

BOOK 2R

Notes:

Blank pages: 6, 12, 14, 16, 18, 58, 82-90, 92-100, inside back sheet

- note stapled to page 17
- 6 graph sheets stapled to page 22
- 3 graph sheets taped to page 28
- 1 long graph sheet stapled to page 32
- 2 graph sheets taped between page 32 & 33
- 1 graph sheet taped to page 34
- note taped to page 45
- 1 graph sheet taped between page 46 & 47
- drawing stapled to page 81
- green phone sheet found between pages 90 & 91
- note stapled to page 91
- 3 "analytical requisition exception sheets" stapled to back sheet

Scanned by:

Sheila Finch

RSICC /Oak Ridge National Lab.

March 22, 1999

BOOK 2

1152

SPRING

[Redacted]

1040

CARBIDE AND CARBON CHEMICALS CORPORATION
OAK RIDGE, TENNESSEE

INV.
R

NOTEBOOK NO. 1152

107
58

Assigned to: A. J. Bellahan
Department: Physics Lab
Location: K-1095
Date: 11/22/48

107
58

This notebook is assigned to personnel performing research and development work and must be used for all original calculations, notes and abstracts from reports.

Assignee is responsible for the safe-guarding of this notebook in accordance with security regulations.

Do not use scrap paper.

Be sure to record all personal

conferences
K-25 LABORATORY CENTRAL

This notebook must be returned to _____
when completed or upon termination of assignee.

Subject

Page

Subject	Page
<u>2% Storage Cylinder Exp</u>	<u>1-17</u>
<u>5% Sphere</u>	<u>19</u>

CAUTION

contents in
prohibited
is under

~~SECRET~~

This document consists of 100 pages,
No. 1 of 1 copies, Series 77

14-2-2

~~SECRET~~



CLASSIFICATION CANCELLED
DATE 5-27-60
Edgar J. Murphy
CO-ORDINATING ORGANIZATION DIRECTOR
OAK RIDGE NATIONAL LABORATORY
AUTHORITY DELEGATED BY AEC 8-10-57

~~RESTRICTED DATA~~
This document contains restricted information developed in the Atomic Energy

This document consists of 172 pages,
No. 1 of 1 copies, Series A

5-25-60

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Page

1

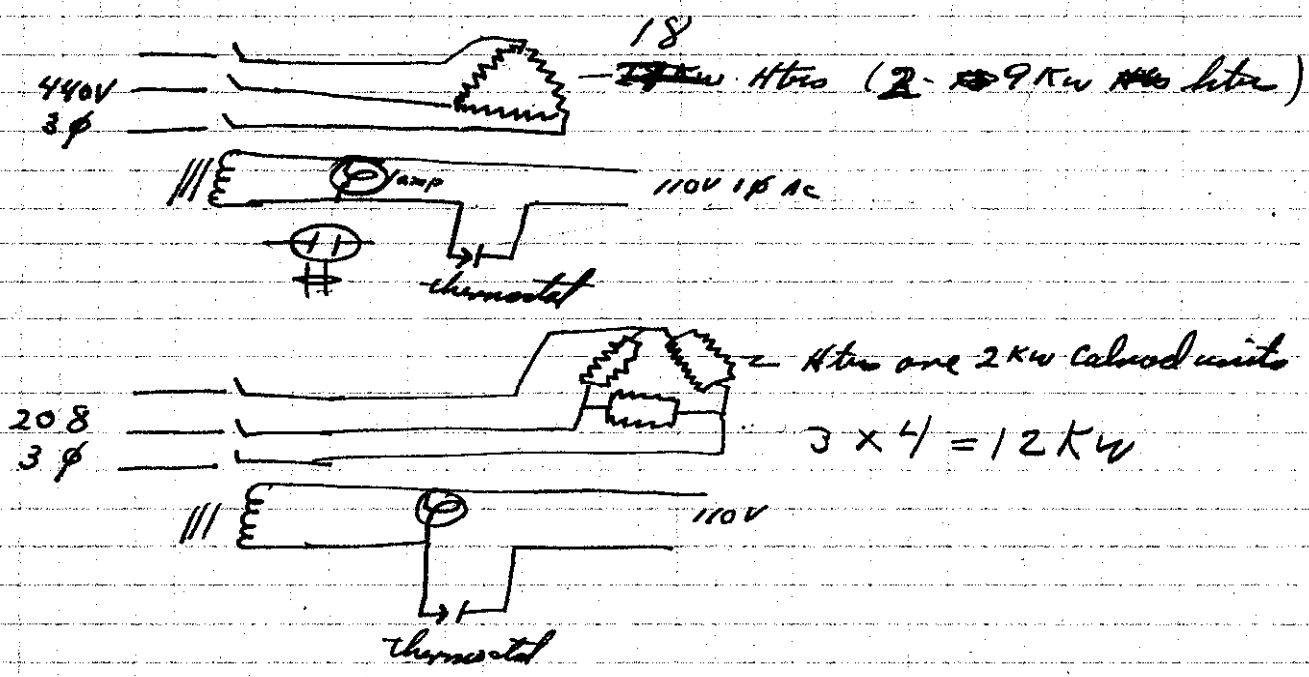
Set up

5

Exp #1 - 1-2% storage tanks

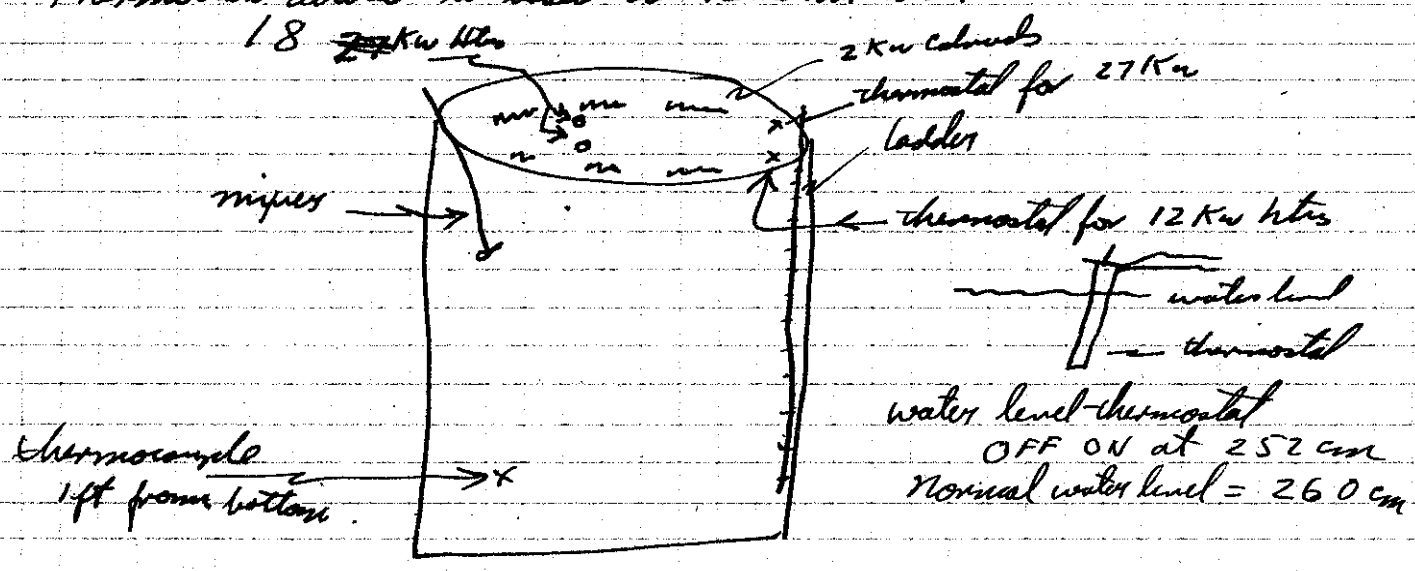
8/31/53

Thermostated Heater in Big Sid



Tanks filled by 10⁰⁰ AM Htr for post 1 1/2 hrs
 regulated temp to 1°C at 82° with ¹⁸ kW Htr-thermostated set lower
 than 12 kW Htr.

Thermostats altered to ~~used~~ set 12 kW Htr lower.



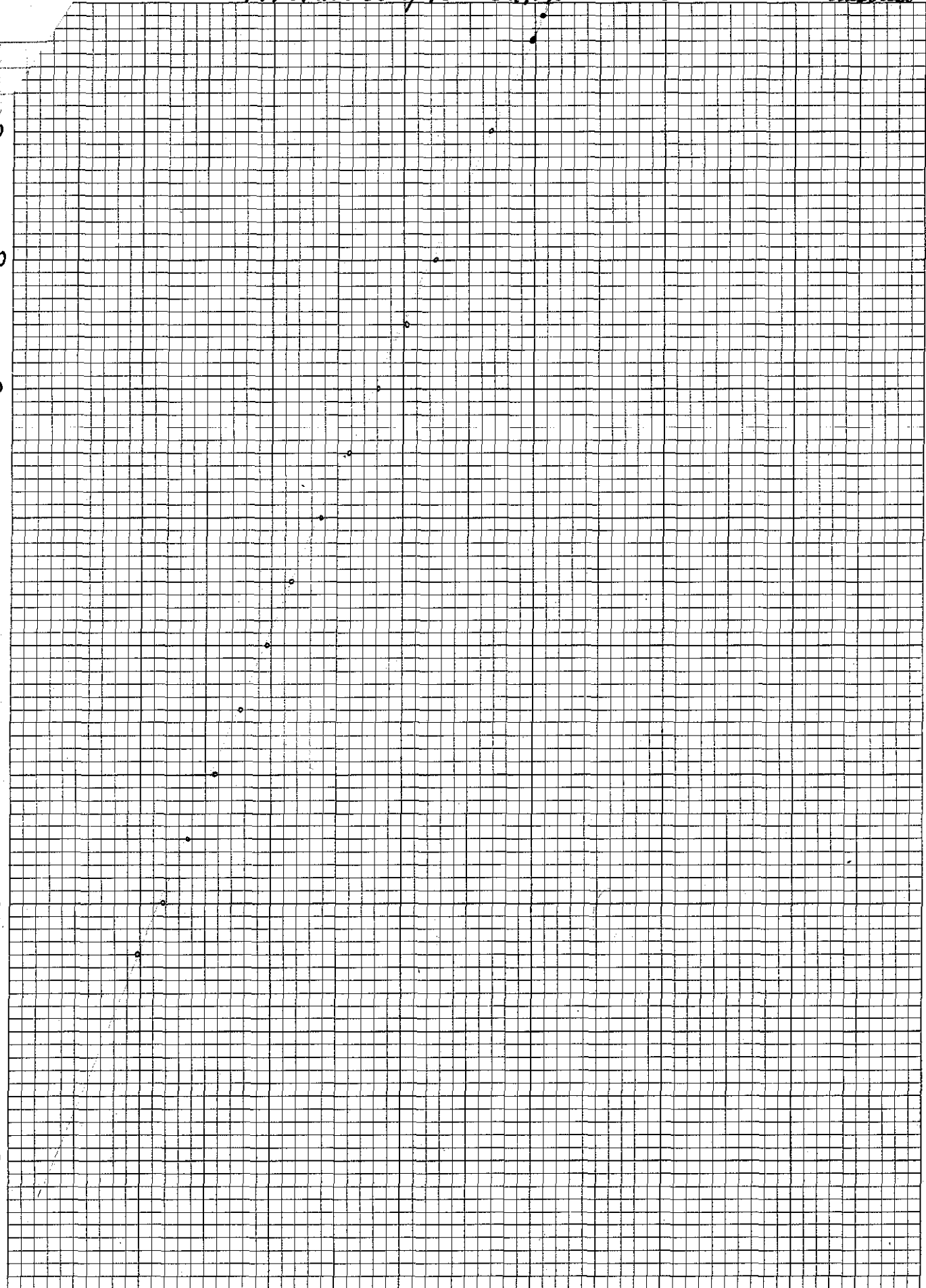
2 Date

Thermocouple Calibration Cu-Constantan

Degrees Centigrade

10
80
70
60
50
40
30
20
10

1 2 3 4 5 6 7
milli-volts



NU. 34010 DIEZGEN, U.S.A.
10 X 10 PER INCH
DIEZGEN, U.S.A.
MADE IN U.S.A.

Date 8/31/53

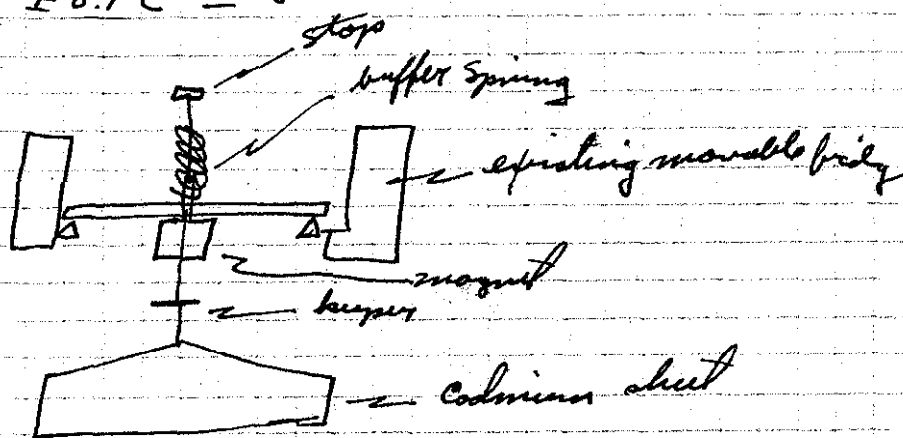
3

Temperature readings in tanks using thermocouple

1. at ¹⁸ 27 Kw hts thermostat no change
2. at 12 Kw hts thermostat. no change
3. Beside 2 Kw Calrod on North edge of tank ~~no change~~ no change
4. Beside 2 Kw Calrod on South edge of tank drop one degree or so
5. Beside lighter North up one or two degrees
6. " " " South no change
7. Geometric center of tank.
8. Center of tank - foot down in water. no change

Thermocouple re-calibrated + heating system is maintaining temp at $67^{\circ} \pm 0.1^{\circ}C$ -

Safety Blade installed + tested.



Radiation detection Instruments checked out - all operable except R-2 (Gamma monitor using Argon chamber.

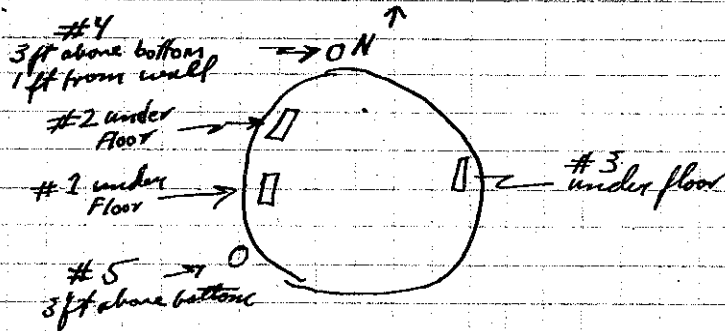
- Available
- 5 proportional counters
 - 2 ion chambers with DC amp & recorder in Series circuit
 - 1 anthracene xtal detector in Series circuit
 - 1 - BF_3 filled ion chamber with vibrating Reed Electrometer in Series circuit
 - 1 - GM + Counting Rate meter for gamma's
 - 1 - Pile Power + Period meter

Signed

U.F. cyl

- 1 - D-43
- 2 - D-44
- 3 - D-31
- 4 - D-39

Coremeter Positions



Date Sept 2, 1953

Callahan Fox Cronin

5

2⁰⁰ PM First U₂₃₅ storage cylinder installed in tank No. D-4.3

Adding Water - {Temp in cyl = 64°C from bottom to 12" of top measured every 18" by thermometer}

Safeties set Source 11 (no provision for withdrawing source.) - approx center of U₂₃₅ cyl in venturi tube.
water Hgt = 28 cm

	C ₁	C ₂	C ₃	C ₄	C ₅	
5 min counts 12 ⁰⁶ PM	x64 4 ²⁸	x64 6 ⁴⁰	x8 42 ⁵	x16 297 ⁺⁸	x16 —	
60 cm Ht (5m) 12 ²⁰ PM	5 ¹³	6 ²²	43 ⁰	320 ⁺³	231 ⁺⁵	{ Rahert Harness in
" (2 min.) 12 ²⁵ PM	1 ⁴¹	2 ³⁹	16 ⁵	116 ⁺¹	93 ⁷⁶	
150 cm 12 ⁴²	1 ¹⁹	1 ²⁵	19 ¹	7 ⁷	5 ⁷	{ Milly Noahs } in
200 cm 12 ⁵²	1 ⁴⁰	1 ⁹	20 ¹	6 ¹	2 ¹⁴	
230 cm 1 ⁰⁸ PM	1 ³⁴	1 ³	20 ⁵	5 ²	2 ¹¹	

temp of water in tank 62.5°C

260 cm 1 ²⁰ PM	9 ⁴⁶	7 ³²	107 ²	24 ¹⁴	13 ⁴
---------------------------	-----------------	-----------------	------------------	------------------	-----------------

260 cm 64°C 1 ³⁰ PM				25 ⁹	13 ¹³
--------------------------------	--	--	--	-----------------	------------------

64.5°C 1⁴⁰ PM
260 cm 10 min counts

Water sample taken for ppm U from Reflector Reg. 635286 = 0.21 ppm U

65°C at 1 ²⁰ PM	13 ²⁰	260 cm 6 ⁶³	124 ³	25 ²	13 ⁴
----------------------------	------------------	------------------------	------------------	-----------------	-----------------

Replaced previous source with source no. 307, source in same position as before. 1⁵⁹ PM

65°C at 2 ¹⁰ PM	14 ⁵⁰	9 ⁴²	128 ¹	33 ⁹	18 ¹⁰
10 min				528	288

Water dumped 2³⁰ PM

10 min counts		x32	x64	x64	
no water in tank	55 ³²	112 ⁴¹	75 ⁸	1151 ¹⁶	883 ¹²⁵
top recess full					

~~30 PM Temp = 26.7 MN~~

Signed

Date 9-2-53

2³⁰ PM Second Cylinder Arrived - # D-44

4⁰⁰ PM Cylinder installed in far West Side of tank
no evidence of multiplication on covering cyl heads
previous one -
Water started in. Trouble with Pile Period meter - erratic -
Water temp at 4:20 PM 2.45 Millivolts = 62.5°C

Water hgt = 260 cm

#1 x64	#2 x64	#3 x8	#4 x64	#5 x64
21 ⁴⁶	10 ⁰⁰	109 ³	8 ⁵⁸	3 ⁵³
1344	640	872	512	192

7⁰⁰ PM Temp = 2.5 MV = 64°C Water level = 259 cm
Added 1 cm - new level = 260 cm
Outside tank temp = 64°C
Thermostat seems to be working on sid.

