B-3

### START-UP CHECK LIST

Equipment checked by [IDC] Personnel check by [IDC]

Instruments and safeties checked and reset by [ ]

Source in checked by [IDC] Source No: M-45

Emergency equipment in control room checked by [IDC]

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

Red light on by [ ] Time: 0510

Start-up OK'd by [IDC] Date: 7/19/46
Now have 7 HFIR elements in Nell. Triangle pattern, 5.0 in. separation.

\[
\begin{array}{ccccc}
10 & 4 & 8 \\
9 & 5 & 7 \\
6 & 11 & \\
\end{array}
\]

06:45 Water at 43.1°C. + Paint

08:05 Water at 42.7°C. Critical
Drain

Sparging from 5.60 in. 7 elements in Triangle pattern.

14:45 Water at 46.7°C. + Paint

14:55 Water at 45.6°C. Critical
Drain
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
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<td>3&quot;</td>
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<td>R.2</td>
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<tr>
<td>PM-1</td>
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<td>V</td>
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<td>V</td>
<td>1/2&quot;</td>
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LOG N CALIBRATE V OPERATE __________ SOURCE No. 0-10

DUMP WELL FROSE LIGHT __________

### START-UP CHECK LIST

- Equipment checked by E. JDC Personnel check by JDC.
- Instruments and safeties checked and reset by E. J.
- Source in checked by E. J. Source No. 49-72.
- Emergency equipment in control room checked by I. J.
- Red light on by __________ Time 0845.
- Start-up OK'd by __________ Date __________.
7/2/66

Elements in triangular pattern spaced 6.7" in.

12:02 Water at 51.70 cm. Sub-critical.

Saucer in to increase level.

10:10 Remove saucer for leg. Point #1. Too steep to become.

Drain

Spacing 1.25 cm.

14:05 Water at 51.70 cm. Sub-critical.

Saucer in to increase level.

14:15 Remove saucer for leg. Point #1.

T ~ 53° C; P 7.86 kPa

Drain
7 elements spaced 6.5 in. The center one (C1) now is adjusted so that it will be critical.
Submerged, it contains 7 fuel plates, 1 enriched strip, 1 natural strip, and 6 SS strips.

\[ 240 - 49.5 = 191.5 \text{ in.} \]
Element curve: 190 - 191.1 in.
Should have 0.4% excess associated with center element.

10.48
Water at 46.2 cm. + Peabody
\[ T = 47.6 \text{ cm.}, \quad \rho = 16.5 \text{ psi} \quad (244/\text{cm}) \]

12.55
Water at 47.35. Critical
Drain

Added 2 enriched strips to C1 (center).
Now curve 46.5 + 53.4 in. Peabody = 101.9 in.
\[ 240 - 101.9 - 191.1 = 5.3 \text{ in.} \]
The center element is subcritical.

11.5
Water at 50.9 cm. + Peabody
\[ T = 49.4 \text{ cm.}, \quad \rho = 13.4 \text{ psi} \quad (874/\text{cm}) \]

11.3
Water at 49.7 cm. Critical
Drain

Replace poison to have 4 enriched strips and 1 natural strip. Poison = 120.6 in.
\[ 240 - 120.6 - 191.1 = 28.9 \text{ in.} \]
Subcritical (center element).

12.5
Water at 52.6 cm. + Peabody
\[ T = 128.5 \text{ cm.}, \quad \rho = 5.6 \text{ psi} \]
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
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<td>3&quot;</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>R-1</td>
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<td></td>
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</tr>
<tr>
<td>R-2</td>
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<td>PM-1</td>
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<td></td>
</tr>
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</table>

LOG N CALIBRATE ✓ OPERATE ✓ SOURCE No. B-51
DUMP WELL PROBE LIGHT

### START-UP CHECK LIST

Equipment checked by [John Doe](#). Personnel check by [Jane Doe](#).

Instruments and safeties checked and reset by [John Doe](#).

Source in checked by [John Doe](#). Source No. M-70.

Emergency equipment in control room checked by [John Doe](#).

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


Start-up OK'd by [John Doe](#). Date 7/22/64.
7/11/66
1340
Water at 50.65 mm. Critical.

Drain.

Add 1 liter of strip. Now have 4 enriched 2nd & 2nd of strip. P hemat 325.5 (individual)
249.3 = 25.5
- 88.5 & that the central element is 3rd element.

1410
Water at 55.0 mm. + Caend 3/4

T = 117.0 Kev; p = 8.15 K

1420
Water at 57.5 mm. Critical.

Drain.

245 = 54.5
- 5.0 = 94.5 & that central element should have some subtraction. It can be over critical somewhere. Added 96.6% to central element to make away critical.
### INSTRUMENT CHECK

<table>
<thead>
<tr>
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<td>7</td>
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<td></td>
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<td>V</td>
<td></td>
<td></td>
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<tr>
<td>K-2</td>
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<td>V</td>
<td>4''</td>
<td>V</td>
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<td>P-2</td>
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<tr>
<td>PM-1</td>
<td>700 V</td>
<td>V</td>
<td>Cont'</td>
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<td>500 V</td>
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<td>PM-2</td>
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<td>V</td>
<td>10''</td>
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<td>900 V</td>
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<td>Alarm</td>
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</table>

LOG N CALIBRATE: ____________  OPERATE: ____________  SOURCE No.: 13-80

DUMP WELL PROSE LIGHT: ____________

### START-UP CHECK LIST

Equipment checked by IDC  Personnel check by IDC
Instruments and safeties checked and reset by IDC
Source in checked by IDC  Source No. 143
Emergency equipment in control room checked by IDC
Instruments in trip circuit: K1 K2 PM1 PM2
Red light on by DC  Time 08:15
Start-up OK'd by DC, IDC  Date 7/25/66
7/5/76

7 elements, triangular pattern, spread 6.48 in.  
Wet at 56.6 cm. Fume in & increase level.

Drain

Reduced speed for 5 mins. Replaced spacers.  
Now have 7 elements, triangular pattern, 6 in. separation.

1343  
Wet at 758.0 cm. Fume in to increase 

element level.

Drain

At same speed, installed 9th element with 
4 fuel plates and 4 inatural boro strips in 
center element (9).

Fuel 2 + 252, element 9 - 101.4,  
s + x = -55.28

1445  
Wet at 47.8 cm. + Fume #3  
T = 72.75 in, p = 12.8 ft

1448  
Wet at 47.1 cm. Critically

Drain
Now leave 2 fuel valves, 3 enriched and
3 unenriched slugs.
44 fuel, -176.6 elem., 171.6 elem.

1523
Water at 55.8°C, plus

T = 57.0°C, p = 15.06

1533
Water at 45.6°C, corrected

D\textsuperscript{2}Z\textsuperscript{2}

40 - 17.11 - 121.7 - 15 = 83.57, amount center element

must be subtracted to make any critical. It is added
191.1 - 83.57 = 103.6 g in center slugs to make

away critical. See p. 43 for further treatment.
## Instrument Check

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Range</th>
<th>Trip</th>
<th>Source Distance</th>
<th>Set</th>
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<td>$3 \times 10^{-2}$</td>
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<td>Meter</td>
<td>5&quot;</td>
<td>1</td>
<td>$3 \times 10^{-2}$</td>
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<td>R-1</td>
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<td>R-2</td>
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<tr>
<td>PM-1</td>
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<td>Alarm</td>
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<tr>
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<td>1</td>
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</tbody>
</table>

LOG N CALIBRATE: — OPERATE: — SOURCE No.: 8-88

DUMP WELL PROBE LIGHT: 

### Start-Up Check List

Equipment checked by EDC  Personnel check by: EDC

Instruments and safeties checked and reset by: EDC

Source in checked by EDC  Source No.: M-43

Emergency equipment in control room checked by: EDC

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

Red light on by EDC  Time: 0810

Start-up OK'd by EDC  Date: 08/15
7/6/66

Now leave 1 more enriched strip, making a total of 4 enriched and 3 natural strips, spacing 0.7 cm.

0850

Wate 51.8 cm. Critical

T = 9.2 cm, p = 19.4 lbf

0955

Wate 27.56 cm. + PWR 1

0900

Wate 52.1 cm. Critical

Drain

1. Center element was + 249 – 15.11 – 15.10 – 12.6

2. Critical = 99.0 %; added 91.2 %. The center element.

3. Removed the inner annuli from all elements except the central one. The central element includes 2 fuel plates, 3 enriched and 3 natural strips. Region = 12.5 cm, center element

1053

Wate 27.5 cm. Essentially no multiplication.

Drain.

New layer of fuel plates and enriched strips in the central element.

1145

Wate 21.58 cm. Slight + period.

1155

1 1/26

Sew HPR outer annul. A pattern
in contact

20 x 5
Critical 11 x 9 cm

Sew HPR outer annul. A pattern
4.4 in. 5-4-0-5.

20 x 5
Very Sub-Critical

Spacing 20.25 in.

15 x 5

Drain

Spacing 1.060 in.
## INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
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<th>START-UP RANGE</th>
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<tbody>
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<td>K-1</td>
<td>$3 \times 10^{-12}$</td>
<td>Meter</td>
<td>5&quot;</td>
<td>L</td>
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<td>Fast</td>
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<td></td>
</tr>
<tr>
<td>K-2</td>
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<td>Meter</td>
<td>5&quot;</td>
<td>V</td>
<td>$3 \times 10^{-12}$</td>
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<td></td>
<td></td>
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<td>R-2</td>
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<tr>
<td>PM-1</td>
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<td>Alarm</td>
<td>Cont.</td>
<td>L</td>
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<tr>
<td>PM-2</td>
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<td>L</td>
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</table>

Log in: CALIBRATE ____ OPERATE ____ SOURCE No. B-80

Dump well probe light __________

## START-UP CHECK LIST

- Equipment checked by ___ Personnel check by ___
- Instruments and safeties checked and reset by ___
- Source in checked by ___ Source No. ___
- Emergency equipment in control room checked by ___
- Instruments in trip circuit: K1 - K2 - PM1 - PM2
- Red light on by ___ Time: 0810
- Start-up OK'd by ___ Date: 7/27/66

Spec: now 1.06 in. 7 am "escribe"

0838 water over 34.1 cm. Critical, drain

0847 water over 34.1 cm. Critical, drain
7/27/66
Spooning now 1.5-3.5 in. I do. Did
0948 Water at 58.2 cm. Little multiplication.

Drain

Spooning now 1.4 and in.

1045 Water at 49.4 cm. + peering #2

1056 Water at 48.6 cm. Critical.

Drain
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
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<td>5&quot;</td>
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<td>3 x 5&quot;</td>
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<td>4&quot;</td>
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<td>3 x 5&quot;</td>
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<tr>
<td>PM-1</td>
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<td>Contact 500 V</td>
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<tr>
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</tbody>
</table>

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

DUMP WELL FROSE LIGHT

### START-UP CHECK LIST

- Equipment checked by ♕ Personnel check by EDC
- Instruments and safeties checked and reset by ♕
- Source in checked by ♕ Loc. No. M-43
- Emergency equipment in control room checked by EDC
- Instruments in trip circuit: K-1, K-2, PM-1, PM-2
- Red light on by ♕ Time 110
- Start-up OK'd by ♕ EDC Date 7/28/66
1126

Water at 38 cm. Sub-critical.

Drain.

Annulus spread as close as possible. Some in contact at top, some gaps. Slightly irregular spacing.

13.5

Water at 40.7 cm. + pencil #1

To 80.1 cm., p = 11.7 psi

13.5

Water at 40.15 cm. Critical.

12 of 2.75 ft.

Note: 1.5 cm. below top (fuel).
For example, consider the "A" floor layout.

All rooms share a common area. Each room in the center of the floor.
**INSTRUMENT CHECK**

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
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<th>TRIP</th>
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</tbody>
</table>

LOG M CALIBRATE: ✓ OPERATE: ✓ SOURCE No.: B-25
DUN VINYL GREEN LIGHT

**START-UP CHECK LIST**

Equipment checked by ✅ Personnel check by IDC
Instruments and safeties checked and reset by FP
Source in checked by ✅ Source No.: 77-43
Emergency equipment in control room checked by IDC
Instruments in trip circuit: K-1, K-2, PM-2, PM-3
Red light on by ✅ Time: 1230
Start-up OK'd by ✅ IDC Date: 7/29/66
Three atm. zounds in contact as shown below.

10.0 9.0 11.0

139

1134

10.0 9.0

5.0 11.0

Four atm. zounds in contact, square restoring

1335

Wear at 58 mm. Very subcritical.

Down via server button. It works!
July 9, 1968

3 elements spread 9.05% 2

1550 Water of 58.0 cm. + reverse 92
To 15.0 cm. 91.7 F.

1600 Water of 51.05°C. Critical Drain.
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
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LOG N CALIBRATE OPERATE SOURCE No. B-40

DUMP WELL 60-1/2 LIGHT

### START-UP CHECK LIST

- Equipment checked by DC JOC Personnel check by JOC
- Instruments and safeties checked and reset by JOC
- Source in checked by DC Source No. M-43
- Emergency equipment in control room checked by JOC
- Instruments in trip circuit: K-1, K-2, PM-1, PM-2
- Red light on by JOC Time 0830
- Start-up OK'd by JOC JOC Date 9/1/66
Element (89) with 2 SPERT plates and 2 natural strips.

1820

Width = 54.7 cm. + period #1

T = 59.3 cm.  p = 14.5 %

1827

Width = 50.1 cm. Critical

$E_{en} = 240 \times 721.6 (125.000) - 216 (\text{water loss, etc}) = 185.8 \%$

Drain

Element (810) with 2 SPERT plates and 2 natural strips.

1325

Width = 54.1 cm. + period #2

$240 - 23.2 - 53.4 = 153.5 \times \frac{1}{2} - 1106 cm. 6.5 \%$

1335

Width = 49.4 cm. Critical

Drain

Added 1 natural strip. Now have 2 fuel plates
and 3 natural strips. $E_{en} = 41.8 \%$

1406

Width = 56.4 cm. + period #3

$T = 69.7 \% 12.3 \%

1414

Width = 51.0 cm. Critical

$240 - 71.2 - 5.6 = 133.2 \% 29.1$

Drain

Now have 4 SPERT plates, 6 enriched and 3 natural strips. T = 1 p. 55\% - 201.4

$3.91 - 201.4 = 185.4$
17/11
15/11
Went to 58.8 cm. + Evening #4
T 11/2 4:30 9,34

15/11
Went to 52.5 cm. Critical
Ding
3 11/2 4:30 9 - 120.48 5 3 101
S P E R T element with fuel plate 25, 3 external slivers

16/11
Went to 56.0 cm. + Period 3-
T 11/2 4:30 9,32

16/11
Went to 54.1 cm. Critical
Ding
2 11/2 4:30 - 15.6 = 123.0 - 9.1
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
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LOG N CALIBRATE OPERATE SOURCE No.  D-10

START-UP CHECK LIST

Equipment checked by EDC Personnel check by EDC
Instruments and safeties checked and reset by E9
Source in checked by EDC Source No. M-43
Emergency equipment in control room checked by EDC
Instruments in trip circuit: K-1, K-2, PM-1, PM-2
Red light on by E9 Time 23:55
Start-up OK'd by E9 EDC Date 19/1/60
Element #11 in cell SPERT element with 4 fuel plates and 3 natural strips.

1036 Water to 53.1 cm, + Period #2

1035 Water at 51.8 cm, Critical

Drain

-2.7 - 41.4 - 11.0 - 157.2 ± 5.1

Nodal one 4 fuel plate, 6 enriched and 3 natural strips

1034 Water at 53.1 cm, theorem #2

1035 Water at 54.1 cm, Critical

Drain

391.2 ± 6.1 = 740.7 ± 20.1

Stagg thyroid data

Summary 5/14/66

See summary sheet in Rudis file marked operating history
## INSTRUMENT CHECK

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<thead>
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Log n Calibrate: Operat: Source No. B-80

Dump well: Prox. Light

## START-UP CHECK LIST

- Equipment checked by: AMM
- Personnel check by: FWC
- Instruments and safeties checked and reset by: AMM
- Source in checked by: AMM
- Emergency equipment in Control room checked by: EOC
- Instruments in trip circuit: K-1-2 PM-1-2
- Red light on by: AMM
- Time: 13:05
- Start-up OK’d by: EOC AMM
- Date: 1-12-66

(Handwritten notes)
### INSTRUMENT CHECK

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LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

### START-UP CHECK LIST

- **Equipment checked by** [Signature]
- **Personnel check by** [Signature]
- **Instruments and safeties checked and reset by** [Signature]
- **Source in checked by** [Signature] Source No. M-43
- **Emergency equipment in control room checked by** [Signature]
- **Instruments in trip circuit:** K-1-2 PM-1-2
- **Red light on by** [Signature] Time 0910
- **Start-up OK'd by** [Signature] Date 1-13-67
1103 Water ht = 21.0 cm.

\[ t = 158.6 \text{ mm} = 6.8^\circ \]

\[ a_1 = 24.3 \]

\[ a_2 = 24.3 \]

11.11 Water ht = 15.20 cm

System just critical

\[ Q_{\text{in}} = 240.0 - 55.20 - 1.4 = 183.4^\circ \]

\[ 240 - 55 \div 0.9 = 183.5^\circ \pm 2.5 \]
60

Fuel rate = 2.35/43 hrs.
N" Drain rate = 9.8 gpm.
N" Steam rate = 73.9 gpm.
9.9 cm outer element core.
9.1 cm inner element core.

Report of critical conditions with 6 E-2 core.
Have core only; for first run.

1430
Water Ht = 22.4 cm
System sub-critical.

1455
Now have the spent fuel element installed, with spent plate.
D-3274, D-3275, D-3272, D-3270, also have 3 enriched lower shift # 5.
9.8 + 10.9, and 1 natural shift # 2.
Power = 93.5 W.

1525
Water Ht = 21.10 cm
System just critical.

391 - 93.5 = 297.1 W.
10.45 water hgt 21.0 cm.  Water Tmp. °C.  
Lytton sub-critical.  
\[ T_1 = 24.0° \] 
\[ T_2 = 24.0° \]

Now have 6 enriched fuel elements installed with 5 fuel plates. 4-0.32, 9-0.5495, 3-0.324, and 2-0.287. Also have 6 enriched strips 4.9, 7, 8, 9, 10, and 2 natural strips 4.9, 3.49.  
Fuel plates are .250" below top of inner core.  
Fuel plate P0. 151 in. = 187.8°F  
187.8°F

10.51  Water hgt = 19.60 cm.  Water Tmp. °C.  
\[ T_1 = 29.2° \] 
\[ T_2 = 29.2° \]

10.51  Water hgt = 12.6 cm.  
Drain to 9.0 cm on manual scale.  
Added 1 natural strip.  

---
New J(7.7) C2/15 strps
1103  Water at = 21.0 cm,  Water temp. °C
11 11  Water at = 15.20 cm

Set up just critical

\[
\begin{align*}
\text{Draught} & : 391.0 - 100.4 - 31.6 - 0.8 = 182.3^\circ \\
\text{Set-up} & : 391 - 31.6 - 31.6 - 182.3 = 24.2
\end{align*}
\]

Over 20-0 + 20-1.

Now have first element with 2 fuel plates (10 - 22.24 + 0.0 - 5.96) and 2 natural films. 4.23.4.20. 4.20.4.0. 4.20.4.0. 4.20.4.0.