11 P Temp 2.62 mv = 66.5°C (scaled reading - not there).
Outside tank temp 70°C.
Added 1 cm Ho (to 260 cm).
Raised north Fenwall thermostat ~ 3 cm (to supply clear water).
Room Temp (above tank) 40°C = 104°F
Water Temp (near north Fenwall) ~ 66°C - heat on -

9/3
7⁰⁰ AM Temp = 2.65 MV = 67°C
Water Hgt was 258 cm added 2 cm to 260° cm.

10 min Counts	1x64	2x64	3x8	4x64	5x64
	28 ⁴	10 ⁶³	132 ⁵	8 ⁵⁰	4 ⁴⁷
	1792	640	1056	512	256
	28 ³⁷	11 ⁴¹	136 ⁶	7 ³⁵	4 ³²
	1792	704	1088	448	256

Water drained out

10 min Counts	61 ⁴⁷	120 ²⁰	33 ⁴⁰	1314 ³⁰	289 ³
10 ⁰⁰ AM	3904	76800	3340	84096	18,496
	39651	76820	3475	84126	18785
			2112		
			2145		
			52		

Remote push buttons need re-wiring -
as wiring will not raise & lower large cylinder.

/

~~Write Hx?~~

Date 9/4/53.

11⁰⁴ AM Counts taken with two (2) cylinders in tank unreflected for background for third cylinder

x64	x64	x64	x64	x64
C ₁	C ₂	C ₃	C ₂	C ₅
59 ⁵⁰	114 ⁴⁰	28 ²⁵	1300 [±]	298 [±]
3648	72,960	1792	83,200	19,072
3698	73,109	1817		

12³⁰ PM 3rd Cyl being placed in tank Remotely. Cyl # D-31

12³⁵ Cylinders in contact ready to cover in position



12⁴⁰ all cylinders in place & in contact 000

10 min counts	55 ²²	111 ¹²	x16	1095	1304 ²	326 ⁵²
3 ²⁵	3252	71,040	6000	1664	83,456	20864
12 ⁵⁵	3224		00			156
	3 Cylinders	ao:				720

10 min counts

x64	x64	x64	x64	x64
51 ¹⁹	97 ³¹	26 ¹²	1310 ³³	298 ²
3264	63080	1664	83,840	19,072
2 ¹⁰ PM	Cylinders immersed in water	66°C		

Water level	1x64	2x64	3x8	4x64	5x64
260 cm	28 [±]	18 ²⁹	113 ^{±5}	9 ³³	559
10 min Count	1792	1152	904	576	320

2 cyl p. 7	28	11	136	8	4.5
------------	----	----	-----	---	-----

1 cyl p. 5	15	9	128	8	4.5
------------	----	---	-----	---	-----

Loaded 4 cylinders?

3 ⁰⁹ PM	53 ¹¹	90 ³⁰	x8	278 ²	1351 ¹³	294 ⁴⁷
	3392	57,600	2224	86,464	18,816	
3 ²⁵ PM	55 ¹¹	90 ⁸	(277 ¹⁵)	1339 ²³	296 ¹⁵	
	3520	57,600	2216	85,680	18944	

3³⁵ PM started adding water to four cyl. Cylinders in contact

260 cm water height	x8	x8	x8	x8	x8
5 ¹² PM	27 ⁴²	22 ³⁴	185 ⁹	84 ²	454
	1728	1408	1480	512	256

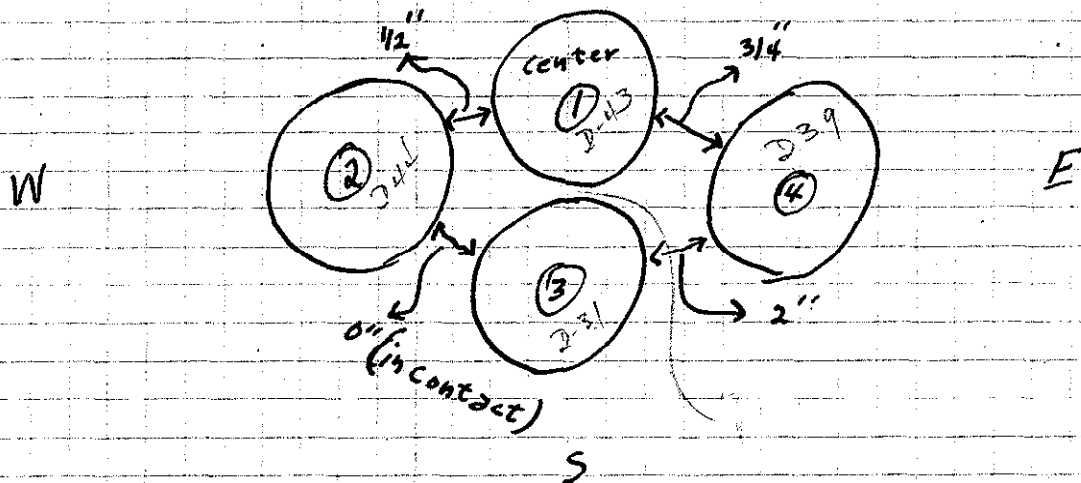
(over)

Signed

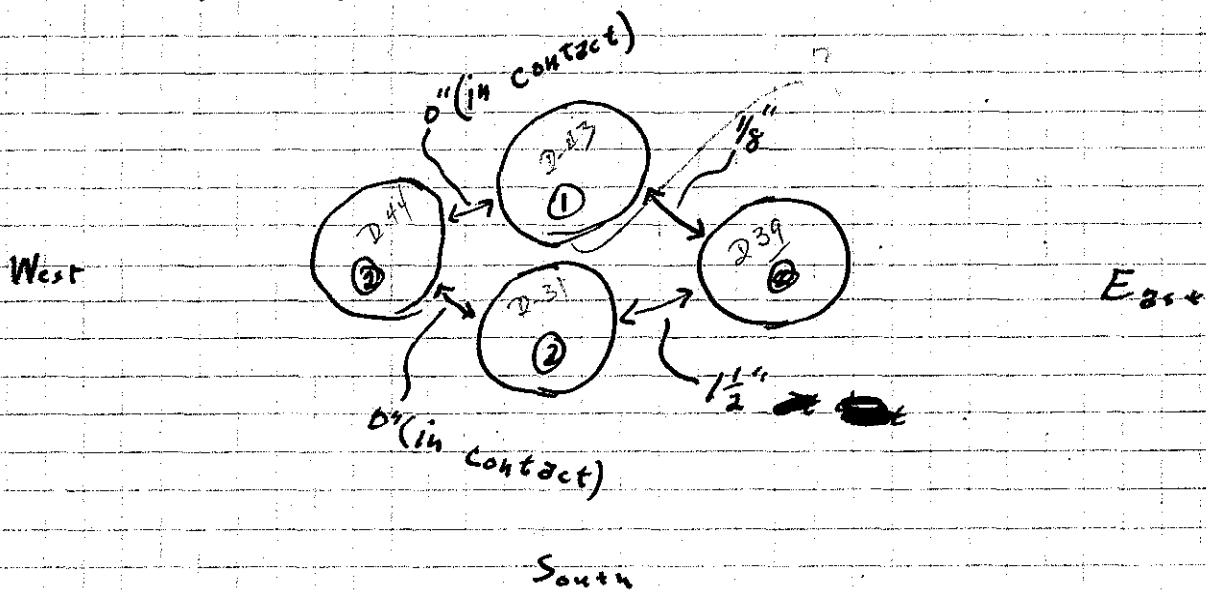
239

Close Spacing Configurations for experiments
on 9/3/63.

Measurements taken about 1' from top of tanks



Measurements taken about 1' from bottom of tanks



Tanks numbered in order they were placed in 'sid'

Date 9-4-53

7:30 PM Water temp 2.62 mv = 66°C

Water level 260 cm

little change in instruments (same radiation level as at 4:30 PM)

Outside reflector water = 65.5°C

Reflector water seems very dirty - Brownish (Rust?)

11:35 P - Water Temp 2.68 mv = 68°C -

add 1 cm H₂O (to 260 cm)

outside water tank temp 69°C.

220v heater regulating - long period -

9/4/53

12:30 A - Water temp 2.70 mv.

7:40 AM Water temp 2.7 mv = 68.5°C

Water itself is almost opaque. worse than 12 hrs earlier.

10 min	1	2	3x8	4x256	5x64
Counts	31 ⁴³	20 ⁵³	193 ¹⁰	290	493
	1984	1280	1544	512	256

9-4-53 10:00 AM

Four (4) tanks in "Big Sid" spaced so as to have approx. two (2) inches between outside edges. See ~~drawing on page 10~~

Source rod and source capsule measured 5'3" long. Source capsule 4" long. Source rod placed so that rod sticks above dished top of tank 2'5 3/4".

10:30	1x64	2x64	3x8	4x256	5x64
	56 ⁴⁶	99 ⁴⁹	270	344 ¹⁷⁸	289 ⁵⁰

Counts taken with no water in tank.

11:00 AM Water temp = 2.58 mv = 65°C Water height?

1:20 AM	x64	x64	x8	x256	x64
	35 ³	15 ¹⁹	154 ³	142	230
	1600	960	1232	256	128
2:30 PM	27 ⁴⁴	11 ⁴	180	157	259
	1728	1088	180	256	128
			1440		

#1	#2	#3	#4	#5	
3552	71600 ⁴	2408	73,6 ⁷⁰	56,5 ³⁷	1 cylinder
51	72,960			18499	
3967	76800	2152	84,126	24,850	2 cylinders
3698	46720				3 "

4 " Close contact

No Reflector Counts/10 min

inter	1	2	3	4	5	
	3552	71,680	2408	73,664+6	56,512+25	1 cyl
		41				
	51	72,090	52		499	} 2 cyl
	3965	76,820	2155	84,126	18,785	
	3698	73,108	1817	83,204	19,078	

3274	71,050	1669	83,458	20,920	} 3 cyl
3280	6239	1678	83,873	19,081	
3403	5790	2228	86,477	18,863	
3533	5768	2231	85,719	18,969	

3630	5790	2161	88,242	18,546	4 cyl.
	6385				

region counts

C ₁	M ₁ ⁻¹	C ₂	M ₂ ⁻¹	C ₃	M ₃ ⁻¹	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹
3552	1.0	7209	1.0	2408	1.0	73670		56537	
3825 ^{asy}	.93	7497	0.96	1985	1.21	83665	0.88	18789	
3373	1.05	6226	1.15	1952	1.23	84881	0.87	19458	
3630	0.97	6385	1.13	2161	1.11	88,242	0.835	18546	

No definite Evidence of multiplication without Reflectors

Map Multipliers shown by counter #4 is 1.198 others show none or a decrease.

Date

Reflected System

Counts/10 min

	C ₁	C ₂	C ₃	C ₄	C ₅
1 cyl	846	639	1025	537	298
2 cyl	1390	640	875	570	245
	1796	713	1061	568	303
	1819	745	1094	483	288
avg	1668	699	1016	540	279

1 cyl	1794	1181	909	609	379
-------	------	------	-----	-----	-----

1 cyl	1770	1442	1489	554	310
nted	1984	1380			
	2037	1333	1554	552	299
avg	1904	1388	1522	553	305

4 cyl	1605	979	1232	303	158
2" sep		1092	1440	313	187
avg	1689	1036	1336	308	173

	M ₁ ⁻¹	M ₂ ⁻¹	M ₃ ⁻¹	M ₄ ⁻¹	M ₅ ⁻¹
1 cyl	1.00	1.00	1.00	1.00	1.00
2 cyl	0.57	0.57 0.91	1.02	0.995	1.07
3 cyl	0.53	0.53 .54	1.13	0.88	0.79
4 cyl control	0.50	.46	0.67	0.97	0.98
4 cyl 2" sep	0.56	0.62	0.77	1.74	1.72

Max Multiplication on # 2 counter - 2.175

Signed

248 cm

59102
248

472816
236408
118204

14657.296 L.
400

15057

~~1.51 x 10⁴ x 10³ x 2.1 x 10⁻⁷~~

151
302
3.172

15100000

100 gal
4
400 L.

9/5/53

Reflection water measured = 8 feet deep in tanks
and on sight glass = 248 cm

⊗ Sample prepared for lab - Analyt. Req = 2.15329 .07 ppm
Water dumped on basis of previous sample Req. 63) 286 = 0.21 ppm

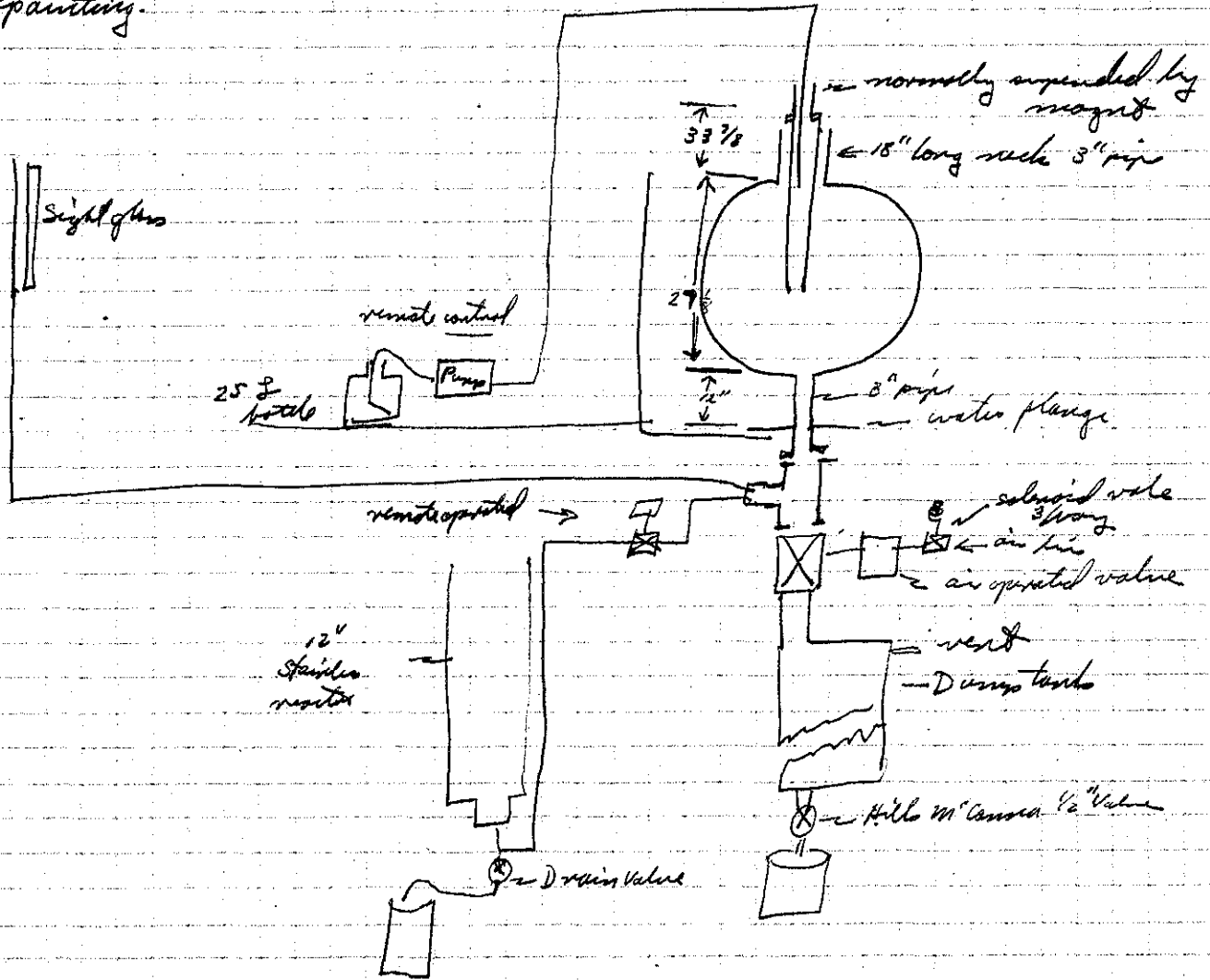
Calibration of Sphere							
Liters	Specific Gravity	Liters	S. G. am	Liters	S. G.	Liters	S. G.
1	2.2	16	12.0	40	20.6	64	27.6
2	3.5	18	12.8	42	21.3	66	28.1
3	4.5	20	13.6	44	21.9	68	28.6
4	5.3	22	14.4	46	22.4	70	29.1
5	6.0	24	15.2	48	22.9	72	29.6
6	6.7	26	15.9	50	23.6	74	30.1
7	7.3	28	16.6	52	24.1	76	30.6
8	7.9	30	17.3	54	24.7	78	31.2
9	8.5	32	18.0	56	25.3	80	31.7
10	9.1	34	18.7	58	25.9	82	32.2
12	10.1	36	19.3	60	26.4	84	32.8
14	11.0	38	19.9	62	27.0	86	33.3

Liters	S. G.	Liters	S. G.	Liters	S. G.	Liters	S. G.
88	33.8	112	40.2	136	47.3	160	56.2
96	34.3	114	40.8	138	47.9	162	57.1
92	34.8	116	41.3	140	48.5	164	58.2
94	35.4	118	41.9	142	49.2	166	59.3
96	35.9	120	42.5	144	49.9	168	60.5
98	36.4	122	43.2	146	50.6	170	62.0
100	36.9	124	43.6	148	51.3	172	64.0
102	37.5	126	44.2	150	52.0	173.640	67.0
104	38.0	128	44.8	152	52.8	173.740	67.7
106	38.6	130	45.4	154	53.5	173.773	68.7
108	39.1	132	46.0	156	54.4	173.840	70.3
110	39.7	134	46.6	158	55.2	174.040	
						173.940	73.0
						174.040	75.5
						174.140	78.2
						174.240	80.7

Sphere damaged after calibration and repaired.
~~Sphere damaged~~

Sphere installed in Well - zero on sphere = zero on S.G. = 4.465 liters.

Paint (Kensite) surface of sphere had peeled off in spots - sent back for repainting.



Feed controlled by turning on/off small Sigran motor pumps -

Max rate of feed = 1.5 g/min max cont = 25 liter.

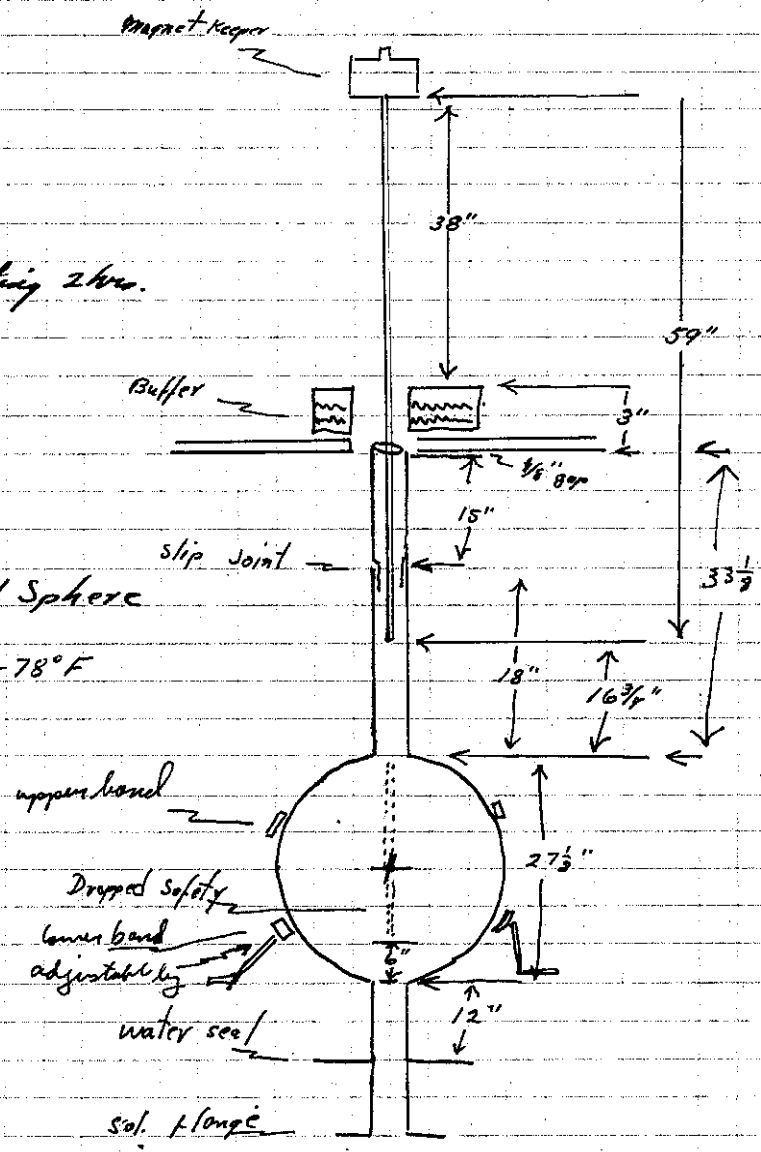
Separate momentary Drain Valve into 12" reservoir.

Safety Rod is really a tube 38" long with a 32" piece of 1/8" Cadmium sandwiched between 1/16" Stainless Steel. Tube has soft iron on top and is manually set into position (above fuel) and held by a small DC Magnet. The 18" long 3" diam neck of sphere serves as guide for the 2 1/2" OD tube.

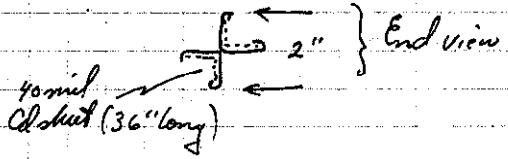
Reshield zero = 4.650 Liters -
 Sight glass read approx 1.1cm Hi - (new gradid etc...)
 11-18-59 Re-Calibration

Vol	S.G	Vol	S.G
0	0	108	39.3
4	5.6	110	40.3
8	8.2	114	41.0
10	9.3	118	42.1
12	10.3	122	43.3
16	12.2	126	44.9
20	13.9	130	45.6
24	15.5	134	46.8
28	16.8	138	48.1
32	18.3	142	49.5
36	19.5	146	50.7
40	20.7	150	52.2
44	22.0		52.2 after sitting 2 hrs.
48	23.2	154	53.7
52	24.3	158	55.4
56	25.5	162	57.2
60	26.6	166	58.3
64	27.7	170	62.1
68	28.8	172	63.9
72	29.8	173	65.3
76	30.9	173.9	68.1 ← Top of Sphere
80	31.9		
84	33.0		
88	34.0		
92	35.0		
96	36.1		
100	37.1		
104	38.2		

Room temp. approx 76-78°F



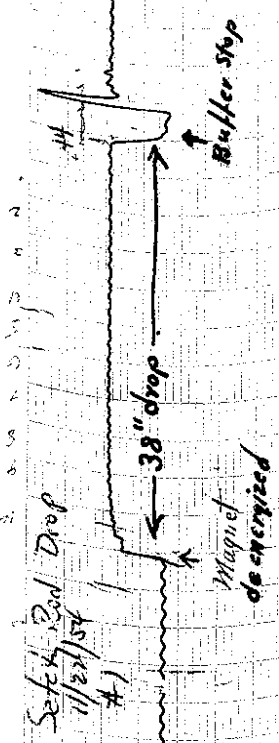
New Safety Blade (Cross) as shown above



fall is 38" to top of buffer

on all drops:
 #1 = 0.44 secs
 #2 = 0.41
 #3 = 0.45

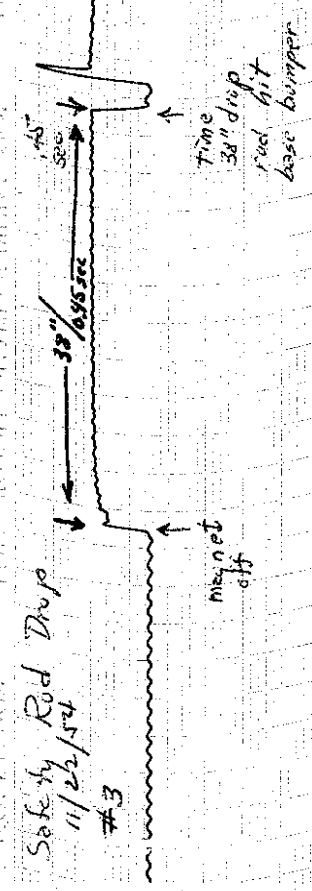
#1
 Time = 0.44 sec



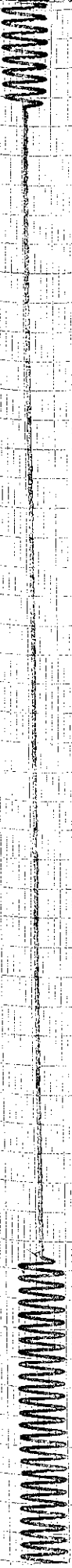
$\Delta t = 0.04 \text{ sec}$
 $\rightarrow \left| \leftarrow \right.$
 $0.1 \text{ sec} = 12 \frac{1}{2} \text{ mm}$

#3

Time = 0.45 sec



Note Bumper Action



Fuel Dump

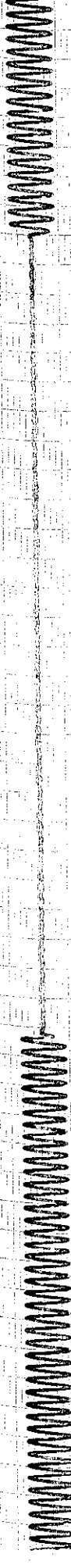
Scram
A

water drop
B

Reset

242.00

THE INSTRUMENT COMPANY, INC. INSTRUMENTS DEPT. 200



2

THE INSTRUMENT COMPANY, INC. INSTRUMENTS DEPT. 200

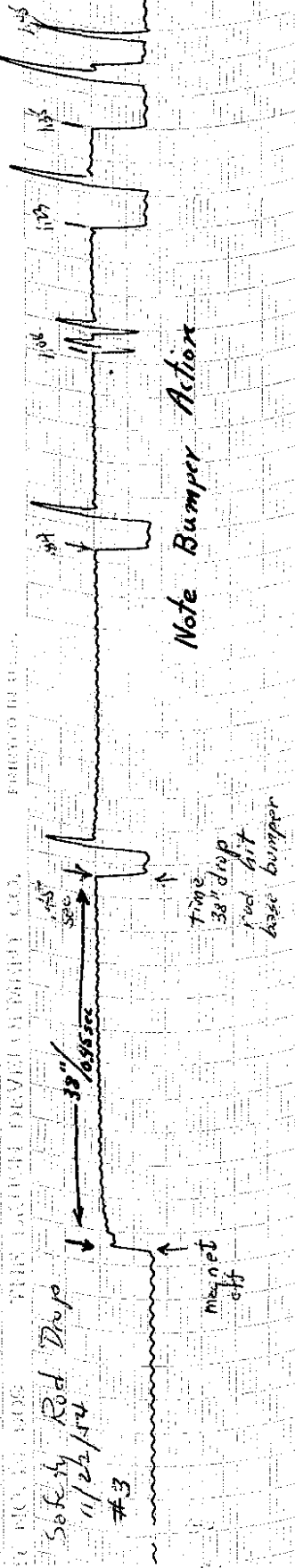


$5 \text{ mm} = 0.04 \text{ sec}$
 $0.1 \text{ sec} = 12 \frac{1}{2} \text{ mm}$

3

Time = 0.45 sec

Safety Rod Drop
 11/22/54
 #3



Note Bumper Action

Time
 38" drop
 rod bit
 base bumper

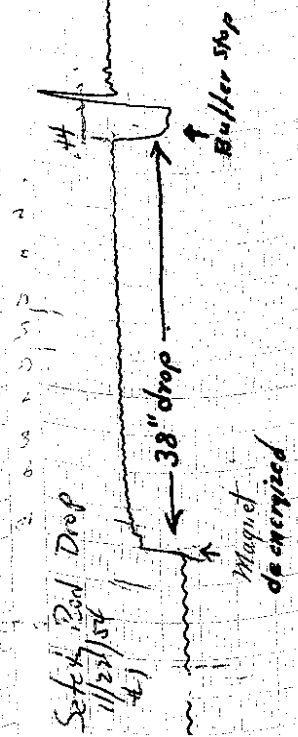
#1 = 0.44 sec
 #2 = 0.91
 #3 = 0.48

on all drops:

1

Time = 0.44 sec

Safety Rod Drop
 11/22/54
 #1



Magnet de-energized

Buffer stop

Setup Recording Oscillograph to check Safety devices

Time measured from Power off to opening of Safety dumps includes time for water to drop approx 0.05 sec

$$\begin{array}{r}
 \text{Time} = 0.887 \text{ sec} \\
 0.84 \\
 \hline
 0.855 \\
 3 \overline{) 2582} \\
 \underline{0.86 \text{ sec}}
 \end{array}$$

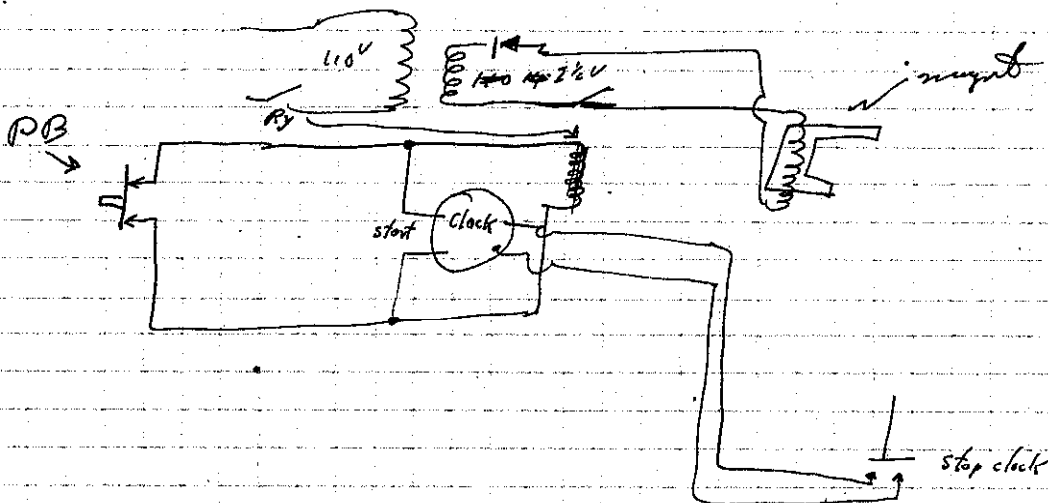
Time for safety Rod to fall 38" measured from Power off to contact on buffer plate.

$$\begin{array}{r}
 \text{time} = 0.44 \text{ sec} \\
 0.41 \text{ sec} \\
 \hline
 0.45 \text{ sec} \\
 3 \overline{) 130} \\
 \underline{.43 \text{ sec}}
 \end{array}$$

$$s = \frac{1}{2} g t^2 = 2 \times \frac{3.16}{32} = t^2$$

$$0.1975 = t^2 \quad 0.444 \text{ sec}$$

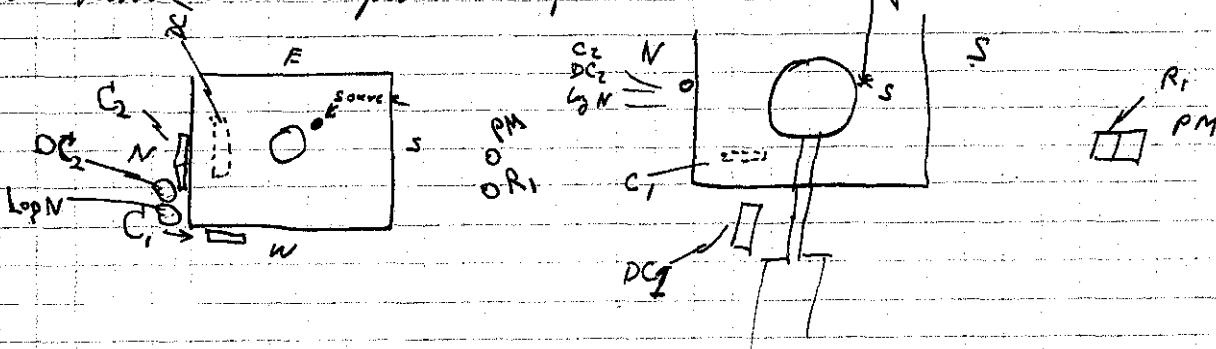
magnet release = approx 14 milli sec
 So safety falls in approx free fall within any measurable limits



Date 11/22/54

From evidence of Safety tests - all too slow - dependence must be on procedure + set trip levels initially low.

1. Max flow rate adjusted to 750 ml/min.
2. Safety blade adjusted so that max IN position is 3" above base of sphere -
3. Upper reinforcing band adjusted on Sphere = 30.25" above tank floor.
4. Vent tubes repositioned for better drainage.



With Source at SE of sphere at Equator and instruments placed as shown - instrument readings all increased as source draws into sphere with tank full of Reflector water -

Counts on counter -	C ₁ - 0 x 64 + 38	0 x 64 + 15	} Source in
	C ₂ - 0 x 64 + 20	0 x 64 + 15	
Under Sid	C ₃ - 11 x 64 + 13	10 x 64 + 51	
Source out	C ₁ - 8 x 64 + 9		
	C ₂ - 6 x 64 + 19		
	C ₃ - 19 x 64 + 8		

No Reflector - Sphere full of water

Source going in raise indicated level on det - at one position DC₂ + Log N hidden from Source by sphere so level drops -

SG		} 4 - 4:10 PM
65.4	No Outside Reflector	
65.4	Reflector	

Leaving water in tank overnight to check for leaks in sphere.

11-23-54

Checking instruments + moving detector heads to new positions in attempt to obtain better response.

Expansion chamber provided for dump will vent - 12 ft above dump

Blowing air thru desiccated sphere to remove H₂O moisture

Instrument line up:

2 Boron lined Proport Counter C₂ - C₃ + Recorders

2 - Ion Chambers + IC amp DC-1 DC-2 + Recorders

1 Ion chamber + $\log N$ + $d \log N$ amp + Recorders

1 - Ion chamber + Vibrating Reed R-2 + Recorders

1 - Scintillation head + trap circuit No Recorders

Scram Circuits

R-3

$\log N$ (period Scram)
Photo-multiplier

} Breaks power lines to
dump valves, pumps, + moquit.

Also 1 thermocouple + recorder.

Date

11-24-55 - 8¹⁰ AM

INSTRUMENT CHECK				
Date	1954	Time	10 ⁵⁵ AM	5 M9 R2
Instrument	Trip Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	90%	10x10	Responds	10
DC-3	95%	100x1	touching can	50x1
Log-N	20 sec			5x1
R-1				
R-2	and			1000x100
P. M.		90V	2" away	

with no reflective water

Fuel being from #35 0.31759 gal/gal total 12,696.0 gal

Exp.	J	Time	11 ⁰⁰ AM	Date	11-24 1954
Purpose	crit point with sphere 27" at this cone.				
Personnel	Clemens, Billy, Roberts				

START-UP CHECK LIST	
Equipment Checked by	DK Personnel Check by DK
Instrument and Safety Checked and Reset by	Roberts
"Source In" Checked by	DK Source No. PN 58
Emergency Equipment in Control Room Checked by	DK
Test Light On by	DK
Start-Up OK'd by	DK Time 11 ⁰⁰ AM Date 11-24 1954

11¹⁵ AM started fuel feed, all controls seem to operate smoothly - small amount of water in sight glass line - instruments respond OK as expected

11²⁸ AM stopped feeding fuel for lunch, sight glass reads 15.0 cm.