1310  Water at = 21.00 cm,  Water temp. °C

\[
\begin{align*}
\text{Draught} & : 391.0 - 100.4 - 31.6 - 0.8 = 182.3^\circ \\
\text{Set-up} & : 391 - 31.6 - 31.6 - 182.3 = 24.2
\end{align*}
\]

1341  Water at = 21.10 cm

\[
\begin{align*}
\text{Draught} & : 391.0 - 100.4 - 31.6 - 0.8 = 182.3^\circ \\
\text{Set-up} & : 391 - 31.6 - 31.6 - 182.3 = 24.2
\end{align*}
\]

1351  Water at = 19.20 cm

Set-up just critical

\[
\begin{align*}
\text{Draught} & : 391.0 - 35.20 - 1.4 = 183.4^\circ \\
\text{Set-up} & : 391 - 35.2 - 35.2 - 183.4 = 8.0
\end{align*}
\]
<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>SET R.</th>
<th>START-UP RANGE</th>
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<tbody>
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<td>2&quot;</td>
<td>3 X 16-1/2</td>
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<td>3 x 15&quot;</td>
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<td>R-1</td>
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<tr>
<td>PM-1</td>
<td>200 V</td>
<td>Alarm</td>
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<td>PM-2</td>
<td>150 V</td>
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<td>10 900 V</td>
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</table>

LOG N CALIBRATE OPERATE SOURCE NO. 8-88

DUMP WELL PRESS LIGHT

START-UP CHECK LIST

Equipment checked by 
Personnel check by 

Instruments and safeties checked and reset by 

Source in checked by Source No. M-23

Emergency equipment in control room approved

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

Red light on by 

Start-up OK'd by Date 1-16-67
Core 21-0 & 21-1

Wax core 21-0 & 21-1 resemble in small reflector tank. Inner are spaced 3.75" with plastic spacers.

Water LID = 21.0 cm
Lid is sub-critical design.

Your have first element with 2 fuel plates, (φ 0.322 x 0.5795) and 4 natural boron strips, (φ 2.3 x 0.5) porous 5%.

104.5 Water LID = 21.10 cm 2.4 = 5.90

10.49 Water LID = 15.20 cm
Lid is first critical.

Drain : 100° 240.0 - 55.2 - 7.4 = 177.7 ft
24/2 - 55.2 - 6.0 - 178.3 + 7.4

Your have first element with 4 fuel plates, (φ 0.322 x 0.5795, 0.3242, 0.0 - 2670) plus 6 enriched strips (φ 2.3 x 7.8910) and 3 natural strips (φ 2.3 x 4.2) and 4 stainless steel strips. (φ 0.072 x 2.0).
1340 Water ht = 21.15 cm

1352. Water ht = 15.25 cm.

System just critical

\[ 3.910 - 16.012 - 41.4 - 5.20 - 7.0 \]
\[ 3.91 - 10.56 - 6.8 - 17.7 \]
\[ 1.70 - 1.73 \]

1353 Scrammed reactor. Check reactor core and reactor with scrammed bottom.

Core #3 22-0 + 22-1

Have core 22-0 + 22-1 available in small reflector tank. Inner core spread 375" with plastic sleeves.

1500 Water ht = 21.20 cm

System just critical

Cross

New bare bent fuel element with 4 plates, C enriched strips, 3 flattened strips, and 4 stainless steel strips. (See bottom of page 65 for numbers.)

-26.7
INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
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<td>SOURCE No. 0-80</td>
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</table>

Chime will flash light
START-UP CHECK LIST

Equipment checked by
Instruments and safety's checked and report by
Source in checked by
Source No.
Emergency equipment in control room checked by
Instruments in trip circuit:
Red light on by
Time
Start-up OK'd by
Data

Note: 22-0 x 22-1

Remove the 4 stainless steel strips, now have 4 field plates. 6 enriched strips and 3 natural strip, 1 in = 0.16

1103
Water: 52 = 21.40°C
C = -1302.80 in = -10°F
271 = 24.0

1112
Drain: 751 - 37.6 + 10 = 190°F x 20.1

Remave 1 natural strip (#7) and added
6 stainless steel strips:
1 in = 0.392
### Instrument Check

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Range</th>
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Log to Calibrate: Operate

Source No: B-80

Dump Well Pro3e Light
START-UP CHECK LIST

Equipment checked by AKL
Personnel check by FPLC

Instruments and safeties checked and reset by AKL

Source in checked by AKL
Source No. 4-93

Emergency equipment in control room checked by FPLC

Instruments in trip circuit: 1.1 2 1M-1 7

Red light on by AKL
Time 0830

Start-up OK'd by FPLC
Date 1/15/67

0930 Water ht = 21.4 cm
System sub-critical Drain

0936 Demand 14.5 natural strip, added 6 stainless steel strips.

Water ht = 23.9 cm

Water temp

\[ t = 22.2 \degree C \]

\[ t = 22.2 \degree C \]

\[ \Delta T = 434.60 \times 2.7 \]

\[ \Delta T = 434.60 \times 2.7 \]

\[ \Delta T = 24.8\degree C \]

\[ \Delta T = 24.8\degree C \]
10:02  Water ht = 17.90 cm
Lyten just critical
Drain
240.0 - 40.4 - 7.8 - 2.7 = 189.1
2.4 - 4.5 - 2.4 - 18.4 = 25.4

19:01  Core PT 19-0  & 19-1

19:30  Now have Core 19-0 & 19-1 assembled in small reflector block. Now core spaced 3.75" with plastic spacers.

Water ht = 21.50 cm
Lyten not critical

Drain

Now have spent fuel element with 2 fuel plates (10.0 - 32.24 - 10.0 - 5.495) and final fuel strip (2.424). Power = 55.5

15:54  Water ht = 21.30 cm.
Lyten not critical

Drain
### INSTRUMENT CHECK

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<thead>
<tr>
<th>INSTRUMENT</th>
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<td>Low</td>
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LOG N CALIBRATE ✓ OPERATE SOURCE NO: R-80

DUMP WELL PROBE LIGHT

---

### START-UP CHECK LIST

- Equipment checked by [Signature]
- Personal check by TJC
- Instruments and safeties checked and reset by DFL
- Source in checked by [Signature] Source No. M-93
- Emergency equipment in control room checked by FJC
- Instruments in trip circuits: K-7-2 R19-1-2
- Red light on by [Signature] Time 08:25
- Start-up OK'd by [Signature] Date 1-19-67
08:55  Water h.t. = 21.80 cm

t = 24.0
P = 710

09:15  Water h.t. = 17.80 cm

System first critical
Drain

243 - 45.3 - 2.3 = 152.4 N°C

10:45  Your sample went excellent with 7 fuel plates

(26.0 - 32.4, 0.3795, 0.3242, 0.0 - 0.7870) G

Enriched strips (º 2.3, 7.89.8.10) and 2 natural strips (º 203)
Drain 4 stainless steel strips

P = -18.7

11:15  Water h.t. = 21.50 cm

1 = 24.0

System slightly - N°C
Drain

Co = N°C
Area 19-0 + 19-1

Removal natural strip #3 and added 3 stainless steel strips. Water temp. 90°

Water height = 21.20 cm

\[ 2 + \frac{1}{r} \]

\[ 2 + 5 + \frac{2.5}{r} = 2.3 \]

\[ 13.50 \text{ Water height} = 17.6 \]

System just critical.

\[ \text{Power} = 391.0 \left( \frac{160.20 - 13.80 - 3.90 - 2.3}{210.80} \right) \]

\[ 391 - 17.8 - 12\text{ ft NG} \]

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

\[ \text{Power} = 168.0 \]

Water height = 21.50 cm

Water temp. 90°

\[ 2 + \frac{1}{r} \]

\[ 2 + 17.2 \text{ cm} = 11.9 \text{ ft} \]

\[ 14.52 \text{ Water height} = 19.20 \text{ cm} \]

System just critical.

\[ 391.0 - 160.2 - 7.8 - 11.9 = 211.1 \]
1530

1559

Water ht = 21.2 cm

Lifts out cylinder

Draft

INSTRUMENT CHECK

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<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>DISTANCE</th>
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LOGIN CALIBRATE OPERATE SOURCE No. 0-80

DUMP WELL PRESS LIGHT
START-UP CHECK LIST

Equipment checked by R.M. Personnel check by E.H.C.

Instruments and safety items checked and reset by R.M.

Source in checked by R.M. Source No. 19-4.3

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

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

Red light on by R.M. Time 0540

Start-up OK'd by E.H.C. R.M. Date 1-20-68

Done 19-0 & 19-1

The purpose is to check artificial core shown on top of page 73. Note slight fuel element wall
2 fullplates (#0-3229.0,0-5445) and 3 natural strips (#2,3,4) and 3 stainless steel
strips. Power = 45.3

Water l.t. = 21.30 cm Water Temp °C

(1) + Res
T = 217.3 cm = 51.2°

D = 24.3

0937 Water l.t. = 15.80 cm System first artificial

Rm = 43.5

\[
\frac{40.0 - 45.3 - 5.3}{18.9.6'} = 19.3
\]

Page 73 = 1/17-57
New have spent element with 4 fuel plates (4.15 = 322.0, 0.54 = 52.0, 32, 2.40 = 287.0), and 6 enriched strips (1.0, 3, 7, 8, 9, 10) and 6 stainless steel strips. 1.8.17

Water vol = 21.30 cm.

\((4.15) \times 28.25 = 385.8\)
\(\frac{1.0}{2} = 1.0\)

1100 Water vol = 12.50 cm

System just removed

Drain, \(391.0 - 160.2 = 270.8 - 23.5 = 199.5 \, \text{cm}^3\)

1:10:07 added more water to fill tank.