Temp - 76.5°F Thermocouple in contact with sphere surface

2 min counts C_2 74x64 + 13 C_3 62x128 + 4

Signed

12:50 PM

Inst. back on -
Repeated blow back of Sight Glass gave reading of 11.1 cm.

MULTIPLICATION					
Expr.	1	Time	1:02 PM	Date	11-24 1954
Scalar		meter Settings		I. G.	
C(2)	780	Disc.		c/u Min.	
C(3)	1.8			24 x 64 + 12	
C()				6.2 x 128 + 4	
Temperature	76.5°F	Height		M ⁻¹ or Remarks	
Time	Ref.	Sol'n	Ref.	Sol'n	C(2) M ⁻¹
11:05			14.5 cm	80	57 / 105

11:02 adding Reflector water - gives 3 cm priced Top of sphere = 72 cm on both ends

Empty
27 now in place = 11668.2 cm³ at 0.3 gm u/gm

Ref. fuel	C ₂ x 64	C ₃ x 128
1:25 PM 97.0 cm 14.5 cm	16 + 30	0 + 97
		0 + 72

1:45 PM 97.1 22.5 cm 7 + 35
Water temp = 32°C Responder reads 88°F
SG blown back - no change.

2:00 Feeding from # 26

# 26 Empty	C ₂	C ₃
2:45 # 25 In	4 + 24	0 + 86
3:14 # 25 Empty 35.6 cm	6 + 3	0 + 103

4:00 # 36 Empty stopped pumping 42.7 cm
18 + 35 1 + 6
4:02 Pumping again

4:40 Stopped pumping approx 45 cm
orig now
log N = .005 .015 = multiplication of 2.3
C₂ M⁻¹ C₃
30 + 58 0.129 1 + 69

Signed

4:30 PM On removing source level on all instruments went down

Source out
Reflector water drained

C₂ C₃
M⁻¹
402 + 0 x 64 0.184 57 + 63

Fuel Pump jammed open (on purpose) Switches in Room 101 opened -

Outside Reflector tank - thermostat next down to 28° C

Room 101 set to 80° F

Fuel System By-pass -

11-26-54
9:00 AM

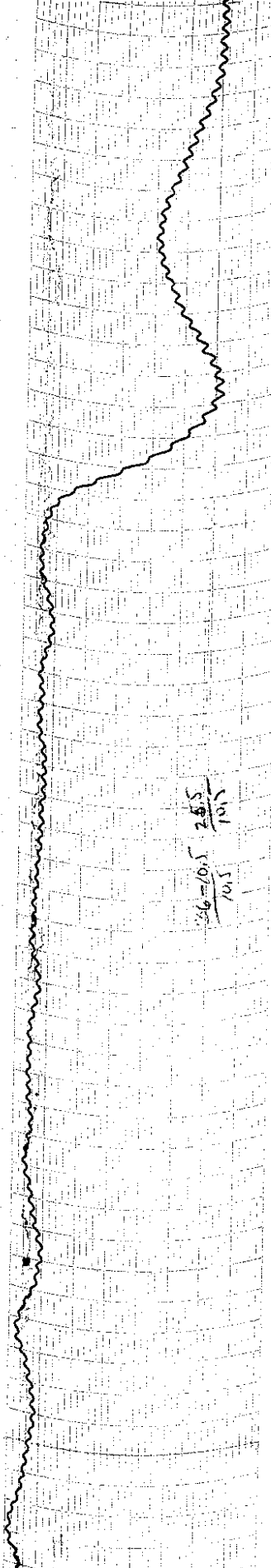
Fuel System Bypassed

INSTRUMENT CHECK			
Date	11-25-54	9 ⁰⁰	PRG No. 8
			X 2
7 sec	—	3"	—
1000	—	antistat	—
200V	—	2"	200V

Expt. 1
 Purpose: continue #
 Date: 11-26-54
 By: DFL Billy Ann

STARTUP CHECK LIST	
Equipment Checked by	DFL
Instrument checked by	DFL
Operator	Crown
Ref. Temp.	Crown
Start Date	DFL
Stop Date	DFL

Sight Glass reads 45.5 cm No Reflector



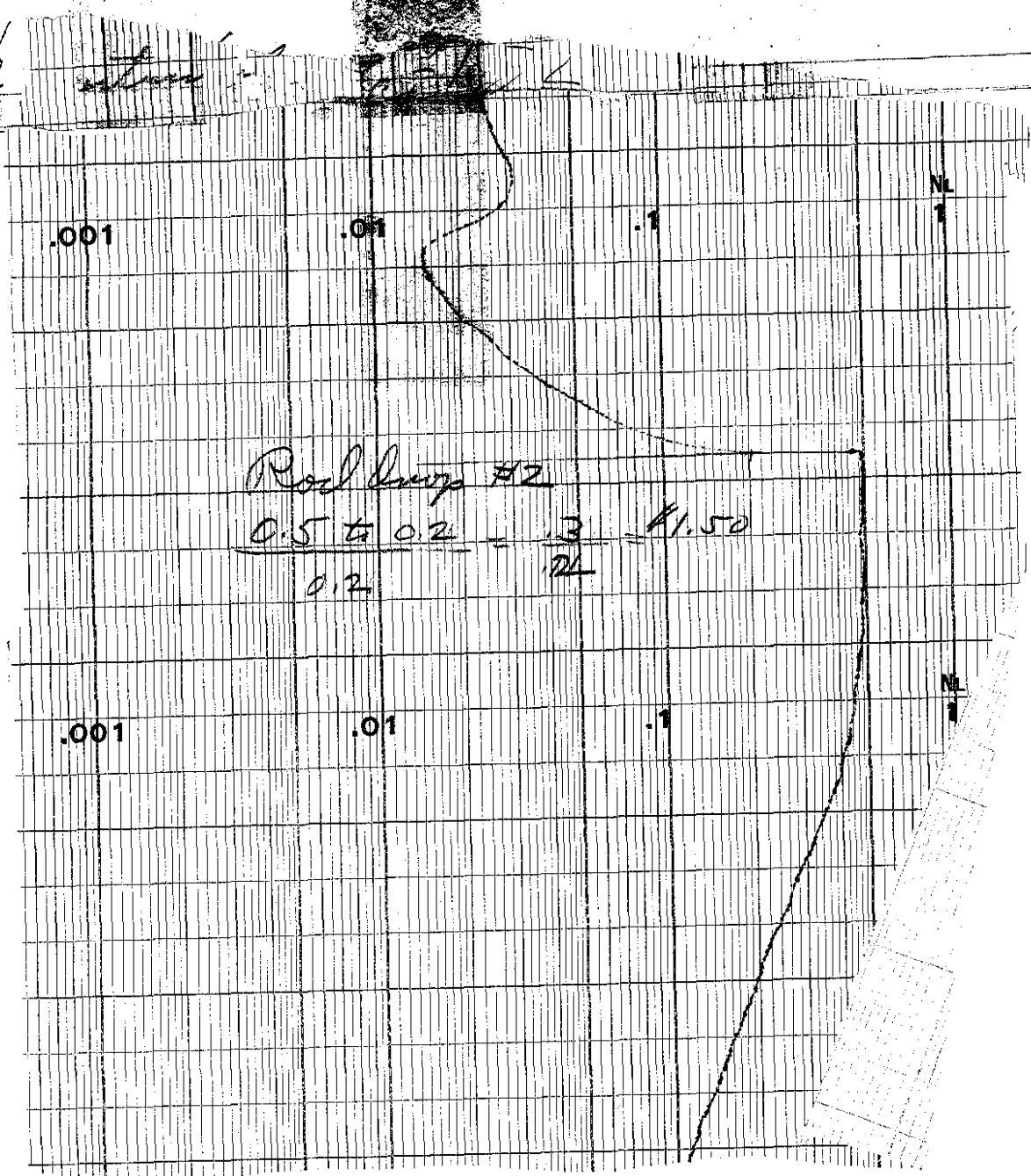
$\frac{26-10.5}{10.5} = \frac{15.5}{10.5}$

ROD (Cadmium Cross) DROP

Exp 1-A-4 $\frac{22}{pm}$ 11-28-54

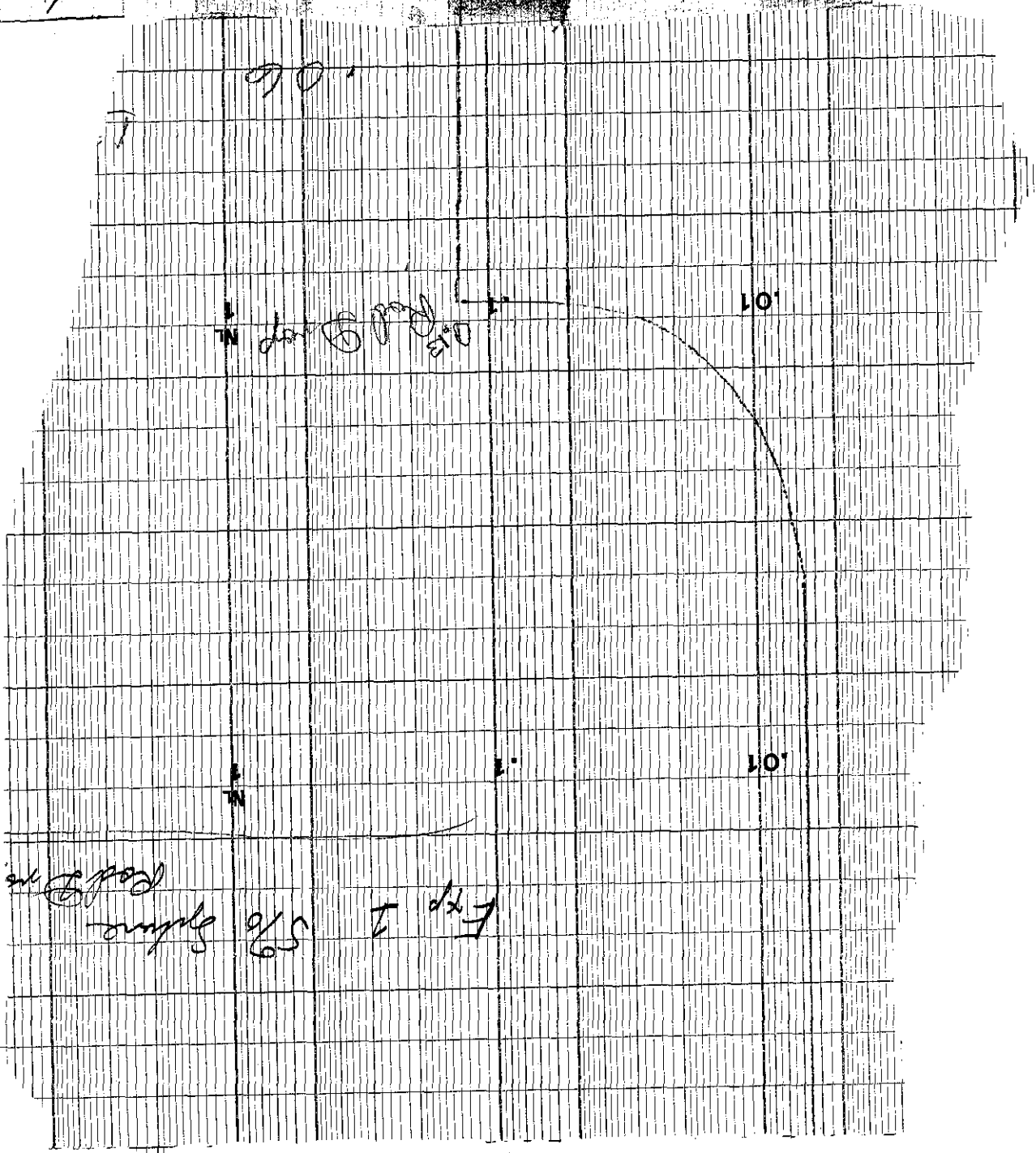
THE ELECTRO-VOLTAIC COMPANY
FERRIS, CALIFORNIA, U.S.A.

28 Date
11-26-54
Sp 2



Signed

8 Date 11-26-51
Exp 1



Signed

28

Date

11-26-54

Exp 2 continued

C₂C₃

Time Fuel Ht Refl

9⁰⁰ AM 45.5 372 + 52 58 + 999¹² start adding water

B.G

9²⁵ Fuel 45.5 cm 104 cm 4 + 24 = 280 $\frac{26}{28} = 0.67$
 31 + 38 1 + 7
 $M^{-1} = .127$ $M^{-1} = 0.57$

These counts check
 pretty well with
 yesterday's

9⁴⁵ 46.5 ^{extra from 202} cm 103.8 cm 48 + 50 1 + 118

Some evidence of leaking water valve.

 $M^{-1} = .0818$ $M^{-1} = 0.349$ 9⁵⁵ 47.3 cm 103.4 cm 56 + 35 2 + 41 $M^{-1} = .071$ $M^{-1} = 0.29$ 10⁰⁰ AM 48.7 103.0 cm 117 + 7 3 + 96
 $M^{-1} = .034$ $M^{-1} = 0.179$ 10²⁰ AM 49.6 103 cm 267 + 57 8 + 91
.0149 $M^{-1} = 0.077$

10⁵⁰ AM 50.0 102.5 580 + 39 18 + 27
 Radiation level at PM tube is 6 MR/hr as read by 2610
 $M^{-1} = .0069$ $M^{-1} = .0372$

11¹⁸ 50.35 cm 102 - Source out just sub.

50.4 cm approx (from 202) Water temp 88°F

11²⁵ 50.4 _{Read in 101} 102 } Appears just crit.
 first Critical (all inst. built for 5 min)

Added one "squant" not noticeable on S.C. Slightly Squirr.

Preparing for Rod Drop.

11³⁰ Dropped Rod - Water partially out Radiation = 30 MR/hr 2 ft from sphere11⁴⁶ At PM Radiation no water = 25 MR/hr -

Signed

12⁰⁰ PM Safety Rod Reset (water out)

12⁴⁵ PM Source all IN γ Reflector -
 Fuel Ht = 50.5 cm

BC=74	C ₂	m ⁻¹	C ₁	OG=58	m ⁻¹
		0.116	76+22		0.77
638			78+22		

1⁰⁰ PM adding Reflector for repeat of Rod Drop -

no change in fuel

1³⁵ PM Water IN 100 cm ht - System just critical
 $\log N = 0.21$

2⁰⁰ PM PN 58 Removed & placed in H₂BO₃ soln in 10/ Replaced by weak source
~~Reflector~~ Rod withdrawn

2¹⁵ PM Reflector water IN

3⁰⁵ leveled off at 0.5 on log N for Rod Drop.
 3⁰⁵ Rod dropped -

3¹⁵ Dumped water + training fuel into 12" Manhole

Rod worth approx 75¢ by Point
 best guess from log N = 1.50

3⁴⁵ PM fuel Ht = 43 cm

Est U = 0.30 gm U/gm density = approx 1.55

Vol Est = 146 L = 226 Kg = 67.8 Kg U
 = 3.34 Kg X

11-29-54 Fuel drained into 12" reservoir - & put back into

25 liter bottles - sampled - Reg 635313

H = 167.8924

T = 19.2518

WT 158.5506

by phone

0.31543 gm U/gm
 Sp Gr. = 1.563

10⁰⁰ AM Began priming fuel coils into sphere

Expt. 1A Time 10³⁰ AM Date 11-29-54
 Purpose: Repeat to check mixing of solution
 Personnel: D.C. P.M.

INSTRUMENT CHECK
 Date 11-29 1954 Time 10³⁰ - Source No. 8
 Instrument Name: *5mg*
 D-1: responds to 8 X10
 D-2: responds no trip X10
 Log: Trips at 7 sec period
 R-1: set to trip at 60% of 1000 ma scale 1 1/2" x 100 x 1000
 R-2: 900V 2"

10³⁵ AM Fuel = 13.8cm 74+17 C2 C3 X32
 205+23 no reflectors

START-UP CHECK LIST
 Equipment Checked by D.C. Personnel Check by D.C.
 Instrumental & Scales Checked and OK'd by ERR
 Source List Checked by D.C. Control No. PN-58
 Emergency Equipment in Control Room Checked by D.C.
 Red Light Out by D.C.
 Start-Up OK'd by D.C. Time 10³⁷ AM Date 11-29-1954

10⁵² AM Fuel 13.8 water 100cm
 C2 C3 X32
 18+15 2+23

Time Fuel water C2 C3
 11³⁰ AM 20.8cm 100cm 8+37 2+17 approx 40.4 liters

Date Fuel
105 28.8 cm 68.4 liter water at 28 cm

MULTIPLICATION									
Expr. <u>1 A</u>		Time <u>AM</u>		Date <u>195</u>		Settings			
Scalar		H. V.		Disc.		c/() min.			
C(1)									
C(2)						4 1/2			
C(3)						2 1/4			
Temperature		Height		M ¹ or Remarks					
Time	Refl.	Sol'n	Refl.	Sol'n	C(2)	C(3)	M(1)	C(1)	M(1)
<u>105</u>			<u>98 cm</u>	<u>28.8</u>	<u>4+5 1/2</u>		<u>2+1 1/4</u>		

2:20 PM 78°F 100 355 18+42 0.27 4+12 0.50 Vol = 94.5 Liters

3:00 PM 100 42.0 15+40 4+6 Vol = 118 Liters
 16+15 4+15

3:30 AM 78°F 98 47.5 70+41 = 0.58 8+14 0.25
 47.6

4:00 50.0 Source out - just sub
 4:11 78°F 99 50.1 " " Super slightly actually just critical

4:22 PM 50.1 * Source out } Read Dropped
 Log N = 0.48

Read seems to be worth 2.43
 Re reading S.C. = 50.1
 on topping S.C. to break minimum = 50.4 cm a check on
 previous min. = 145 J

SUMMARY OF CRITICAL CONDITIONS					
Expr. <u>1 A</u>	Reactor <u>Sphere</u>				
Solution <u>U₂F₆ 5% mag</u>	Height <u>50.4</u>	Volume <u>145.0</u>	Temp <u>78°F</u>		
Reflector <u>Water</u>	Height <u>99 cm</u>	Temp <u>78°F</u>			
Time Critical <u>4:11 PM</u>	Duration <u>12</u> min.	Log N <u>0.48</u>			
Anal. Req. <u>635313</u>	gms U/gm <u>0.31543</u>	Sp. Cr. <u>1.563</u>			
Critical Mass <u>71.488 Kg U</u>	Atomic Ratio <u>53.63 H:U</u>				
<u>3.539 Kg U₂F₆</u>	<u>1083.6 H:X</u>				

Fuel drained to 47.2 cm Water out

* Read thru window

Rad-drop #2

OPMENT CO. PRINCE GEORGE, MD.