INSTRUMENT CHECK

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<tr>
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<th>TRIP</th>
<th>SOURCE DISTANCE</th>
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LOG N CALIBRATE: OPERATE: SOURCE No: B-27

DUMP WELL PROSE LIGHT
START-UP CHECK LIST

Equipment checked by [Signature], Personnel check by [Signature]

Instruments and safety checks and reset by [Signature]

Source in checked by [Signature], Source No. 14-22

Emergency equipment in control room checked by [Signature]

Instruments in trip circuits 1-1-2 P09-1-73

Red light on by [Signature], Time 08:10

Start-up OK'd by [Signature], Date 1-23-67

Purpose is to check critical conditions shown on page 77, (4 full plates, 6 annealed trip and 6 stainless steel stop) 108.0°

Water Ht. = 21.10 cm

\[ +{\Delta }H \]
\[ c = 30.4 \text{ m/s} = 22.5 \text{ ft/s} \]

[Signature]

Water Ht. = 12.50 cm

Lepton just annealed \[ 3910 + 160.2 - 7.8 - 22.5 \] 200.5 ft

Removed 3 stainless steel trip, and added natural trip to 2 (see page 77), 117.5

Water Ht. = 21.30 cm

\[ +{\Delta }H \]
\[ c = 16.06 \text{ m/s} = 12.2 \text{ ft/s} \]

Water Temp. °F

\[ 25.2 \]
0956 Water ht = 13.80 cm
System just switched
Drain
391.0 100.2 12.8 3.9 12.2
Current 200.96

Your line first element with 2 fuel plates (2 D-3224 + 0.5495) with 3 natural legs and 3 stainless steel legs 45.3

Water ht = 21.50 cm
Water temp 5°

1104 Water ht = 17.30 cm
System just switched
Drain
240.2 41.4 3.9 3.1
Current 191.6 NC
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
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<th>SET</th>
<th>START-UP RANGE</th>
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<td>P-2</td>
<td></td>
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<td>1&quot;</td>
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</table>

- **FM 1**: 700 V, Alarm, 600 V
- **PM 2**: 1200 V, Low, 12", 900 V

- **LOG N CALIBRATE**
- **OPERATE**
- **SOURCE No. 17-80**

- **DUMP WELL PROBE LIGHT**

---

### START-UP CHECK LIST

- Equipment checked by [Signature]
- Personnel check by [Signature]
- Instruments and safeties checked and reset by [Signature]
- Source in checked by [Signature] and No. M-43
- Emergency equipment in control room checked by [Signature]
- Instruments in trip circuit: K-1-2, PM 1-2
- Red light on by [Signature], Time 09:15
- Start-up OK'd by [Signature], Date 1-24-67
New felt element with 2 felt pads
(+5.0 - 32.24 + 0.5445) and 1 mastic strip and 1 natural strip. 43.5

0.658
Water: h = 22.10 cm

0.905
Water: h = 13.95 cm
System joint critical
Drain: 240.0 - 40.5 - 15.5
Area = 184.0 NC

CF - 2 coke

113.2
Water: h = 13.80 cm
System joint critical
Drain: 391.0 - 93.5 - 6.3
Area = 291.8 NC
1-24-67

Core 18-0 & 18-1:

See page 75 for 1st or sub critical step, for above # element.

Now have first element with 9 fuel plates (5 0-3224, 0-5495, 0-3242 and 0-2870) and 6 enriched plates (4 2, 3, 7, 8, 9, 10) and 6 stainless steel plates, and 3 natural stainless # 2, 3, 4.

Vol 1.2 x 1.1

14-45

Water h.t. = 21.50 cm

Water temp°C

+3°F

C = 182.5 cm = 6.0 ft

14-55

Water h.t. = 15.10 cm

System just critical

Chords: 391, 0 -160.2 -41.4 -6.0

Core = 104.60 ± 2.0

183.7

Now have first element with 9 fuel plates

(5 0-3224, 0-5495) with 4 natural stainless

(4 2, 3, 4, 5) P r i n r m = 52.4

55.1 ± 9.8

Water h.t. = 21.60 cm

Water temp°C

+3°F

C = 66.9.3 cm = 21.8 ft

#1 = 26.2

2 = 26.5
1600 Water, \( h_t = 18.55 \text{ cm} \)

System just critical

\[ \frac{55.6}{150} - \frac{55.4}{150} = 1.8 \]

\[ \text{h} = 183 \pm 9 \]

---

**INSTRUMENT CHECK**

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
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LOG IN CALIBRATE OPERATE SOURCE No. 12-80

DUMP WELL FROZE LIGHT
START-UP CHECK LIST

Equipment checked by [Signature] (EOD)
Personnel check by [Signature] (EOD)
Instruments and safety checked and reset by [Signature]
Source in checked by [Signature] Source No. M-93
Emergency equipment in control room checked by [Signature]
Instruments in trip circuit: [Signature] Time 10.45
Red light on by [Signature] Date 1-25-67
Start-up OK'd by [Signature] Date 1-25-67
Core 18-0 18-1

New core start element with 2 fuel plates
(L60 - 3224 + 0 - 5445), with 3 natural stuff.
and 6 stainless steel stuff. P - 47.7

Water level = 21.60 cm
Water temp °C
21 = 21.0
2 = 26.0

Time = 24.6

11:30 Water level = 15.80 cm
System first critical

Core = 185.0 ± 18.0
Core = 184.8 ± 5.8
The cone 17-0 & 17-1 resemble a small reflector tank. Inner cone spread .375" with plastic space.

14.15
Water h.t. = 21.60 cm

Kepko sub critical.

Water temp °
11 = 20.0°

\( r = 26.0° \)

\( r_n = 26.0° \)

Now have spent fuel element with 2 steel plates (250-32.24 x 0-5.495), with 3 natural strips and 6 stainless-steel strips. Power 42.4

15.00
Water h.t. = 21.60 cm

Water temp °

7.9°

\( t = 41.3 - 18.6 \)

Water h.t. = 13.0 cm

Leak just withstand

Drain

240.0 - 41.4 - 7.8 = 16.6

8.1 = 172.2°

172.5 = 9.4

...
Removed 4 stainless steel strips and added 5 natural string - gain = 57.8 ft

Water set = 21.60 cm

+ Perl

T = 99.9°F = 9.9 ft

Water set = 19.40 cm

System first critical

Drain:

2.40.0 - 5.5 - 2.6 - 7.9 ft

Area = 172.3 ft² - 17.3 ft

t = 8.5
## Instrument Check

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<th>Trip</th>
<th>Source Distance</th>
<th>Set</th>
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Log n calibrate: __________ Operate: __________ Source No: __________

Dump Well Probe Light:  

---

## Start-Up Check List

- Equipment checked by __________ Personnel check by __________
- Instruments and safeties checked and reset by __________
- Source in checked by __________ Source No: __________
- Emergency equipment in control room checked by __________
- Instruments in trip circuit: __________
- Red light on by __________ Time: __________
- Start-up OK'd by __________ Date: __________
1-20-67

Nov. 23, 67, added fuel element with fuel plates (10-3224, 10-5495, 10-3242 and 10-2870) and 8 enriched strips (15 23, 45, 78, 9, 10), P = 26.8, P=213.5

Water ht = 21.6 cm

Water temp °C

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<table>
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<tbody>
<tr>
<td>%1 = 24.2</td>
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</tbody>
</table>

0912

Water ht = 14.7 cm

Diatom fuel enriched.

Drain: 391.0 - 213.6 = 177.4

Dow = 168.8 #17

169.1 #2

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

Water ht = 21.5 cm.

Water temp °C

<p>| | |</p>
<table>
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<tbody>
<tr>
<td>%1 = 24.0</td>
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</table>

1020

Water ht = 14.7 cm

Diatom fuel enriched.

Drain to 10.0 cm. Repeating +
Water lit = 21.5 cm
3
17.5 cm = 8.0 ft

1036 Water lit = 19.70 cm
391.0 - 211.1 = 8.6
System first critical core = 171.5 ft 21.5
Cross.

Core 16-0 + 16-1

Hole core 16-0 & 16-1, assemble in small reflection tank, inner core spaced 0.375" with plastic spacers.

1320 Water lit = 21.50
Water temp.

21 - 21.2
2 - 24.5

Now have first fuel element with fuel plates (46-3224, 0.5495, 0-32420 D 3870) and 6 enriched strips (2.75.9 10) and 3 natural strips (4.6 34). Power - 15.5.

201.3 T-2011
Geo.
1415. Water lift = 15.70 cm

System just critical

Drain:

\[ 391.0 - 301.6 - 51 \]
\[ \text{mm} = 189.3 \text{ cm} \]
\[ \text{mm} = 18.93 \text{ cm} \]

Resssed 1 natural strip #3 & 4, and added 1 enriched strip #7.

Water lift = 21.50 cm

\[ 5 + 0.5 \]
\[ \text{cm} = 165.1 \text{ cm} = 6.53 \text{ ft} \]

1522. Water lift = 15.45 cm

System just critical

Drain:

\[ 391.0 - 200.7 - 6.6 \]
\[ \text{cm} = 183.7 \text{ cm} \]
\[ 184.0 \pm 19.1 \text{ cm} \]
## INSTRUMENT CHECK

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<tr>
<th>INSTRUMENT</th>
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LOG N CALIBRATE OPERATE SOURCE NO. 12-8

DUMP WELL PROBE LIGHT

## START-UP CHECK LIST

Equipment checked by AAFF Personnel check by LAC
Instruments and safety checked and reset by AAFF
Source in checked by AAFF Source No. M-43
Emergency equipment in control room checked by EFC
Instruments in trip circuit: K-1-2 PM-1-2
Red light on by AAFF Time 0810
Start-up OK’d by Ed C. AAFF Date 1-27-67
1-27-67

Cone 16-0 + 16-1

Your hour spent element with 2 full plates
(+50 - 32.2' + 0 - 54.95'), with 4 natural
plates (+2.3, 4.9 + 5).

0950

Water ht = 21.50 cm
System just critical.

240.0 - 55.2
18.7

2 = 24.2

Water temp. °C
1 = 24.2

Amavil natural star #2, and add 6 stainless steel strips.

Water ht = 21.60 cm
System just critical.

240.0 - 49.8 - 7.2
186.6° F. 18.17

0940

Water ht = 16.70 cm
Chain ht = 0.0 cm

18.0° ± 7.2°

Water s.t. = 21.50 cm.  Water temp. °C

2.7  = 271.6 mm = 4.3 ft

1030

Water s.t. = 16.70 cm.
System just critical eue = 196.5

(See 19-0 and 19-1)

Have spent element with 2 fuel plato, (a0-32r1 and 0-5-445), with 20% enriched strip (21) and 1 natural strip (42). See pag 81.

Water s.t. = 21.50 cm.  Water temp. °C

7.5  = 52.2 mm = 15.9 ft

1400

Water s.t. = 13.30 cm.
System just critical

Qmax = 2.40.0 - 40.5 - 15.9
\[ \text{eue} = 183.6 \]
1.27.67

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

Water h.t. = 21.60 cm,

\[ t = 45.6 \text{ cm} = 17.2 \text{ ft} \]

14:50

Water h.t. = 13.25 cm

System just critical

\[ 240 - 40.5 = 17.2 \text{ ft} \]

\[ \text{core} = 132.3 \text{ ft} \]

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

Water h.t. = 21.60 cm, Water temp. 2

\[ t = 115.2 \text{ sec} = 3.8 \text{ sec} \]

15:40

Water h.t. = 14.80 cm

System just critical

\[ 240.0 - 41.4 - 2.9 = 8.8 \text{ ft} \]

\[ \text{core} = 186.9 \text{ ft} \]
INSTRUMENT CHECK

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LOG N CALIBRATE | OPERATE | SOURCE No. R-801
BUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by DCA. Personnel check by EDC
Instruments and safeties checked and reset by DCA
Source in checked by DCA. Source No. M-03
Emergency equipment in control room checked by EDC
Instruments in trip circuit: K-1-2. PM-1-2
Red light on by DCA. Time 10:25
Start-up CK'd by DCA. Date 1-30-67
Water Ht = 21.70 cm

Water Temp \( \theta \)

\( \theta_1 = 22.7 \degree \)

\( \theta_2 = 23.0 \degree \)


\( t = 152.1 \text{ mm} = 7.0 \text{ ft} \)


1106

Water Ht = 15.00 cm

System just critical

\[ 240.0 - 41.4 - 3.9 - 70 \]

\[ Q = 165.7 \text{ ft}^3 \]

Repeat of above:

Water Ht = 21.70 cm

Water Temp \( \theta \)

\( \theta_1 = 23.0 \degree \)

\( \theta_2 = 23.2 \degree \)


1318

Water Ht = 15.00 cm

System just critical

\[ Q = 165.7 \text{ ft}^3 \]
New to have spent angle with 4 fuel plates (\# D-3242 D-5495, D-3242, D-2870).
and 6 available skips (\# 2, 3, 7, 8, 9, 10) plus
6 stainless steel skips. (Spent fuel in some long + not fast as with 2 fuel plates).

\[ \text{Water \ ht} = 14.7 \text{cm} \]
\[ \text{Water \ temp} \ ^\circ \text{C} \]
\[ \text{\# 1} = 23.0 \]

\[ \text{Water \ ht} = 11.6 \]

\[ \text{System just \ initial} \]

\[ \text{Drain} \]

\[ 391.0 - 168.0 = 27.4 \]

\[ \text{\# 1} = 23.0 \]

\[ \text{\# 2} = 23.0 \]

\[ \text{14.15 \ Water \ ht} = 11.6 \text{cm} \]

\[ \text{System just \ initial} \]

\[ \text{Drain} \]

\[ 391.0 - 168.0 = 27.4 \]

\[ \text{\# 1} = 23.0 \]

\[ \text{\# 2} = 23.0 \]
Rotated spent fuel element back to its original face, removed the 6 stainless-steel strips, and added 2 natural strips (1 + 2).

Water h = 21.6 cm.
14.5° Water h = 13.5 cm

System just critical

\[ \text{Water Temp °C} \]
\[ T_1 = 23.2 \]
\[ T_2 = 23.2 \]

Drain

\[ 391.0 - 160.2 = 27.6 - 14.7 \]
\[ \text{Temp} = 189.3 \text{ °C} \]

Added 4 stainless-steel strips. New face has 4 fuel plates, 4 stainless-steel strips, 6 enriched strips, and 2 natural strips.

Water h = 21.6 cm
6 + 3
5 = 11.3 cm = 8.7²

15.5° Water h = 14.7 cm

System just critical

\[ 391.0 - 160.2 = 27.6 - 5.2 - 8.7 \]
\[ \text{Temp} = 189.3 \text{ °C} \]
### INSTRUMENT CHECK

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LOG N CALIBRATE  OPERATE  SOURCE NO. H-50

DUMP WELL PROBE LIGHT

### START-UP CHECK LIST

- Equipment checked by ACH.
- Personnel check by EIDC.
- Instruments and safeties checked and reset by AKL.
- Source in checked by AKL, Source No. H-93.
- Emergency equipment in control room checked by EIDC.
- Red light on by AKL, Time 0810.
- Start-up OK'd by EIDC, Date 1-21-67.
Core 19-0 + 19-1

Repeat of info included on bottom of page 90.

Water ht = 21.6 cm
+ Rea.
T = 121.7 deg. F

391.0 - 160.2 - 27.6 - 5.2 - 8.7
Cone = 189.3 ft

0858. Water ht = 14.15 cm

Lester just entered

391.0 - 160.2 - 27.6 - 5.2 - 8.7
Cone = 189.3 ft

Same as above except foam element noted
45 deg (E)

Water ht = 21.6 cm
+ Rea.
T = 117.3 deg. F

391.0 - 160.2 - 27.6 - 5.2 - 8.7
Cone = 189.3 ft
(6) Water h.t. = 21.6 cm.  
Water h.b. = 16.9 f.  

14.20 Water h.t. = 13.20 cm.  
System just critical.  

15.20 Water h.t. = 13.3 cm.  
System just critical.  

Drain to 0.0 cm on scale.

Mash each poison strip (4) slate in the clockwise for in outer element.  

Mash poison strips (4) slate in the clockwise for in outer element.  

Total of 4 slate from original pos.
Washed poisons twice back to their original

Water lit = 21.6 ccm
Water temp. 23.1

2:29, 0

1550 Water lit = 13.7 ccm
Lepton just artificial

Passed: 391.0 - 193.0 - 13.0

Cm - 185.0 f No
### INSTRUMENT CHECK

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LOG N CALIBRATE: OPERATE: SOURCE NO.: B-80

DUMP WELL PROSE LIGHT

### START-UP CHECK LIST

- Equipment checked by [Signature]
- Personnel check by [Signature]
- Instruments and safeties checked and reset by [Signature]
- Source in checked by [Signature], Source No.: [Number]
- Emergency equipment in control room checked by [Signature]
- Instruments in trip circuit: K1 - K2 - PM1 - PM2
- Red light on by [Signature], Time: 08:20
- Start-up OK'd by [Signature], Date: 2-1-67
8.55 A.M. Water - VII. 65 cm. Page asked: 
C = 60.2 mm = 13.6 F  Period 4 1 July 67

Temp 44.0 °C 44.0 °C

9:00 Water 13.8 cm. Slightly Firmware.
9:00 13.7 cm. Slightly Firmware
9:30 13.7

Repeat of above after removing each poison
ship, and placing it back in the slot
from which it was removed for original
(see.)

Water L5 = 21.60 cm. Water temp °C
5 = 97.4 mm = 13.3 F
1 = 29.0

10:30 Water L5 = 13.70 cm
Soap just critical
Dissolved to 0.0 cm on scale

Wound each poison ship four (4) dots in
the clockwise for one another element. (see
top of page 102.)

Water L5 = 21.70 cm
5 = 71.7 mm = 12.7 F  over
Water ht = 13.70 cm

Lyser just a little

Water ht = 21.70 cm

Lyser just a little

Drain to = 0.0 cm

391.0 - 193.0 = 198

181.0 ft

Water ht = 13.70 cm

Lyser just a little

391.0 - 193.0 = 198

185.8 ft N.C.
Marble each strip four (4) more slabs in the clockwise for (total of 16 slabs).

Water ht = 21.6 cm  Water temp °C
+19.2  21 = 29.5
C = 54.3 cc = 15.5 fl
2 = 29.5
1445

Water ht = 13.20
System just critical 3910 - 1930 - 15.5 fl
Drain to -0.0 cm, con = 182.5 fl
No

Marble each strip two (2) more slabs in the clockwise for (total of 20 slabs)

Water ht = 24.6 cm  Water temp °C
79.5
C = 49.9 = 16.9 fl  3910 - 1930 - 16.9 fl  2 = 29.5
1326
Water ht = 13.15 cm  con = 191.6 fl
System just critical
Drain to 20.0 cm,

Marble each strip four (4) more slabs in the clockwise for (total of 24 slabs)

Water ht = 21.6 cm
+19.2  C = 67.9 fl con = 13.3 fl
aww.
2-1-67
1604

*Water ht = 13.60 cm
*System just critical

Drain.

\[ \text{Water Temp} \]
\[ T_1 = 29.5 \]
\[ \text{Int} = 154.7 \]  \[ N1 = 2 = 29.5 \]

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LOG N CALIBRATE   OPERATE  SOURCE No. B-80

DUMP WELL PROSE LIGHT
Remarks: Came from tank, and made a
visual inspection of the cone, and could not
find any slugs plugged. Replaced cone in
tank. New cone & fuel plate and
Tennickel strips. (234.78.7410)

Water ht = 21.6 cm.

Water Temp °C  
#1 = 29.3
#2 = 29.5

1104
Water ht = 12.5 cm
Feed just cool in
Chains.

4 fuel plts in center (4.96)
Report of slugs after centering the Tennickel
strip at top & bottom of cone. (19-0)

Water ht = 21.6 cm

Water Temp °C  
#1 = 29.5
#2 = 29.5

1430
Water ht = 12.3
Feed just cool in
Chains: 186.1
391 - 179.9 - 21.5 = 189.7 cu cm

Stage one centered at top and bottom on core (19-0).