Vib. Reed into Bush

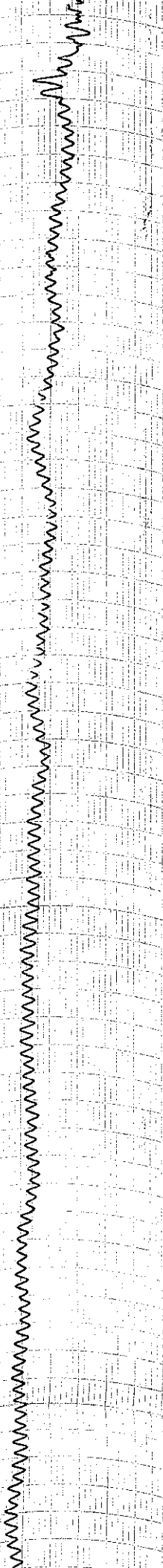
PLANT NO. 11-079

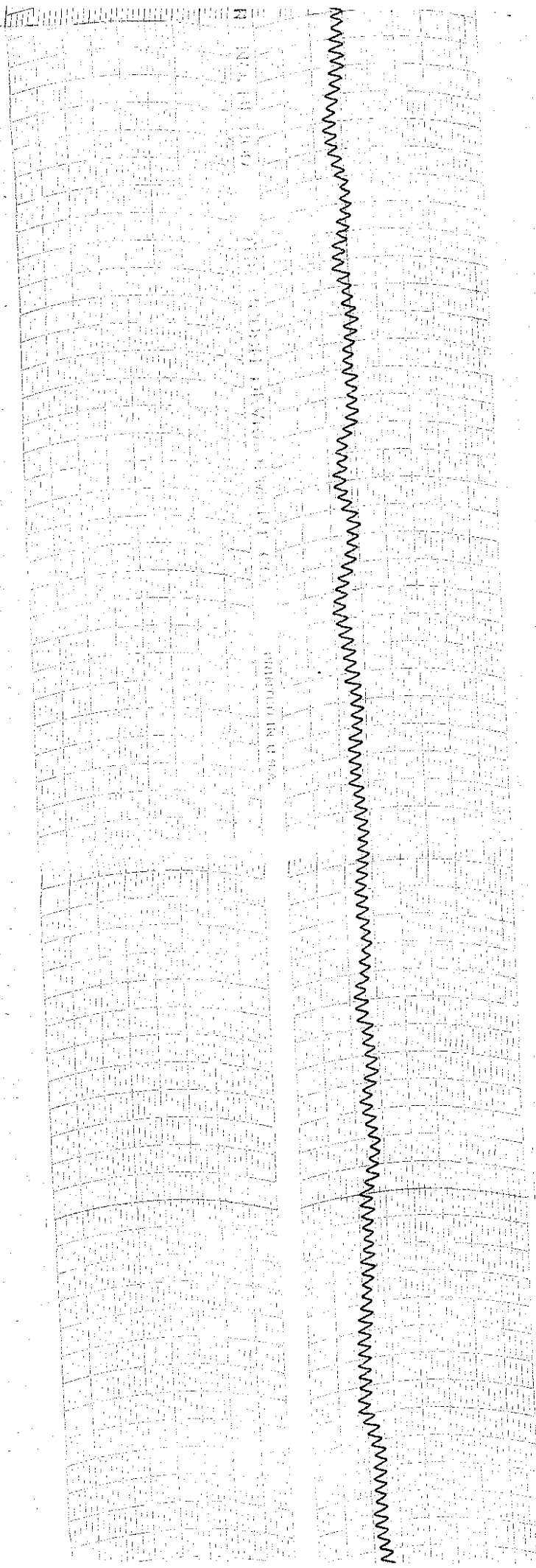
22
27

RECEIVED

APR 11 1969

608 11 103

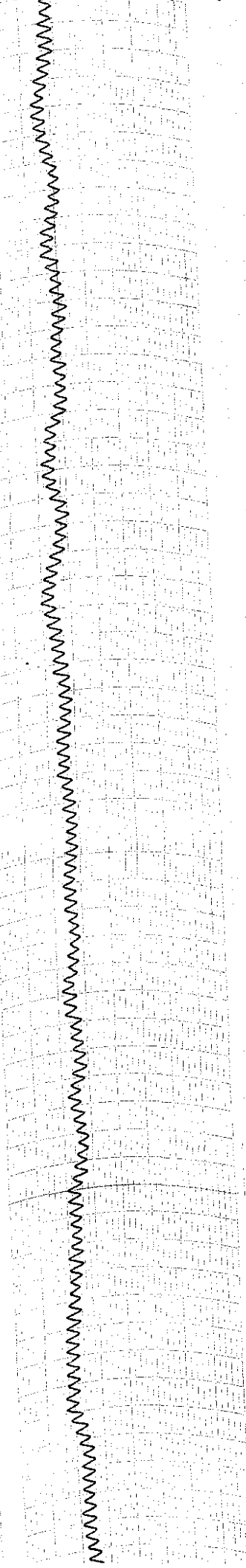


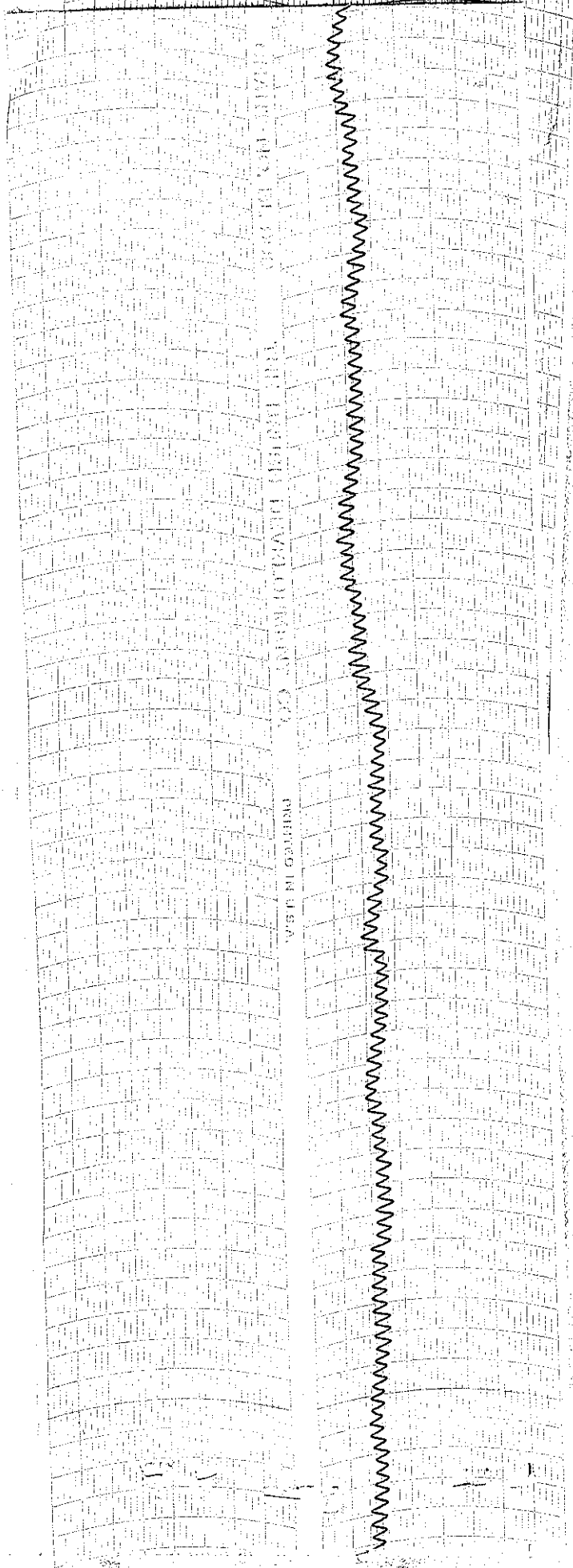


100

100

100





Containers used in
Exp - 6 data

INSTRUMENT CHECK

Date 11 30 1954 Time 8 30 AM Source No. 8

Instrument Yoko Scale response Source Distance — Start-Up Scale —

DC-1 —

DC-2 —

DC-3 —

Log N —

R-1 70%

R-2 70% Contact True

P. M. —

900V 2" 900V

25, 26, 27, 30
32, 35, 36

STARTUP CHECK LIST

Equipment Checked by DPL Personnel Check by DPL

Instrument and Supplies Checked and Reset by ERR-CC

"Source In" Checked by DPL Source No. PN-58

Emergency Equipment in Control Room Checked by DPL

Red Light On by DPL

Start-Up OK'd by DPL Time 8 35 AM PM Date 10 30 1954

Exp. 2 Time 8 35 AM Date 10-30 1954

Purpose Unreflected exposure

Personnel: DPL & G. B. ERR

8³⁰ AM Fuel Nt 47.1 cm Rm Temp 79°F Safety Rock Reset

Fuel	Vol	C ₁	C ₂	M ⁻¹	C ₅ X 128	M ⁻¹
B.G. = 2			74 1/2		51 + 5	
47.1 cm	135.6	54 + 28	426 + 52	0.174	57 + 81	0.85

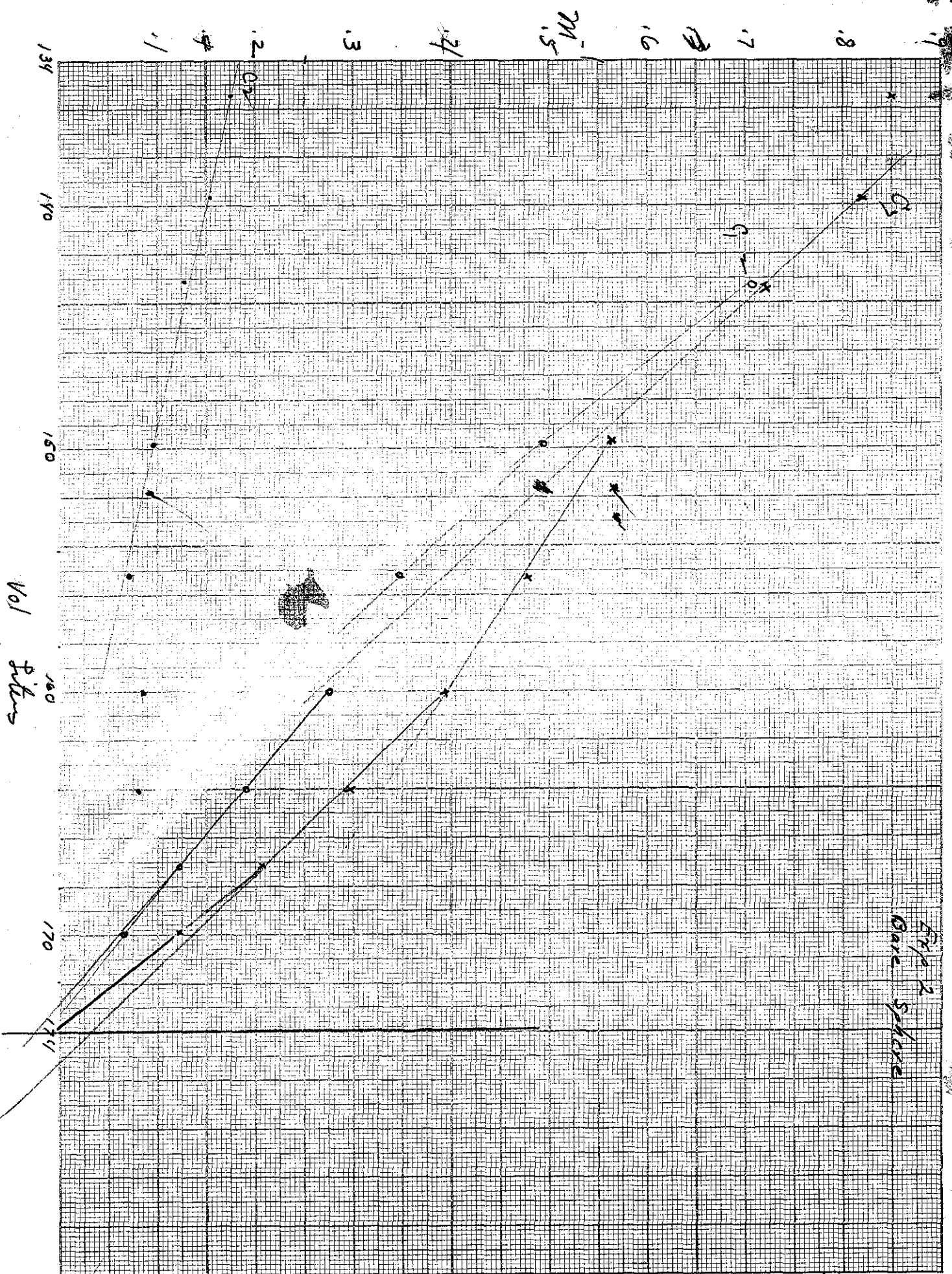
8⁵² AM 48.3 139.6 63 + 51 484 + 44 0.154 62 + 25 0.82

9⁰² AM 49.6* 143.2 76 + 40 0.71 583 + 61 0.127 70 + 33 0.72

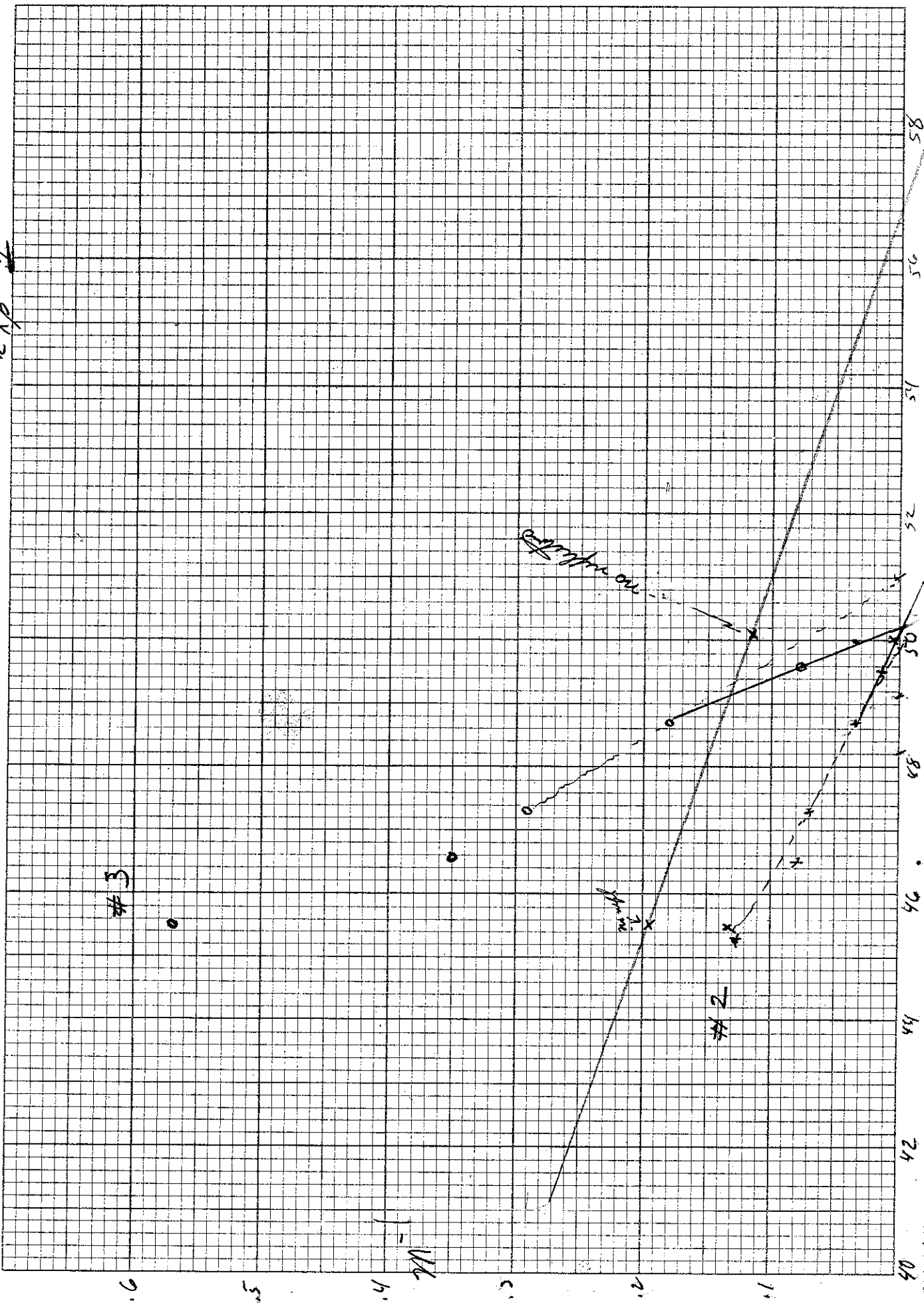
9⁴⁰ AM 52.7 ~~149.8~~ 101.8 110 + 46 0.49 816 + 62 .091 88 + 85 0.57

*Thin window

Signed



Exp 2



cm AX

Time	Fuel	Vol	C ₁	C ₂	C ₃
9:50	54.3	155.6	146+16 .398	1012	.074 107+33 90.477
10:00	56*	160	196+7 .275	885	.083 133+14 .383
10:05	58.3	164	280+56 .192	960	.078 176+69 .29
Brought in #29 from Vault to top off sphere					
10:30	60.0*	167.3	430+42 .125	920	251 .205

11:10 62 170 743 .073 1016 .074 414 .123
 log N reads 0.24 R-1 reads 0.7 on 1000 mV x 1000
 C₂ has evidently jammed.