Water Alt = 21.6 cm

+ 7.5

5 = 39.8 cm = 20.74

Water Temp °C

H = 28.5

H = 29.5

1.553 Water Alt = 12.7 cm

System fuel enriched

Density = 178.80

= 167.5

= 165.9
### INSTRUMENT CHECK

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LOG N CALIBRATE OPERATE SOURCE No. B-80

DUMP WELL PROBE LIGHT

### START-UP CHECK LIST

- Equipment checked by **AKL**, Personnel check by **FLK**
- Instruments and safety checked and reset by **AKL**
- Source in checked by **AKL**, Source No. **M-93**
- Emergency equipment in control room checked by **AKL**
- Instruments in trip circuit: **K-1-2, PM-1-2**
- Red light on by **AKL**, Time **0830**
- Start-up OK'd by **MC AKL**, Date **2/3/67**
New core sept element with 4 foil plates
(70.0-32.2, 0-54.75, 0-32.42, 0-28.70). Plus
6 enriched stripes (\# 23, 18.710) and 2 natural
stripes (\# 213) plus 4 stainless steel strips.
Each stripe is centered in another element (19.0)
Top and bottom, \# 213:

\[
15.5 \pm 15.0
\]

Water lift = 21.7 cm

Water lift = 2

\[
\# 1 = 24.3
\]

\[
2 = 29.5
\]

0914 Water lift = 12.9 cm

Dry out critical

Drain:

89.0 - 193.0 = 186

Core = 178.4

\[
179.5 \pm 19.5
\]

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

Water lift = 21.6 cm

Water lift = 2

\[
\# 1 = 24.3
\]

\[
2 = 29.5
\]

1006 Water lift = 17.1 cm

Dry out critical

Drain
Repeat of agreement described on bottom of page 713. After centering ship at top and bottom of arc (19-0).

Water ht = 21.6 cm

1307 Water ht = 13.0 cm

eyslin just animal

Water temp °

°F = 29.5

2 = 29.5

Mark the strip joyon strip to the outer edge of plate in outer element. Some marks of fuel plate and fusion strip as above.

1534 Water ht = 21.6 cm

Water temp °

°F = 29.5

2 = 29.5
## INSTRUMENT CHECK

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LOG IN CALIBRATE OPERATE SOURCE No. D-90 DUMP WELL PROBE LIGHT

---

## START-UP CHECK LIST

Equipment checked by AKF. Personnel check by FIOC.

Instruments and safety checked and reset by AKF.

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

Emergency equipment in control room checked by FIOC.

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

Red light on by AKF. Time 0920.

Start-up OK'd by FIOC AKF. Date 3-6-67.
Report of observations taken on page 113.

Water level = 21.6 cm

7:56.5 a.m. = 15.0 ft

Water level = 13.35 cm

Systen just critical

Drain, to = 0.0 cm.

Mound water not drop #3 to side of wall.

Water level = 21.6 cm

2:20 a.m.

Water level = 19.40 cm.

Systen just critical

Drain.

Required natural step #3 = 12.2 ft

Water level = 13.35 cm.

7:56.5 a.m. = 12.2 ft

11:32

Water level = 11.5 cm

Systen just critical
Bernoulli + static & Total Energy. = 1.7

$\text{Water Alt.} = 13.35 \text{ cm.}$

$+P_a$

$= 91.3 \text{ mm} = 18.6 \text{ g}$

$\text{Water Temp.}$

$\#1 = 23.5$

$\#2 = 23.7$

$1150 \text{ Water Alt.} = 11.35$

System just critical.

Draw.

Core 17-0 4/17-1872

Have 2 first fuel plates ($F = 3.22 \times 0.5975$) and 5 weak.

The top are against the water top and hoten outside using (see page 30).

$1555 \text{ Water Alt.} = 21.6 \text{ cm.}$

System just critical. $\text{Bar} C = 914.2 \text{ mm}$

$\text{Dmm} = -1.5\%$

The above step leading in error. Due to the fact that I come not read.

May 2./7-67
## INSTRUMENT CHECK

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<td>R-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2</td>
<td></td>
<td></td>
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<tr>
<td>PM-1</td>
<td>100 V</td>
<td>Alarm</td>
<td>cont.</td>
<td>500 V</td>
<td></td>
</tr>
<tr>
<td>PM-2</td>
<td>1200 V</td>
<td>Low</td>
<td>12°</td>
<td>900 V</td>
<td></td>
</tr>
</tbody>
</table>

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

## START-UP CHECK LIST

Equipment checked by **BMP** Personnel check by **F.D.C.**
Instruments and safeties checked and reset by **BMP**
Source in checked by **BMP** Source No. M-03
Emergency equipment in control room checked by **F.D.C.**
Instruments in trip circuit: K-1-2 PM-1-2
Red light on by **BMP**  Time 0900
Start-up OK'd by **F.D.C.**  Date 2-7-67
Have 2 first full plates (50 - 32.2 + 0 - 37.75)
and 9 natural steps, and 2 stainless steel
steps. Two steps are against the top and
bottom of outside ring. (See page 85 & 86)
Total length: 57.5 ft

Water height: 21.6 cm

#1 = 23.5
2 = 23.5

Water height: 15.0 cm

Height first ethanol
Drain:
Diameter = 1.5 ft
Area = 174.1 ft²

Some are sheared except poison steps one
made in the center (2nd) inside ring.

Water height: 21.6 cm

1.0
1 = 86.9 ft² = 11.0 ft²

Water height: 14.30 cm

Height just ethanol.
Syphon to -0.0 cm
Core = 171.2
Strips removed one at a time, and placed in center of top ring in the normal manner.

Water height $= 21.6$ cm
$+ 15.7$ cm $= 37.3$ cm
$\therefore C = 95.6$ m $= 10.2$ ft

13.2
Water height $= 14.5$ cm

System just critical

Water temp $^\circ C$

$\#1 = 23.5$
$\therefore = 23.5$

Removable natural strip #4

Water height $= 14.5$ cm
$+ 15.7$ cm $= 37.3$ cm
$\therefore C = 67.1$ m $= 13.3$ ft

13.4.5
Water height $= 12.30$ cm

System just critical

Water temp $^\circ C$

$\#1 = 23.5$
$\therefore = 23.7$

Removable natural strip #2

Water height $= 12.30$ cm
$+ 15.7$ cm $= 37.3$ cm
$\therefore C = 67.1$ m $= 13.3$ ft
1400  Water ht = 11.10 cm
System just critical
Draw to ~ 0.0 cm.

Install side enriched stage II 2:

Water ht = 21.6

$\theta = 78.2^\circ$ $\Delta = 11.9\, \text{ft}$

$15.15$  Water ht = 14.10 cm
System just critical
Draw to ~ 0.0 cm.

Remaind natural stage II. 5.

Water ht = 14.10 cm

$\theta = 69.5^\circ$ $\Delta = 13.0\, \text{ft}$

$15.26$  Water ht = 12.10 cm
System just critical
Draw to ~ 0.0 cm.
Removal natural slope 22.3.

Water Alt = 12.10 cm.
8 + R3
E = 8216 res = 11.3 ft

Water Info
W = 23.5
2 = 23.7

15.43
Water Alt = 11.20 cm
System just critical
Drain.
### Instrument Check

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Range</th>
<th>Trip</th>
<th>Source Range</th>
<th>Set</th>
<th>Start-Up Range</th>
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<tr>
<td>K-1</td>
<td>10</td>
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<td>R-1</td>
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<td></td>
</tr>
<tr>
<td>R-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PM-1 1000V Alarm - Can't c 500V
PM-2 1300V Low - 12" c 900V
II Alarm - 3" -

Log in Calibrate Operate Source No. B-80
Dump well probe light

### Start-Up Check List

Equipment checked by [Sign]
Personnel check by [Sign]
Instruments and safety checked and reset by [Sign]
Source in checked by [Sign] Supply No. M-43
Emergency equipment in control room checked by [Sign]
Instruments in trip circuit: K-1-Z PM-1-2
Red light on by [Sign] Time 09:10
Start-up OK'd by [Sign] Date 7-8-67
cone 17-0 + 17-1

Have sheet element with 3 feel plates, and
2 concrete strips (+2) 2 natural strips (+3) and
3 stainless steel strips. Purpose is to
overcome month of natural strip #3.

Water h = 21.6 cm
+ H 1 = 23.0
15-8 (1.9 mic) = 11.8

0905 Water h = 14.3 cm
System just artificial
Chain to -0.0 cm.

Removal natural Strip #3.

Water h = 14.3 cm
\[ \Delta P \]
15-67.5 mic = 12.0

Water h = 12.25
System just artificial

Water of natural bow

Total # 2.2.3.4.5. 109 = 13.15 #

# 2 = 12.3  # 4 = 12.3
# 3 = 13.0  # 5 = 13.0
INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE DISTANCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
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<td>Motor</td>
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<td></td>
<td>3X10^-12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Filt</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>K-2</td>
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<td>Motor</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Filt</td>
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<tr>
<td>R-1</td>
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<tr>
<td>R-2</td>
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<tr>
<td>PM-1</td>
<td>760 V</td>
<td>Alarm</td>
<td>18&quot;</td>
<td>500 V</td>
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</tr>
<tr>
<td>PM-2</td>
<td>1200 V</td>
<td>Low</td>
<td>12&quot;</td>
<td>900 V</td>
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<td></td>
<td></td>
<td>Alarm</td>
<td>3&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LOG IN CALIBRATE __ OPERATE __ SOURCE No. B-50

DUMP WELL PRESS LIGHT

START-UP CHECK LIST

Equipment checked by ALL Personnel check by LAD

Instruments and safety check and reset by ALL

Source in checked by ALL Source No. M-43

Emergency stop button in control room checked by F.D.C

Instruments in trip circuits: K-1-2 011-1

Red light on by ALL Time 0520

Start-up OK'd by F.D.C ALL Date 2-2-62

acc.
Now first insert with 2 fuel plates, 1 enriched strip (\#2) and 1 natural strip (\#5). Have removed the 2 stainless steel strips (see page 124).

<table>
<thead>
<tr>
<th>Time</th>
<th>Water ( h_t )</th>
<th>Water ( T_p )</th>
<th>#1</th>
<th>#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900</td>
<td>12.1 cm</td>
<td></td>
<td>22.0</td>
<td>22.0</td>
</tr>
<tr>
<td>1010</td>
<td>18.4 cm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
General enriched strip #1, and added enriched strip #2.