11:20 66.5* Same as - Sub

11:30 67.0* doubtful

68.5* Either just ^{super} critical or very close to limit

11:35 68.0* Possibly still super - log N = 0.20

11:40 67.5* attempting to level off. log N = 0.225

11:43 Indicates very level - DC-2 DC-3 very slight rise
 log N = 0.225
 Thermocouple reads 72 F°

11:45 67.3* level -

11:47 67.2 slight upward log N = 0.24

11:48 Rod dropped
 11:49 solution displaced to 74.5 cm

$$\frac{32 - 9}{9} = \frac{23}{9} = 2.55 \text{ dollars}$$

$$174 \text{ liters Critical} \times 1.563 = 271.962 \text{ Kg}$$

$$\begin{array}{r} .31543 \\ 85.785 \text{ Kg U} \\ \times 0.495 \\ \hline 4.251594235 \end{array}$$

THE ENGINE DIVISION OF THE U.S. GEOLOGICAL SURVEY
WASHINGTON, D.C.

32-9
7
Exp 2
Road & map.





WARRIOR IN 1976

ALPHABETICALLY ORDERED

FROM 1976 TO 1977

34

Date

11-30-54

Fuel drained to 50.4 cm

1 bare indium, 1 Cd covered ind + gold foil placed at equator
180° from source to check prev needed to expose foils.3¹⁵pm adding water^{with} for criticality3⁴⁵pm Source out Critical Water at 72 cm fuel 50.4 cm3⁵⁰pm

Shut down -

log W needs 0.2

Result of Foils on Counter #5. Counted 10 min after shutdown.

Bare ind	2 min	87 x 64 + 16
Cd covered	"	20 x 64 + 23
Gold	"	66 x 64 + 61

12-1-54

Resampled Fuel cell. Reg # 635314 see p. 46 in Inventory Book.

analysis = 0.316700 gm U/gm

Sp. Hr. = 1.5656

Spec	135 ppm Ag	5 ppm Cu	210 ppm P
	16 ppm Al	180 ppm Fe	33 ppm Pb
	< 1.0 ppm B	7 ppm Mg	< 10 ppm S
	< 10 ppm Ba	5 ppm Mn	< 15 ppm Sn
	< 50 ppm Ca	< 200 ppm Mo	< 40 ppm Zn
	< 6 ppm Cr	15 ppm Na	
		< 25 ppm Ni	

Signed

INSTRUMENT CHECK

Date 12-3 1954 Time 10³⁰ AM
 Trip _____ Source No. 8

Instrument	Value	Scale	Source	Distance	Start-Up	Scale
DC-1	✓					
DC-2	no trip					
DC-3	✓					
Log N	✓	Zero				
R-1	✓					
R-2						
P. M.	✓			1 1/2"		

Fail:

Monitor = 7.4

#17

16

15

14

10

7

4

3

2

1

1/2"

1/2" apart
on diameters

None of above

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Reset by LWG
 "Source In" Checked by DK Source No. PN-58
 Emergency Equipment in Control Room Checked by DK
 Red Light On by DK AM
 Start-Up OK'd by DK Time 10³⁰ Date 12-3 1954

Expr. 3 Time 10³⁰ AM Date 12-3 1954
 Purpose Fail Exposure Base Insulation
Radial (Vertical) Transverse
No Reflector
 Personnel: LWG C.C. D.F.C.

10³⁰ AM Fuel Height = 34 cm at start log N = 0.02 with source IN
 C₁ 18+58 C₂ 121+34 C₃ x 128 39+55.

12⁰⁰ PM Fuel = 43 cm log N = .036
 35.5 283 53

1²⁵ PM Fuel = 59.6 cm
 C₁ 406 C₂ 954 C₃ 261

1⁴⁰ PM log N = 0.65 start timing for fail Exp. Fuel = 65.2 cm source out
 with log N at 0.65 1/2 M trips at 1200V =
 2⁰⁰ PM Shut down - Fuel = 67.5 cm

1 1/2" spacing

INSTRUMENT CHECK					
Date	Time	AM/PM	Source No.		
12/6	1054	3:45	8		
Instrument	Value	Scale	Source Distance	Start-Up	et
DC-1		response			
DC-2		response			
DC-3		response			
Log N					
R-1	OK			7cm	
R-2					
P. M.	900V	1 1/2"			

Fails # down

Monitor fail 7-4

Repl- fuel

START-UP CHECK LIST			
Equipment Checked by	DK	Personnel Used by	DK
Instrument and Cables Checked and Set by	DK		
Source Int. Checked by	DK	Source No.	PN 58
Emergency Equipment in Control Room Checked by	DK		
Red Light On by	DK		
Start Up Time	DK	Time	8:45 AM
		PAI Date	12-6-1954

Exp.	4	12/6	1954
Purpose	Reflected critical		
	Fail traverse Beam and fails		
Personnel:	JWA, CC, DK		

1:45 PM Solar hgt 50.2 cm no reflectors
adding water fails loaded.

2:05 Cut fuel at 50.2 water at 73.3 cm log N = 0.12
2:06 water at 75.2 cm = 20 min period
74.7 cm level at 0.75 on log N PM trip at 1100V
74.5 cm to correct small period

2:35 shut down after 20 min fail Egs.

20 -

28 1/2"

B-8 -

on sphere

6 - 2"

27 - 2"

23 - 1 1/2"

29 - 1"

20 - 2"

32 - 1"

24 - 1"

33 - 1 1/2"

11 - 1 1/2"

19 - 1 1/2"

31 - 1 1/2"

34 - 1 1/2"

18 - 1 1/2"

30 - 1 1/2"

9 - 1 1/2"

0 -

INSTRUMENT CHECK				
Date	12-7	1954	Time	8:15 AM
			Source No.	8
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1	Repeatability			X 20
DC-2	Repeatability			X 10 X 10
DC-3	Repeatability			X 50 X 1
Log-N		1 m		
R-1				100 X 500
R-2				
P. M.	800 V	1"		

START-UP CHECK LIST

Equipment Checked by DKC Personnel Check by DKC
 Instrument and Safeties Checked and Reset by DKC CC
 "Source Is" Checked by DKC Source No. PH 58
 Emergency Equipment in Control Room Checked by DKC
 Red Light On by DKC 8:10 AM
 Start-Up OK'd by DKC Time 8:10 AM Date 12-7 1954

Expt. 5 Time 8:15 AM Date 12-7 1954
 Purpose Foil Exposure Cd covered fuel Radial Trains water reflector
 Personnel: L. G. C. J. T. DKC

Fuel at 46.5 cm no reflector to start

9:40 AM Fuel at 50.5 cm foils loaded - beginning water

10:00 Fuel 50.5 water 72.5 period = 200 sec log k at 0.5

10:25 Fuel 50.5 water 72.95 log k = 1
 Source dead PM trip at 1000V

Start down at 10:42

	Fuel	Ref.
32		20
25	5 1/2"	28 1/2"
6	2"	8 1/2"
		on sphere
27	3"	
21	3"	
24	5"	
	3"	
19		
	2 1/2"	7 1/2"
34		
	2"	
18		
	3"	
9	0	

Signed

INSTRUMENT CHECK

Date 12-8 1954 Time 6:15 AM
 Instrument No. 8
 Instrument neoponds Start-Up Scale X10
" " " 1 X 50
" " " 1 X 20
6 X 1000 1" 1000 R/100
800 V 1 1/2"
 All inst equip by N moved
 further from capsule approx 4 feet

START-UP CHECK LIST

Equipment Checked by DTC Personnel Check by DTC
 Instrument and Safeties Checked and Reset by DTC
 "Source In" Checked by DTC PN 58
 Emergency Equipment in Control Room Checked by DTC
 Red Light On by DTC
 Start-Up OK'd by DTC Time 7:05 AM Date 12-8 1954
 Expt. 6 Time 7:10 AM Date 12-8 1954
 Purpose Bare sphere foil traverse
above sphere on diameter
 Personnel:

7:10 Fuel height 47.0 cm no Reflector Foil Position
 Temp 74.5°F thermo couple in contact with capsule all down (numbers
 7-4 = monitor

7:45	Fuel 52.2 cm	B-13	2 1/4"
8:14	Fuel 61 cm	B-26	2 1/4"
8:20	Source out 65.0 cm sub critical - 400 m	B-28	2 1/2"
8:25	65.2 cm super C + 400 m	B-11	2 1/2"
8:33	66.5 cm super approx 600 m period	B-29	2 1/2"
		B-23	2"
		B-20	2" center 13.6
		B-30	2"
		B-33	2 1/2"

When meter on log N panel reads 1.0 - 8 radiation on RCL = 1 mvr/h
 head on East wall at balcony level. PM trips over 1200V

8:45 Started timing exposure log N = 1.85
 8:55 Gended off of 5 on log N - all inst off scale except log N, DC-3
 and PM - RCL head in room 202 reads 1000/m on x1
 DC-3 = 67 on 50 X 10
 log N = 5
 PM trips at 920V - inst head near outside wall of Sid
 Thermo couple = 78°F

9:04 shut down

SUMMARY OF CRITICAL CONDITIONS
 Expt. 6 Detector 27" Sphere Bare
 Solution 40% Fe Density 66.0 Volume 17268 Temp 75°F
 Reflector none Light --- Time ---
 Time Critical 8:30 Duration 34 min. Log N 5.0
 Anal. Req. 635 314 gms G / 4000 gms Cr
 Critical Mass: ---

Signed

Expr. 6-2 Time AM Date 195
 Purpose cd covered indium foil traverse
on bare sphere
 Personnel: Cross, Gritley
 Equipment Checked by OFC Personnel Check by OFC
 Instrument and Safeties Checked and Reset by OFC
 "Source In" Checked by SWJ Source No. _____
 Emergency Equipment in Control Room Checked by SWJ
 Red Light On by Cross AM
 Start-Up OK'd by Cross Time 8:00 PM Date 12/19 1954

INSTRUMENT-CHECK

Date 12/19 1954 Time 8:30 AM Source No. _____
 Trip _____
 Instrument Value Scale Source Distance Start-Up Scale

DC-1	<u>responds</u>				<u>X10</u>
DC-2	<u>"</u>				<u>1 X 100</u>
DC-3	<u>out</u>				
Log N	<u>trip</u>	<u>700</u>			<u>700</u>
R-1	<u>trip</u>	<u>100 X 1000</u>			<u>100 X 1000</u>
R-2					
P. M.	<u>trip</u>		<u>r</u>	<u>2"</u>	

DC-1 moved to floor of 101 NE of center of Well in Paraffin Foil Positions

R-1 " " " " 101 NW of center 7-4 monitor

10:08 AM note source is SXSE of center
 Thermocouple Temp = 80°F fuel = 57.5 cm

10:24 AM fuel at 61 cm changed to full container
 Temp 80°F

10:32 62 cm fuel - fuse blew on fuel pump -

10:52 draining fuel to work on pump.

11:58 Resuming fuel at 61 cm

11:14 Source Out fuel at 65.7 Sub log N 0.134

11:16 Fuel 66.5 slightly depa.

11:17 Fuel 67 cm C 400-6 7100 cm

11:23 Fuel at 72.8 Source in to rain power - hardly a positive period
 Temp = 80°F

11:25 Source Resumed - log N = 1.2

11:34 Fuel at 73.4 cm barely critical may be already sub
 System is sub critical source and fuel at 73.4

11:45 AM Shut down - not Critical too much columns?

Duplicate samples taken: P-5-10 $\lambda = 146.3144$ Rep # 635315
 $T = 20.5831$ P. 46 in inventory
 Analysis = 0.51672
 Sp. Gr. = 1.5668

P-5-5 $\lambda = 106.6996$ Held
 $T = 19.8371$

Room temp also reads 80°F
 So heater control set down to 75°F at 2:00 PM

~~Some wiring approx 2 ft probably was pushed into ...~~
 Signed _____

Expr. 6-3 Time AM Date 12/10 1954
 Purpose cd around pit tunnel of unreflected sphere
 Personnel: OK JWA

START-UP CHECK LIST
 Equipment checked by DFC Personnel Check by JWA
 Instrument and Safety JWA
 Source Isotope Checked JWA
 Emergency Equipment in case of alarm Checked by JWA
 Red Light On by DFC
 Start-Up OK'd by JWA Time 9:00 AM Date 12/10 1954

INSTRUMENT CHECK
 Date 12/10 Test # 4 Time 8:30 AM Source No. 1
 Instrument Value Scale
 DC-1 response
 DC-2 response
 DC-3 response
 Log N trip ~ 5 sec.
 R-1 response
 R-2 response
 P. M. trip

Room temp down to 75°F Thermocouple on sphere = 72°F at start 9:40 AM

foils re-taped & re-installed

Monitors = F-4

Motor replaced

12:00 AM 39.5 cm temp = 72°F

- 2 B-31 - cad covered
- 2 B-26 - Cd
- 2 B-28 - Base
- 2 1/2 B-11 - Cd
- +2 1/2 B-29 - Base
- +2 1/2 B-23 - Cd
- Center +2 B-20 = Cd
- 2 B-30 - Base
- 2 1/2 B-33 - Cd

2:00 AM 63.5 source dist temp 72°F
 64.0 first success

2:10 65 cm approx 100 on period
 2:20 72°F

2:25 just critical at 64.5 cm log N = 5.0
 DC-3 = 68 x 50 x 10
 R-1 off scale
 DC-1 off scale
 DC-2 off scale

2:45 Shut down by dumping fuel.

SUMMARY OF CRITICAL CONDITIONS
 Expr. 6-3 Reflector 27" sphere
 Solution 64.5 cm Volume 176.5 Temp 72°
 Reflector none Height Term
 Time Critical 2:10 Duration 36 min Log N 5.0
 Anal. Req. 655316 gms U/gm Sp. Cr.
 Critical Mass Atomic Ratio

Signed

INSTRUMENT CHECK

Date	12-14	1954	Time	8 ³⁰ AM	Source No.	8
Instrument	Trip	Scale	Source	Distance	Start-Up	Scale
FC-1						
FC-2						
FC-3						
Log N						
R-1						
R-2						
P.M.	200V		1 1/2"			

Expt. 6-4 Time 8³⁰ AM Date 12-14 1954
 Purpose Expose Gold Foils Gave in
 Transfer of Unreflected Sphere
 Personnel:

START-UP CHECK LIST

Equipment Checked by SK Personnel Check by _____
 Instrument and Safeties Checked and Reset by DFC
 "Source In" Checked by DFC Source No. PN 58
 Emergency Equipment in Control Room Checked by _____
 Red Light On by DFC AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 195

Foils -

Centers

160 - 161 - 162 - 163 - 164 - 165 - 166 - 167 - 168 - 169
 2" 2" 2" 2 1/2 2 1/2 2 1/2 2" 2" 2 1/2

1⁰⁰am fuel 5cm temp 71 1/2 °F

& Possible slight dilution of fuel by inclusion of
 2-3 liters of missing into main volume -

1²⁵ 60cm fuel temp 73 °F

1⁴⁷ 80cm fuel temp 73.5 °F

power with source out remaining approx constant at 0.12 ^{log N}

1⁵⁰pm Some slight indication of a rise - source nuts?

or wind -

Source introduced to raise power level
 at 0.9 on log N - removed -
 power fell sharply - Sab

Shut down & drained back -

Sp. A checked by hydrometer on several bottles
 and on grab samples of drain back = 1.569-1.571
 Stopped drainback at 40cm and commenced refilling &
 check air-tightness
 Gold foils left in Reactor

Signed

Expr. 6-5 Time 8³⁰ AM Date 12-15 1954
 Purpose: Victoria Critical System
No Reflector
 Personnel: DK SWS

START-UP CHECK LIST
 Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and tested by DK
 "Source In" Checked by DK Source No. PN-58
 Emergency Equipment in Control Room Checked by DK
 Red Light On by DK
 Start-Up OK'd by DK Time 8³⁰ AM Date 12-15 1954

INSTRUMENT CHECK
 Date 12-15 1954 Time 8³⁰ AM Source No. PN 58
 Trip _____
 Instrument Value Scale Source Effects Scale Trip Scale
 DC-1 Range P _____
 DC-2 _____
 DC-3 _____
 log N _____ True
 _____ 70% of 1000
 P-M: _____ 800 V

8³⁰ AM Solution hgt 50.4 temp 69°F

9²⁷ 62.5 cm Temp 68.5°F

9⁵³ 65.3 Source Out - Sub C 68.5°F log N = 0.6

9⁵⁴ 65.6 Source Out Super C 68.5°F log N = 0.7

9⁵⁶ 69.5 Sphere full plus 1 cm period > 100 < 400
 period remaining reasonably constant between 100-200 cm
 log N from 0.8 to 2.