Water height = 31.0 cm

Water temp °C

1100 Water height = 14.80 cm
System just critical
Drain
Removed enriched strip #2, and added enriched strip #3.

Water ht = 21.6 cm
5 + 25
C = 13.2 cm = 11.94

Water temp °C
51 = 21.8
2 = 22.0

1310
Water ht = 14.10 cm.
Syphon just criticial
Drain to 20-0 cm

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

Water ht = 21.6
6 + 25
C = 91.3 cm = 10.14

Ht = 25.14

1328
Water ht = 14.17 cm.
Syphon just criticial
Drain.

Removed enriched strip #4, and added enriched strip #5.
1903 Water hgt = 15.5 cm

Lifted just critical

Drain to -0.0 cm.

Thermochromic strip #5 and added
enriched strip #6.

Water hgt = 21.6 cm

+ Per

123.9 mm = 8.3 ft

#5 = 23.8 ft

14:25 Water hgt = 15.5 cm

Lifted just critical

Drain to -0.0 cm.

Thermochromic strip #6 and added
enriched strip #7.

Water hgt = 21.6 cm

+ Per

123.9 mm = 8.3 ft

#7 = 23.8 ft

1500 Water hgt = 14.8 cm

Lifted just critical

Drain to -0.0 cm.
Removed enriched strip #7 and added enriched strip #8.

Water lift = 21.6 cm
\[ \frac{4}{7} \times 8.91 \text{ atm} = 10.8 \text{ ft} \]

1517 Water lift = 14.8 cm
Liquid firstinitiated
Drain to = 0.0 cm

Water lift = 21.6 cm
\[ \frac{4}{7} \times 8.91 \text{ atm} = 10.8 \text{ ft} \]

\# 8 = 26.3 ft  2 = 21.7

1530 Water lift = 14.3 cm
Liquid first initialed
Drain to = 0.0 cm

Removed enriched strip #9 and added enriched strip #10.
Annual rainfall = 21.6 cm

\[ R = 0.1 \times 21.6 \text{ cm} \]

Wind speed = 21.6 cm

\[ U = 1.1 \times 1.6 = 1.8 \text{ m/s} \]

Flood depth = 0.5 m

\[ d = 0.5 \times 1.8 = 0.9 \text{ m} \]

Muzzle velocity = 22.7 m/s

\[ V = 22.7 \times 1.8 = 41.0 \text{ m/s} \]

Distance to target = 144 m

\[ P = 0.8 \times 144 = 115.2 \text{ cm} \]

\[ D = 0.8 \times 144 = 115.2 \text{ cm} \]

Missile tip = 0.8 mm

\[ T = 0.8 \times 144 = 115.2 \text{ cm} \]
### INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>3 x 10^-2</td>
<td>Alarm</td>
<td>1&quot;</td>
<td></td>
<td>3 x 10^-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-2</td>
<td>&quot;</td>
<td></td>
<td>&quot;</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&quot;</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>R-1</td>
<td></td>
<td></td>
<td>&quot;</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>R-2</td>
<td></td>
<td></td>
<td>&quot;</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>PM-1</td>
<td>700 V</td>
<td>Alarm</td>
<td>&quot;</td>
<td>500 V</td>
<td>&quot;</td>
</tr>
<tr>
<td>PM-2/1200V</td>
<td>Low</td>
<td></td>
<td>&quot;</td>
<td>900 V</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

**LOG IN CALIBRATE** OPERATE SOURCE No. A-80

DUMP WELL PROBE LIGHT

### START-UP CHECK LIST

- Equipment checked by **All**
- Personnel check by **E.D.C**
- Instruments and safety checked and reset by **All**
- Source in checked by **All** Date **19-93**
- Emergency equipment in external line checked by **E.D.C**
- Instruments in trip circuit: K-1-2, PM-1-2
- Red light on by **All** Time **0920**
- Start-up CK'd by **E.D.C All** Date **2-10-67**
2-10-67

Repeat gent with CE-2 as described on page 60.

Water \( \Delta t = 21.6 \, ^\circ C \)

\[ e = 193.9 = 5.7 \, \text{k} \]

1010

Water \( \Delta t = 17.0 \, ^\circ C \)

System just critical

Drain: \( 39.1 \, \Delta t = 99.6 \, \text{sec} \)

\[ z = -291.4 \, \text{sec} \]

March the 9-pairon stripe toward the outer edge of element as possible.

Water \( \Delta t = 21.6 \, ^\circ C \)

\[ e = 217.3 \, \text{sec} = -7.3 \, \text{sec} \]

11.15

Onemin.
2-10-67

Cone 14-0 & 14-1

Have cone 14-0 & 14-1 assembly in well reflector tank. Known core spaced 3/16" with plastic space.

(See page 152 for new value on piston strips.)

1505 Water K = 2.1.6 cm.

Hydro carbon critical.

---

**INSTRUMENT CHECK**

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>BIT</th>
<th>START-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>3X10^-12</td>
<td>Meter</td>
<td>10</td>
<td></td>
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<tr>
<td>K-1</td>
<td>1&quot;</td>
<td>Foot</td>
<td>1&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-2</td>
<td>1&quot;</td>
<td>Meter</td>
<td>1&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-2</td>
<td>1&quot;</td>
<td>Foot</td>
<td>1&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-1</td>
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<td></td>
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</tr>
<tr>
<td>R-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

PM-1 700 V Alarm: Volt 500 V
PM-2 1200 V Low: Volt 900 V

LOG N CALIBRATE
DUMP WELL PROBE LIGHT

SOURCE NO. B-801
START-UP CHECK LIST

Equipment checked by F. E. Personnel check by F. W. C.
Instruments and safeties checked and reset by F. W. C.
Source in checked by F. W. C. Source No. M-43
Emergency equipment in control room checked by F. W. C.
Instruments in trip circuit: X-1-2, Y-1-2
Red light on by F. W. C. Time 08:15
Start-up OK'd by F. W. C. Date 2-13-67

Water at 21.5 C. Water temp. 21.5 C.

<table>
<thead>
<tr>
<th>T</th>
<th>P</th>
<th>1</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.58</td>
<td>193.8</td>
<td>19.6</td>
<td>186.8</td>
</tr>
<tr>
<td>0.858</td>
<td>35.5</td>
<td>155.5</td>
<td>127.1</td>
</tr>
</tbody>
</table>

Core 186.8 of 184.5

Now have 2 fuel plates, and 1 natural envelope (2.89, 2.84, 2.85). Power 55.1 25.8
5-13-67

\( \text{Water hgt} = 21.6 \text{ cm} \)

+ Res.

\( 5 \times 319.4 \text{ cm} = 3.7 \text{ ft} \)

10\:15

\( \text{Water hgt} = 17.0 \text{ cm} \)

System, just critical

\( 240.05 \times 52.97 \times 3.7 \text{ ft} \)

\( a = 183.5 \text{ ft} \)

\( 240.05 - 52.97 - 3.7 \text{ ft} \)

\( a = 183.5 \text{ ft} \)

11:10

Have come 15-0 + 15-1 ensemble in small reflector tank, inner one spool, 1375" with plastic spacers.

\( \text{Water hgt} \)

\( 21.6 \text{ cm} \)

System, just critical

Have 2 feel plates, and 4 natural drops (2.3.4.5).

13:15

\( \text{Water hgt} = 21.6 \text{ cm} \)

System, just critical

Dished to 20.0 cm.

\( \text{Water hgt} \)

\( 22.2 \text{ cm} \)
2-13-67

Removal natural Fig. A 3, Pan. 4/13/67

Water Ht = 21.6 cm
+ Par.
2 = 319.7 cm = 3.7f

1345 Water Ht = 17.1 cm
System first critical

240.0f - 36.6f - 3.7f

Vane = 196.7 f

\[ \text{240.0 - 36.6 - 3.7 = 196.7} \]

New have 4 fuel plates, 6 enriched

Knife (C² 2.3, 3, 4, 7, 7, 10) and 2 natural

Knife (C² 2, 4, 6) Pan = 182.5

187.5 ± 10

Water Ht = 21.6 cm
+ Par.
2 = 93.4 cm = 10.4 f

1455 Water Ht = 14.35 cm
System just critical

391.0 - 154.2 - 26.4 - 10.8

Vane = 194.6

391 - 154.2 = 173.2 ± 15.4

\[ \text{Vane = 194.6} \]
New sediment core 13-0 & 13-1 removed into small refrigerator tank. Inner core spread 13 75" with plastic spacers.

15-53 Water temp = 21.6 C°
Sediment with undrilled material.

INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
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<tbody>
<tr>
<td>K-1</td>
<td>3 X 10^-12</td>
<td>Meter</td>
<td>1&quot;</td>
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<tr>
<td></td>
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<td>Fast</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>K-2</td>
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<td>Meter</td>
<td></td>
<td></td>
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<td></td>
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<td>Fast</td>
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<td>R-1</td>
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<tr>
<td>PM-1</td>
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<td>5000 V</td>
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<tr>
<td>PM-2</td>
<td>12000</td>
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<td></td>
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<td>3&quot;</td>
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LOG N CALIBRATE         OPERATE          SOURCE No. R-80

DUMP WELL PROBE LIGHT 7
START-UP CHECK LIST

Equipment checked by RHFF. Personnel check by J. DC.
Instruments and safety checks and reset by RHFF.
Source checked by RHFF. Source No. M-93.
Emergency equipment in control room checked by J. DC.
Instruments in trip circuit: 8-1-2 PM-1-2.
Red light on by RHFF. Time 08:15.
Start-up OK'd by J. DC. RHFF. Date 2-18-67.

New tube & fuel plate, 6 enriched strips (A8 2.3.7,8.9,10.), and 3 natural strips (A8 2.3.4).
Water: $H^+$ = 17.2 cm. Water Temp: $T = 22.5$.
Water: $H^+ = 52.2$ cm. $T = 52.2$ cm. $T = 22.7$.
System just critical. Drain to 20.0 cm.

Additional natural strip. 4.5. Total prior.
Water: $H^+ = 21.6$ cm. $T = 20.0$.
Water: $H^+ = 204.3$ sec. $T = 5.5$.
0.92 cm Water \( h_t = 16.0 \text{ cm} \)

Syrinx just critical

Draen

\[ 391.0 - 70.0 = 5.5 \]

\[ v = 178.5 \text{ cm/s} \]

\[ 591 - 215.1 - 5.5 = 170.4 = 20.8 \]

Now have 2 grind plates and 2 milled edges (in 2 parts).