10⁰⁵ 65.7 cm fuel log N 5.6 just critical - Power slightly after 2 min

10⁰⁸ 65.5 cm fuel just sub critical -
 shut down - drained to 49.2 cm into dump well
 Crit conditions

173.2 litres
 Fuel 65.6 cm No Reflector Temp 68.5°F
 Sp Gr = 1.569 (hydrometer) Power = log N at 6 for 10-15 min

Expr. 6-6 Time 10⁴⁵ AM Date _____ 195____
 Purpose: Repeat of 6-5
 Personnel: DK SWS

Signed

Date

11⁰⁰ AM Began re-filling sphere - Room temp 19.5°C (Air)
thermocouple on sphere = 68.5°F

11⁴⁵ AM temp 67.5°F Fuel at 64.2 cm Sub C

11⁵⁵ Fuel 64.7 cm Same Out Sub C

11⁵⁵ Fuel 64.8 cm Same Out log N = 0.85

12⁰⁰ log N 0.9 at fuel = 64.8 cm = very slightly Super C

12⁰¹ added fuel to 65.3 slight period < 400 sec > 200 sec

12⁰⁰ log N 1.0 fuel drained to level off 64.9 cm

12¹¹ log N 1.5 -

12¹² PM System critical fuel 64.9 cm temp 67.5°F
Draining back

Expt. 6-7	Time 1 ⁴⁰ PM	Date 12-15 1954
Purpose Repeat of 6-5 6-6		
Personnel: JSC		

1⁴⁰ PM Fuel height at stand = 50.4 cm temp = 68°F

2³⁰ PM 65.3 cm Super Crit. period approx 200 sec. 68°F

2⁵⁵ PM 65.2 cm Super
65.0 cm just crit or slightly super 172.8 s
64.9

Duplicate Samples taken from Drainback -

Reg 635317	5-18	5-19 → kept in 9213
G	128.6032 gms	126.2722
T	19.8243	18.5724
	109.7789	107.6998 gms

0.31611 gm U
Sp Act 1.5638 at 26°C R

Duplicate kept back from 12-9 sample 5-5
portion placed in 5-6

5-5	G	166.6879 (loss from 12/9 = .0117 gms)
	T	95.7043
		70.9836 approx net

5-6	G	91.0402	Reg 635316	0.31696 gm U / gm
	T	20.0256		
	Net	71.0146 - for analysis		

Signed

Expt. 6-8 Time 9³⁰ AM Date 12-16 1954
 Purpose Cd fraction for fission - both
Sealed & Cleared fuel capsules in Core 27" cylinder
 Personnel: JWA DDC

INSTRUMENT CHECK

Date 12-16 1954 Time 9³⁰ AM P31 Source No. 7
 Instrument Value Units Spring Tension Start-Up Scale

DC-1	<u>responds</u>		<u>X 2</u>
DC-2	<u>responds</u>		<u>10 x 10</u>
DC-3	<u>responds</u>		<u>20 x 1</u>
Log N	<u>5"</u>		<u>5cm</u>
R-1	<u>trips</u>		<u>1000 x 100</u>
R-2			
P. M.	<u>900V</u>	<u>1"</u>	<u>500V</u>

START-UP CHECK LIST

Equipment Checked by DDC Lock by JWA
 Instrument and Detector JWA
 Source In. Checked by JWA Source No. PN 58
 Emergency Equipment Checked DDC
 Red Light On by JWA
 Start-Up OK'd by DDC Time 9³⁰ AM Date 12-16 1954

9³⁰ AM Fuel 50.5 temp 69°F Monitor Fail = A-4
10⁵⁵ Source out fuel at 63cm capsules
10⁵³ approx 101 sec period fuel at 69½ cm (full sphere) 10 2 ¼"
11⁰² temp 69½°F 3 = 2"
11^{28 ½} started exposure log N = 1.85 period from drop of log N = 1250 sec 2 = 2"
11 45 ½ leveled off at log N = 5 fuel ht = 67.9cm 11 = 2"
 Shut down at 11⁴⁸ AM 15 = 2" cd
13 = 2"
14 = 2" cd
17 = 2 ½" cd
18 = 2 ½"
6 = 2
5 = 2 ½" cd

SUMMARY OF CRITICAL CONDITIONS

Expt. 6-8 Reactor _____
 Solution UO₂ Height 67.9 Volume 17385 Temp 69½°F
 Reflector none Height _____ Temp _____
 Time Critical 10⁵⁵ AM Duration 57 min. Log N 5
 Anal. Req. 635317 gms U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

SUMMARY OF CRITICAL CONDITIONS

Signed

PIN # 1 Bag 1 63 64 65 66	Bag # 5 79 80 81 82
67 68 69 70 Bag 2	PIN # 2 Bag 6 83 84 86 87 88 89 90 91
71 72 73 74 Bag # 3	Bag # 7 92 93 94 95 96 97 98 99
75 76 77 78 Bag # 4	Bag # 8 100 101 102 103

Date

Expt. 6-9 Time AM PM Date 195
 Purpose check effect of adding fuel discs to top hemisphere
 Personnel: J.W.D. D.K.

INSTRUMENT CHECK

Date 12-17 1954 Time 9⁰⁰ AM PM Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1	<u>repeatability</u>			<u>X 2</u>
DC-2	<u>repeatability</u>			<u>X 2.0</u>
DC-3	<u>repeatability</u>			<u>X 2.0</u>
Log N	<u>repeatability</u>	<u>Scale</u>		<u>X 2.0</u>
R-1	<u>90% feedback control</u>			
R-2				
P. M.	<u>200V</u>		<u>2"</u>	

R-1, DC-2 and PM moved further back

START-UP CHECK LIST

Equipment Checked by: D.K. Personnel Check by: D.K.
 Instrument and Safeties Checked and Reset by: D.K. J.W.D.
 Source Int. Checked by: D.K. Source No. PN 58
 Emergency Equipment in Control Room Checked by: D.K.
 Red Light On by: D.K. AM
 Start-Up OK'd by: D.K. Time 9⁰⁰ AM PM Date 12-17, 1954

40 Fuel discs approx 1.8 gm each placed on top 1/3 of upper hemisphere to increase (?) reactivity to help in foil exposure. Numbers as recorded - 1 layers - 1 disc thick, evenly distributed

9⁵⁰ AM 21°C air temp (thermometer in Pan) 67 1/2 °F thermocouple on sphere

10²⁰ AM Fuel 56 cm temp sphere = 68 1/2 °F

10⁴⁵ AM Fuel 63.3 Source Out Sub C

10⁴⁷ Fuel 63.5 Source Out

10⁵⁰ Fuel 63.5 Just C

10⁵² Fuel 64.7 } log N 0.6 } 145 sec period
 log 1.0 }

11⁰⁰ AM PM tripped at 1010V log N = 5 Fuel drained to 61.3 temp 68°F

11⁰² fuel 64.2 log N = 10 PM trips at 900V

11⁰⁸ fuel 64.0 log N = 10.1

11¹¹ fuel 64.0 log N = 10.1 PM trips 890V

17218

Signed

Expt. <u>6-10</u>	Time <u>12⁵⁵</u> PM	Date <u>12-17</u> 195 <u>4</u>
Purpose <u>irradiate bare fuel capsules</u> <u>in unreflected sphere</u>		
Personnel: <u>I.W.H. Ed.</u>		

1²⁵ PM Fuel 64.0 cm Same Out 67¹/₂°F Tails - monitor = F. 4

1²⁸ PM Fuel 65.5 cm Beginning Period

1³¹ PM Fuel Exposure ended at Log N = 3.7

1³³ period = 160 sec
 Landed off at Log N = 10 Fuel = 64.5 cm

1³⁷ Very slight Rise on DC-3 Irradiated fuel = 64.3 cm

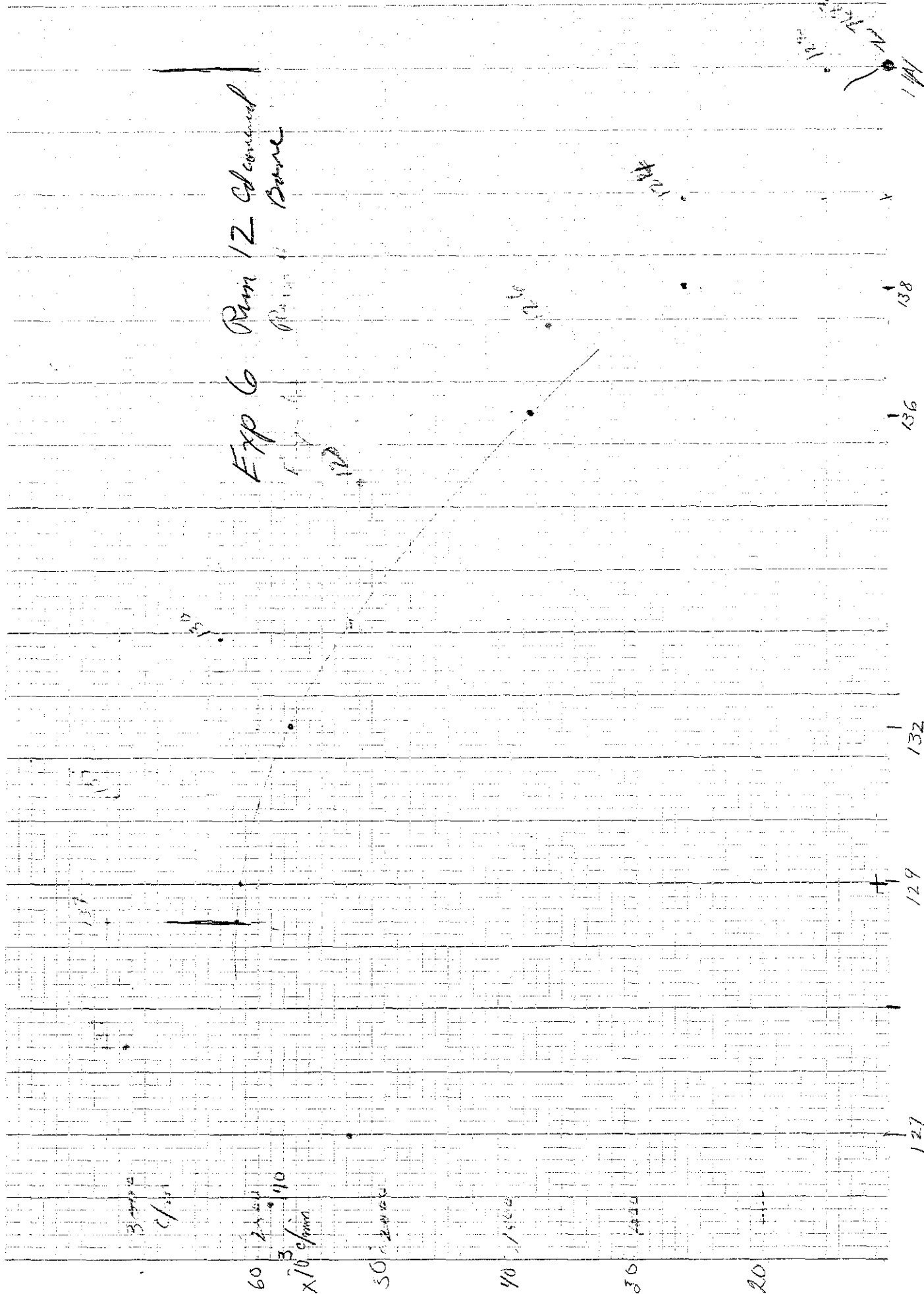
1⁵¹ PM Shut down

5 —
 9 —
 10 —
 11 — 2/2
 13 — 2/2
 15 —
 17 — center
 18 —
 19 — 2/2
 9
 3 —

↓
 top of
 chain

SUMMARY OF CRITICAL CONDITIONS			
Expt. <u>6-10</u>	Reactor <u>Bare 27" Sphere</u>		
Solution <u>UO₂F₂</u>	Height <u>64.3</u>	Volume <u>17.3</u>	Temp <u>67¹/₂°F</u>
Reflector <u>none</u>	Height	Temp	
Time Critical <u>1²⁸</u>	PM	Duration <u>23</u>	min. Log N <u>10</u>
Anal. Req. <u>635317</u>	gms U/gm	Sp. Gr.	
Critical Mass	Atomic Ratio		

Signed



141
138
136
132
129
127

Date

Expt. 6-11 Time 9⁰⁰ AM PM Date 12-20 1954
 Purpose All traces of above 2.7" sphere
 Personnel: JWB DSC

INSTRUMENT CHECK

Date 12-20 1954 Time 9⁰⁰ AM PM Source No. 8

Instrument	Trip Value	Scale	Source Distance	Start-Up Scale
DC-1	<u>5000</u>			<u>x 10</u>
DC-2	<u>5000</u>			<u>x 20</u>
DC-3	<u>5000</u>			
Log N	<u>trips on set</u>			<u>5 sec</u>
R-1	<u>7 x 1000</u>		<u>3"</u>	<u>x 200</u>
R-2				
P. M.	<u>500</u>		<u>1"</u>	<u>5000</u>

START-UP CHECK LIST

Equipment Checked by DSC Personnel Check by DSC
 Instrument and Safeties Checked and Reset by DSC CC
 "Source in" Checked by DSC Source No. PN 58
 Emergency Equipment in Control Room Checked by DSC
 Red Light On by DSC
 Start-Up OK'd by DSC Time 9¹⁵ AM PM Date 12-20 1954

Began feeding solution 9²⁵ AM

Foils distribution F-4

to 4mm # bottom of sphere w/

75	120	2"		10.470
253	122	2"		"
811	120	2"	1/2"	4
1356	126	2 1/2"	1/2"	"
2107	128	2 1/2"	-1	10.472
2649	130	2 1/2"	1/2"	10.473
3063	135	2"		"
3094	137		center	"
3034	139	2"		10.474
2447	140	2 1/2"	1/2" use as alt. monitor	10.474

1¹⁵ pm Foils in soln = 50cm temp = 69°F

F-4 mass = 13,144g/pc

1⁵⁰ pm 63.5cm Source out just cont - 70°F

2⁰² pm 65.2 108 sec period

2⁰⁵ ~~65.5~~ cm started timing apparatus

2⁰⁷ 64.3cm level at 10 on log N
 shutdown 2¹⁵ pm

SUMMARY OF CRITICAL CONDITIONS

Expt. 6-11 Reseter _____
 Solution _____ Height 64.3 Volume 172.3 Temp _____
 Reflector none Height _____ Temp _____
 Time Critical 1.58 min. Log N 10
 Anal. Req. 635317 gms U/gm _____ Ep. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

Monitor Foil F-1

Expr. <u>6-12</u>	Time <u>3:30 PM</u>	Date <u>12-20 1964</u>
Purpose <u>cd covered A- Foil (unref)</u>		
Personnel: <u>PA. ERR</u>		

Foil distribution

cm	top	width
76.83	141 base	.0474
	4 1/2"	
	↓	
26.173	138 center	.0475
38.704	12.6 2"	.0473
57.490	12.2 5"	.0473
61.201	12.9 2 1/2"	.0472
52.292	12.7 4"	.0472

3:25 PM Fuel 51-3 Temp 70°F

consolidated
dispersed
129 markers →

3:30 PM stopped to move DC-3 further away
now reads 28 on 1x20
after moving reads 22

4:08 64.3cm. 70°F

4:05 65.7cm 75-100 sec period
4:12 Period measured per log N from 2 to 5.86 = 150 sec

4:17 PM trips at 930V log N = 10

4:21 log N = 37.7 started timing. 65.7cm 70°F

4:29 100 log N PM trips at 620V fuel at 65.0

Radiation = 5R/hr at door to 201
in 202 = 3 cm/hr
windows contact = 6x reading contact wall 202

4:43 Shut down

SUMMARY OF CRITICAL CONDITIONS					
Expr.	<u>6-12</u>	Reactor	<u>27" Sphere</u>		
Solution	<u>UO₂F₂</u>	Height	<u>65.5cm</u>	Volume	<u>173.1</u>
		Temp	<u>70°F</u>		
Reflector	<u>none</u>	Height		Temp	
Time Critical	<u>4:05 - 4:43</u>	Duration	<u>37</u>	min.	Log N <u>100</u>
Anal. Req.	<u>635317</u>	Sp. Gr.			
Critical Mass		Atomic Ratio			

Signed

Expt. 6-13 Time 9⁰⁰ AM
 Purpose radiation of control fuel exposure
 Personnel: JWA, etc

INSTRUMENT CHECK

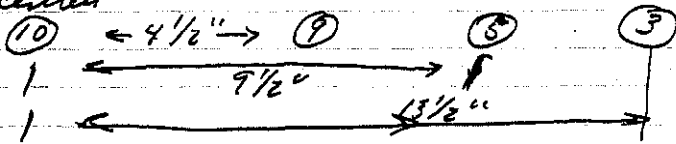
Date 12-21 1954 Time 9⁰⁰ AM Source No. 8

Instrument	Trip Value	Scale	Source Distance	Start-Up Scale
DC-1		<u>Regrads</u>		
DC-2		<u>"</u>		
DC-3		<u>"</u>		
Log N		<u>set at 5 cm</u>		
R-1		<u>set at full scale</u>		
R-2				
P. M.		<u>750 V</u>		

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Reset by DK
 "Source In" Checked by DK Source No. PN58
 Emergency Equipment in Control Room Checked by DK
 Red Light On by DK
 Start-Up OK'd by DK Time 9¹⁵ AM Date 12-21 1954

Monitor Fail 7-4
 Fail (exposed distrob)
 center



10³⁰ AM Fuel = steam temp 67 1/2° F

10⁴¹ Fuel 55.2 cm

11 ⁴²	64.0	Source Out	Sub	} 67 1/2° F
11 ⁴³	64.3	Source Out	level	
11 ⁴⁴	64.5	Source Out	Super C	
11 ⁴⁶	66.3	on period	120 sec measured on log N from 0.5 to 1.35	} on their highest scales (least sensitive scale)
	DC-1	off scale	approx 2 on log N	
	DC-2	off scale	" 4 on log N	
	R-1	off scale	" 5 on log N	
	DC-3	off scale	" 1 1/2 on log N	

11⁵⁷ Started exposure 36.8 on log N going to 100

12⁰¹ ended off 65.2 172.95 F

Radiation at door to 201 = 5 R/hr } June Serial # 176
 at wall next to door of 201 = 2 R/hr }
 In Room 202 window control pane 10 mR/hr 2010 Guard Shield 7 mm
 wall " " 4 mR/hr " All Guard Shield 4 mm
 Transit door 1.3 R

12:17 + 4 sec Shut down time.

Results of Spec Analysis.

mtl.	11/25/54	12/9	12/15/54
Aq	135	60	26
Al	16	21	18
B	<1.0	<1.	<1.0
Ba	<10	<10	<10
Ca	<50	<50	<50
Cu	<6	<6	<6
Cu	5	<2	<2
Fe	180	150	135
K	<50	<50	<50
Mg	7	6	7
Mn	<5	<5	<5
Mo	<200	<200	<200
Na	15	<10	<10
Ni	<25	<25	25
P	<100	<100	<100
Pb	33	22	20
Si	<10	16	12
Sn	<10	<10	<10
Zn	<40	<40	<40

Summary of clean experiments (no foils)

Exp	Volume	Mass U	Mass U ₂₃₅	Reflected	H:U
1	145.0 Liters	71.487Kg		Reflected	49.62
1-A	"	"		Unreflected	
2	173.6	85.588		Unreflected	49.24
6-5	173.0	85.876		"	
6-6	172.8	85.420		"	49.43
6-7	172.8	"		"	

238.95706
234 = .02

Reg 635318 = 4.92%

Assay Components 635313 thru 635317 on Reg 635316 = 5.00% U-235 ^{theoretically}
limit of error = 2%

4.9
5.7

Estimate sphere critical full water reflected at an H/H of 1090 based on orig assay of 4.889% - dilute to H:U₂₃₅ of 1050.