**Water**

\[ h_t = 21.6 \text{ cm} \]

\[ t = 69.5 \text{ min} = 23.0 \text{ cm} \]

1.041

Water \( h_t = 13.65 \text{ cm} \)

Syrinx just critical

Draen

\[ 24.0 - 51.0 - 13.0 = 17.0 \text{ cm/s} \]

\[ v = 170.5 \text{ cm/s} \]

(12-0) + (12-1)

Now have core 12-0 or 12-1 assemble in small reflector tanks from core spread 1.375' with plastic spacers.

Water \( h_t = 21.6 \text{ cm} \)

Syrinx just critical

Draen
Now have 2 field plates and 2 enriched type (#2.02)

Water ht = 21.6 cm

Water temp °C

#1 = 23.0
2 = 23.0

13.65 Water ht = 14.5 cm

Septum just enriched

Drain

240.0 - 51.4 - 10.2

core = 176.5 ± 177.7

176.5 ± 17

Now have 9 field plates, 6 enriched type (#2,3,7,8,9,10) and 3 natural type (2.52, 3.4.5)

Water ht = 21.6 cm

Water temp °C

#1 = 23.2
2 = 23.5

14.51 Water ht = 17.90 cm

Septum just enriched

Drain

391.0 - 154.2 - 528.2 - 2.3

Core = 181.7 ± 152.0

151 ± 175.6 ± 170.8
One 23-0 & 23-1
New base core 23-0 & 23-1 assemble in small-refractor tank. Inner core spaced .375" with plug spacers.

1600
Water: set = 21.6 cm

INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>3 x 10^-12</td>
<td></td>
<td></td>
<td>1&quot;</td>
<td>3 x 10^-12</td>
</tr>
<tr>
<td>K-2</td>
<td></td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-1</td>
<td></td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-2</td>
<td></td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM-1</td>
<td>700 V</td>
<td></td>
<td></td>
<td>500 V</td>
<td></td>
</tr>
<tr>
<td>PM-2</td>
<td>1200 V</td>
<td></td>
<td></td>
<td>900 V</td>
<td></td>
</tr>
</tbody>
</table>

LOG N CALIBRATE OPERATE SOURCE No. R-50-1

DUMP WELL FROZE LIGHT
COMPO 23-0 & 23-1

START-UP CHECK LIST

Equipment checked by [X] Personnel check by [X]

Instruments and safeties checked and reset by [X]

Source in checked by [X] Source No. 14-43

Emergency equipment in control room checked by [X]

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

Red light on by [X] Time 09:55

Start-up OK'd by [X] Date 2-15-67

New: 4 fuel plates. 6 enriched strips (2, 3, 7, 9, 10) and 4 natural strips (2, 3, 4, 5). 10.3

1022 . Water l.t. = 21.6 cm. Water temp. °

System under nitric acid 11 = 23.7

Drain to 20.0 cm. 3 = 2.40

The instrument screwed: K-2. (Cable wrapped)

Demand for natural strip 12 g. 155.2

Water l.t = 21.4 cm

+ [X]

Q = 117.5 cm = 6.6 ft
Cover 23-0 & 23-1

Water @ 15.05 Gpm
 Pressure just exceeded

111$  

Water @ 25.0 Gpm.

121$  

Cone = 18.56 ft

utra 391.0 - 159.2 - 39.6 - 6.6

131$  

Now have 2 full plates. 3 natural

TRipe (2.3.5). 37.3 ft

Water @ 21.6 cm.

+ 6.6

5 = 54.6 cm = 15.5 ft

Water @ 13.50 cm.

Drain.  

240.0 - 39.6 = 15.5

Cone = 18.48 ft

14.45

Cone 24-0 & 24-1

Now have one 24-0 & 24-1 resemble to small

reflector tank. From core of fuel .375"

with plastic spacers.

Water @ 21.6 cm.

System sub-critical.
Now have 2 feel plates, & natural&

(= 2, 3, 4, 5)

Water ht = 21.5 cm

Water ht = 12.5 cm

System just sickled.

Removal natural strip # 4, and added

Emulated strip # 9. Present = 61.0 ± 5.0

Water ht = 11.6 cm

Water ht = 15.2 cm

System just initial

Churn

2 - 2 - 17 - 10 ± 3 ± 5.6
INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>SET</th>
<th>START-UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>3X10^-2</td>
<td>Meter</td>
<td>1&quot;</td>
<td>3X10^-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-2</td>
<td></td>
<td>Meter</td>
<td></td>
<td></td>
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<td>R-1</td>
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<td>PM-1</td>
<td>200V</td>
<td>Alarm</td>
<td>cont</td>
<td>500V</td>
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<td>PM-2</td>
<td>1200V</td>
<td>Low</td>
<td>12&quot;</td>
<td>900V</td>
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<td></td>
<td></td>
<td>Alarm</td>
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LOG N CALIBRATE OPERATE SOURCE No. A-83

DUMP WELL PROBE LIGHT

START-UP CHECK LIST

Equipment checked by \textit{[Signature]}  Personnel check by \textit{E.D.C.}
Instruments and safeties checked and reset by \textit{[Signature]}
Source in checked by \textit{[Signature]}  Source No. M-83
Emergency equipment in control room checked by \textit{[Signature]}

Instruments in trip circuit: K-1 \textit{[Signature]}  Date 08/15

Red light on by \textit{[Signature]}  Time 08:15

Start-up OK'd by \textit{[Signature]}  Date 2-16-67


Water h.t. 21.6 cm.

Listen just siliceous.

\[
\begin{align*}
391.0 - 179.9 = 211.1
\end{align*}
\]

\[
\text{Calc} = 171.5 \pm 15.7
\]

\[
\begin{align*}
\text{Calc} & = 171.5 \pm 15.7
\end{align*}
\]

Purposes: To check new method on 2-13-67

Set page 137. Have 4 fresh plates, 6 enriched types (5, 2, 3, 4, 7, 8, 9, 10, 11), and 2 natural types (5, 2, 3).

\[
\begin{align*}
\text{Calc} & = 182.5 \pm 12.4
\end{align*}
\]

Water h.t. 21.6 cm.

\[
\begin{align*}
\text{Calc} & = 182.5 \pm 12.4
\end{align*}
\]

Water h.t. 13.35 cm.

\[
\begin{align*}
\text{Calc} & = 195.3 \pm 15.1
\end{align*}
\]

\[
\begin{align*}
\text{Calc} & = 182.5 \pm 12.4
\end{align*}
\]
## INSTRUMENT CHECK

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>RANGE</th>
<th>TRIP</th>
<th>SOURCE</th>
<th>DISTANCE</th>
<th>SET</th>
<th>START-UP RANGE</th>
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<tbody>
<tr>
<td>K-1</td>
<td>Meter</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Fast</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>K-2</td>
<td>$3 \times 10^{-2}$</td>
<td>Meter</td>
<td></td>
<td>30</td>
<td></td>
<td>$3 \times 10^{-2}$</td>
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<tr>
<td>R-1</td>
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<td>R-2</td>
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<td></td>
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<tr>
<td>PM-1</td>
<td>100 V</td>
<td>Alarm</td>
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<tr>
<td>PM-2</td>
<td>1200 V</td>
<td>Low</td>
<td></td>
<td>10''</td>
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<td></td>
<td></td>
<td>Alarm</td>
<td></td>
<td>3''</td>
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</table>

LOG N CALIBRATE OPERATE

SOURCE No. 10-10

DUMP WELL PROBE LIGHT

## START-UP CHECK LIST

Equipment checked by
Personnel check by F.0.C.

Instruments and safeties checked and reset by

Source in checked by Source No. 10-10

Emergency equipment in control room checked by F.0.C.

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

Red light on by Time 0810

Start-up OK'd by F.0.C. 10-10 Date 6-6-67
All experiments with H.E.R. Comp. 140

Fuel rate = 4.6 mpn

Air rate = 2.76 m³/min

Dump rate = 39.2 m³/min

Each element is assemble with the inner element spaced with 3/4" plastic spaces (for air release). Ed in inner cone is mounted on 4.5" of glass tubing (0.5" O.D.) The Ed is 0.000" thick and starts 3" below the bottom of the element and extends upward 20.0". The Ed on the outer outer element is spaced 2.50" from one with plastic spaces and starts 2.56" from bottom of the element and extends upward 24.0" (in photo). Ed thickness on outer element = 0.030"

H₂O = 54.3 Water is at top of fuel plate.

Have 4 x 2 array, Elements are in contact.

Water H₂O = 74.0°C Water temp. 23.5°C

Lyenton and critical

Chains. Hufschmid 1.0
Your data in a 3x3 array as shown below.

Water \( h_0 = 14.5 \text{ cm} \)

System sub critical

Usine : Multiplication < 1.0

See H.F.I.R. Fig 1.3.\]
<table>
<thead>
<tr>
<th>No.</th>
<th>Natural Brown</th>
<th>No.</th>
<th>Enriched</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13.3%</td>
<td>1</td>
<td>27.7</td>
</tr>
<tr>
<td>2</td>
<td>13.0</td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>3</td>
<td>13.3</td>
<td>3</td>
<td>27.4</td>
</tr>
<tr>
<td>4</td>
<td>13.0</td>
<td>4</td>
<td>26.1</td>
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<tr>
<td>Avg</td>
<td>13.15</td>
<td>5</td>
<td>23.6</td>
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<tr>
<td>6</td>
<td>23.4</td>
<td>6</td>
<td>23.3</td>
</tr>
<tr>
<td>7</td>
<td>23.8</td>
<td>7</td>
<td>23.9</td>
</tr>
<tr>
<td>8</td>
<td>21.3</td>
<td>8</td>
<td>21.3</td>
</tr>
<tr>
<td>9</td>
<td>26.3</td>
<td>9</td>
<td>26.3</td>
</tr>
<tr>
<td>10</td>
<td>26.3</td>
<td>Avg</td>
<td>25.7</td>
</tr>
</tbody>
</table>

Worth of Strips