Now { 1 Liter of solution ^{weigh} = 1.5638 Kg contains ~~494.33~~ ^{1.5638} grams U = 639.712 gm U₂₃₅
924.1 gm H₂O
H/H = 1018. { 1 Kg solution = 316.11 gm U = $\frac{489.08 \text{ gm U}_{235}}{590.92 \text{ gm H}_2\text{O}}$

Mass analysis showed to 0.30907 gm U/gm sol.
So add 22.778 cc H₂O per Kg of solution

Fuel returned to Room 101 and a composite duplicated sample taken
 10ml from each container for U, Sp. Gr. & Assay
 Sent to lab # 5-18 G = 150.1587

Req. 655318 7 20.0538

by phone on 4/20/55 - 0.316020 - Sp. Gr. 1.5752 at 25°C 150.1029 gms = 41.41 gms U

Held back # 5-19A G = 150.7866

4:40 pm Fuel left at 27 cm in Sphere
 20
 150.7866 gms

Inst. respond to source - source in = 200 sec on period meter
 " out - 100 sec " " "

INSTRUMENT CHECK

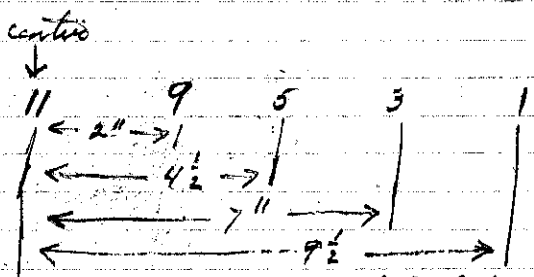
Date	1-7	1955	Time	8 ¹⁰	AM	Source No.	8
Instrument	Value	Scale	Source	Distance	Start-Up	Scale	
DC-1	none	responds			X2		
DC-2	none						
DC-3	98%	1X100					
Log N	5 sec						
R-1	20%	1000 X 1000	against	chamber			
R-2							
P.-M.		710 V.	1 inch				

Expt.	6-14	Time	8 ¹⁰ AM	Date	1-7-1955
Purpose	Bone fuel capsule experiment in unshielded 27" sphere with no U chips on top				
Personnel:	JTC JAD				

START-UP CHECK LIST

Equipment Checked by	JTC	Personnel Check by	JTC
Instrument and Safeties Checked and Reset by	ERR		
"Source In" Checked by	JTC	Source No.	PN-15
Emergency Equipment in Control Room Checked by	JTC		
Red Light On by	ERR		
Start-Up OK'd by	JTC	Time	9 ³⁵ AM
		PM Date	1-7-1955

Foil positioning



Monitor foils 7, 1 & F4 placed equidistant from center.

- 12:23 PM just critical Fuel @ 263.9 cm.
- 12:27 " ~ 100 sec period " " 64.7 "
- 12:37 " 895 min of exposure. Fuel @ 63.75 Power level Log N = 10.5
- 12:49 shift down.

Air borne activity monitored at a point directly over sphere during & after run.

SUMMARY OF CRITICAL CONDITIONS			
Expt.	6-14	Reactor	27" sphere
Solution	63.8	Height	Volume 171.9 Temp 65F
Reflector	none	Height	Temp
Time Critical	12 ³³ PM	Duration	26 min. Log N 10
Anal. Req.	635318	gms U/gm	0.31602 Sp. Gr. 1.5752
Critical Mass		Atomic Ratio	H:U = 4848 N:U = 1005
Signed			

Assay = 4.92%
 N:U = 1005

Expt. <u>6-15</u>	Time <u>2:50 AM</u>	PM Date <u>1-7</u>	195 <u>5</u>
Purpose <u>Determine power level and</u> <u>make radiation survey</u>			
Personnel: <u>J.T.T., B.H.</u>			

START-UP CHECK LIST	
Equipment Checked by <u>J.T.T.</u>	Personnel Check by <u>J.T.T.</u>
Instrument and Safeties Checked and Reset by <u>J.T.T.</u>	
"Source In" Checked by <u>J.T.T.</u>	Source No. <u>-</u>
Emergency Equipment in Control Room Checked by <u>J.T.T.</u>	
Red Light On by <u>F.C.</u>	
Start-Up OK'd by <u>F.C.</u>	Time <u>2:55 AM</u>
	PM Date <u>1-7</u>
	195 <u>5</u>

Foil positions.

Au. foil \uparrow center of reactor
3"
J238 \downarrow

- 3⁰⁵pm 57 cm fuel Thermocouple in sphere reads: 68°F (solution temp)
Exhaust fan off -
Monitoring airborne activity in Hall corridor between Roms 204-205
Counting backgrounds on Inst in Rom 215
- 3²⁰ Just Critical 64.2 cm temp 71°F
on period 65.5 cm temp 71½°F
120 sec run w/ N chand + stop watch temp 72°F
- 3³⁰pm 73°F temp
- 3⁵⁰pm shut down.
- ~ 4¹² Exhaust fan turned on in R. 201
- 5⁰⁰pm Radiation Survey made of extension of Rom 101 and since none greater than 5-10 mc/hr green light turned on.

1/8/55 Survey - Outside Trunk doors 0.5 mc/hr
" Door to 201 0.5 mc/hr
Inside 202
at wall 0.03 mc/hr
at window 0.05 mc/hr.

Signed

Setup for fuel capsule calibration

INSTRUMENT CHECK

Instrument	Value	Scale	Source	Distance	Start-Up Scale
DC-1					
DC-2					
DC-3	84	x100			x5
Log N	5.00				
R-1	100%				
R-2					
V.M.					920V

all leads depend to maintain source position

Expr. 7-1 Time 11¹⁵ AM Date 1-14 1955
 Purpose Calibration of fuel capsules
 Personnel: DK, JT

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Reset by DK
 "Source In" Checked by DK Source No. PN-15
 Emergency Equipment in Control Room Checked by DK
 Red Light On by DK
 Start-Up OK'd by DK Time 11¹⁵ AM Date 1-14 1955

- Thermocouple in sphere $72\frac{1}{2}^{\circ}F$
- 11¹⁵ began adding fuel to 50.4 cm for calibration.
- 12⁰² foils mounted on lower support base - 2" spacing - contact with sphere
Monitor foils 7-1 + 7-4
- 12⁰⁵ Began feeding water - fuel at 49.5 cm temp $72.6^{\circ}F$
- 12³⁰ Critical 50.0 cm with water reflector. temp $75^{\circ}F$
Shift to change head on air sample
- 2⁵⁰ Critical Aquin - start 100 sec period.
- 12⁵⁸ PM log 3.25 Photomultiplier's tripped running off.
- 2¹⁴ PM Fuel temp risen to water temp $79^{\circ}F$ Fuel = 49 cm
- 2²⁰ Critical approx 49.5 cm temp $79\frac{1}{2}^{\circ}F$
- 2²² Started timing Exp from 1.85 on log N
- 2²⁰ log N = 5 PM trip at 840V set at 720V
- 2⁴⁹ Shut down -
- 2⁵³ Into Room removed capsules - wore Chemox mask -
- 3⁰⁵ Exhaust fan turned on after airborne activity built up.

SUMMARY OF CRITICAL CONDITIONS

Expr. 7-1 Reactor 27" Reflected Sphere
 Solution 50.0 cm H₂O Volume 44 Temp 79⁰F
 Reflector H₂O Height 110 cm Temp 80⁰F
 Time Critical 2²⁰ PM Duration 30 min. Log N 5
 Anal. Req. 318 gms U / gm 0.31602 sp. Gr. 1.5752
 Critical Mass _____ Atomic Ratio _____

Signed

Exp. 8-1 Time 9²⁰ AM Date 1-19 1955
 Purpose Re-Run of Home fuel capsules
in un-reflected sphere - with stiff rod
as positions
 Personnel: JAC

INSTRUMENT CHECK

Date 1-19 1955 Time 9²⁰ AM Source No. 8

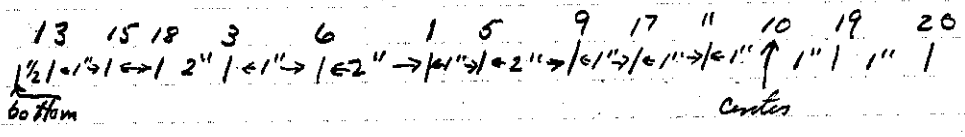
Instrument	Trip	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>at wall near cell</u>			
DC-3	<u>in Sid</u>	<u>89</u>	<u>x100</u>	
Log N	<u>in cell</u>	<u>5cm</u>	<u>5cm</u>	
R-1	<u>near cell</u>	<u>x100</u>	<u>1"</u>	
R-2				
P. M.	<u>690</u>	<u>-</u>	<u>1"</u>	

START-UP CHECK LIST

Equipment Checked by JAC Personnel Check by _____
 Instrument and Safeties Checked and Ready by _____
 "Source In" Checked by JAC Source No. PM-15
 Emergency Equipment in Control Room Checked by JAC
 Red Light On by JAC AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1955

Fail Positions

Monitor Fail 7-4



- 11³⁰ AM fails placed in Reactor Fuel at 54.6cm temp 75°F (detected thermocouple)
- 12¹⁰ PM Critical log N = 0.2 64.5cm 75 1/2 °F
- 12²⁰ PM log N at 10 75 1/2 °F 64.5cm
Radiation at door (constant) of 201 = 50 MR/Hr
- 12³⁸ PM Shut down

SUMMARY OF CRITICAL CONDITIONS

Exp. 8-1 Reactor 27" Sphere
 Solution 64.5 Height _____ Volume _____ Temp _____
 Reflector none Height _____ Temp _____
 Time Critical 12¹⁰ PM Duration 28 min. Log N 10
 Anal. Req. 658318 gms U/gm 0.31602 Sp. Gr. 1.5752
 Critical Mass _____ Atomic Ratio _____

Signed

INSTRUMENT CHECK

AM Source No. 8 PM Source No. 9 Time 9:55 Date 1-24 1955

Instrument	Scale	Source Distance	Start-Up Scale
DC-1	90%	900	90%
DC-2	50%	500	50%
DC-3	50%	500	50%
DC-4	50%	500	50%
DC-5	50%	500	50%
DC-6	50%	500	50%
DC-7	50%	500	50%
DC-8	50%	500	50%
DC-9	50%	500	50%
DC-10	50%	500	50%

Expr. 9-1 Time 9¹⁰ AM Date 1-24 1955

Purpose Check bore critical height and find AK as function of OH

Personnel: DK PN JK

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK CC

Instrument and Safeties Checked and Ready by DK CC

Source In Checked by DK Source No. PN-15

Emergency Equipment in Control Room Checked by DK

Red Light On by DK 10 AM

Start-Up OK'd by DK Time 9 PM Date 1-24 1955

From 202 201
 Fuel HT at stand: 43.5cm 43.6

46.5 46.5 temp 76°F
 55.2 55.0

12⁴⁰ PM 63.8cm Source Crit Sub Crit.

12⁴² PM 63.9cm Source Crit Temp 75½°F

12⁴⁶ PM 63.9cm Just Crit - (Straight line on all charts)

12⁵² 64.3cm Period 240sec Temp 76°F

12⁵² 63.0 log N = 0.7 to log N = 0.2 = 3 min 30.6 sec

1¹⁵ 65.0 log N = 2 to log N = 5 = 1 min 24 sec
 period meter comp 80 sec
 Stop watch = 1.55 min

1²⁰ PM ~~65.0~~ 62.8 log N = 5 to log 0.4 = 6 min 18.8 sec

2²⁰ PM 63.5cm Critical temp 75°F
 Room temp 65°F had dropped because of turning on wall fan.

63.9cm log N = 0.6 to log N = 0 2 min 7.2 sec 74.8°F

3⁵² Plus lead at log N = 1
 fuel hgt = 63.8cm.

4⁰⁰ Shut down - Room temp set at 82°F to warm sol'n.

63.9cm = 171.9 L = 85.569 Kg U at 74.8°F

Signed

INSTRUMENT CHECK

Date 1-25 1955 Time 10³⁰ AM - PM Source No. none

Trip _____

Instrument	Value	Scale	Source-Distance	Start-Up Scale
DC-1				
DC-2				
DC-3				
Log N				
R-1				
R-2				
P. M.				

Response to Source Motion

Expr. 9-2 Time 10³⁰ AM - PM Date 1-25

Purpose Critical at higher solution change

Personnel: _____

START-UP CHECK LIST

Equipment Checked by DJC Personnel Check by PTC

Instrument and Safeties Checked and Approved by PTC

"Source In" Checked by DJC "Source Out" Checked by PTC

Emergency Equipment in Control Room Checked by PTC

Red Light On by DJC

Start-Up OK'd by DJC Time 10⁵⁰ AM - PM Date 1-25 1955

Sol'n Aqf 58cm Temp 81°F at 10³⁰ AM Room temp 82°F

- 11³⁹ 64.6 cm 81°F just barely sub.
- 11⁴⁴ 64.7 cm 81°F Super
- 11⁴⁹ 68.2 81°F log N = 1 to log N = 10 2 min 12 sec
Adding to seventy (70.0cm) did not increase period
- 11⁵⁶ 61.2 log N = 2 to log N = 0.2 3 min 43 sec.

SUMMARY OF CRITICAL CONDITIONS

Expr. 9-2 Reactor 27 1/2" sphere

Solution UO₂F₂ Height 68.2 Volume _____ Temp 81°F

Reflector none Height _____ Temp _____

Time Critical 11³⁹ Duration 20 log N 20

Anal. Ref. 635318 gms U / gm 0.31602

Critical Mass _____ Atomic Ratio _____

All material withdrawn from sphere and diluted.

On basis of analysis Rg 655318 (0.31602 gm U/gm) and orig assay
 added 22.7 cc H₂O/kg solution = 1/4 of 1050

2^{pm} Filling sphere with diluted material Hgt now 30 cm

Enter

25.

G 41.96
 T 2.73
 N 39.23 added 890.5 cc

26 G 36.700
 2.50
 28.20 added 642 cc

27

G 40.825
 T 2.127
 38.698 added 881.2 cc

29 G 39.900
 2.556
 37.344 added 850.3

30

G = 39.950
 2.769
 37.181 added 846.58

32 G 29.66
 2.90
 26.76 added 609.3

35

40.880
 2.629
 38.251 added 866.5 cc

36 G = 34.250
 2.797
 31.453 added 716.1 cc

Fuel 39.23
 38.70
 37.18
 38.17
 28.20
 37.34
 26.76
 31.45
 10.55
 287.51 kg sol.
 9.08 kg U
 28.75
 175 kg O₂, F₂
 11.25 kg H₂O
 6.5
 119.0 kg H₂O

Remainder of sol'n = 13.32
 2.77
 10.55

Water
 890
 881
 847
 867
 642
 850
 609
 716
 4227
 6529 litres

Date

INSTRUMENT CHECK

Date 1-31 1955 Time 4⁰⁰ PM Source No. 5
 Instrument _____ Value _____ Scale _____ Source Distance _____ Start-Up Scale _____
 DC-3: 92 x 100 100
 R-1: 5cm 5cm
 R-2: 90% of 100 100 x 100
 P. M.: 230V 750V

Expr. 10 Time 4⁰⁰ AM PM Date 1-31 1955
 Purpose Water Reflected Sphere just after deletion
 Personnel: _____

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK
 Instrument DK
 "Source In" DK Source No. PN-15
 Emergency Equip. DK
 Red Light On by DK
 Start-Up OK'd by DK Date 1-31 1955

4⁰⁰ PM - no water. Solution lit 57.5. Ambient Reflector temp 23°C
 4²⁵ PM Water added to 53 cm on seal - activity increasing
 Shut down until A.M.

INSTRUMENT CHECK

Date 2-1 1955 Time 8¹⁵ AM PM Source No. PN15
 Trip _____
 Instrument Value Scale Source Distance Start-Up Scale
 DC-1 } all respond to some movement
 DC-2 }
 DC-3 }
 Log N }
 R-1 }
 R-2 }
 P. M. }

Expr. 10 (fuel) Time 8¹⁵ AM PM Date 2-1 1955
 Purpose continuation of #10
 Personnel: _____

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Reset by DK
 "Source In" Checked by DK Source No. PN15
 Emergency Equipment in Control Room Checked by DK
 Red Light On by DK
 Start-Up OK'd by DK Time 8¹⁵ AM PM Date 2-1 1955

3²⁰ AM temp at start reads 73°F in sphere room = 15°F set up to 78°F
 Solution lit = 58 cm
 Water scale set so 68.1 = top of sphere
 9⁰⁵ Fuel 52.5 cm Water 88 cm temp fuel = 74°F
 Slightly Super C

9¹⁸ AM Re-read SG. in Pm 201 = 52.3 cm just critical

SUMMARY OF CRITICAL CONDITIONS

Expr. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM PM Duration _____ min. Log N _____
 Anal. Req. _____ gms-U/gm _____ Sp. Gr. _____
 Critical Mass _____ Signed _____ Atomic Ratio _____

Expt. <u>11</u>	Time <u>9⁰⁰ AM</u>	Date <u>12-1</u>	195 <u>5</u>
Purpose <u>Filling Sphere no reflector</u>			
<u>using diluted solution</u>			
Personnel: <u>BK FWH</u>			

9⁰⁰ AM Full Ht 52.3 cm Temp 76°F No reflector

10⁰³ AM Full Sphere 68.1 cm Temp 77°F No Reflector - Not Critical

Re diluted:

# 25	31.41		# 32	30.75	
	<u>2.732</u>			<u>2.90</u>	
	28.678	321.4 cc		27.85	312.5
# 26	31.10		# 35	31.41	
	<u>2.50</u>			<u>2.63</u>	
	28.60	320.3		28.78	322.6
# 27	32.00		# 36	31.10	
	<u>2.13</u>			<u>2.80</u>	
	29.87	320.88		28.30	316.96
# 29	31.30		Remainder	7.55	
	<u>2.586</u>			<u>2.13</u>	
	28.714	321.44		5.42	= 60.54
30	31.57				
	<u>2.77</u>				
	28.80	322.6			

11.2 cc/kg

SUMMARY OF CRITICAL CONDITIONS			
Expt. _____	Reactor _____		
Solution _____	Height _____	Volume _____	Temp _____
Reflector _____	Height _____	Temp _____	
Time Critical _____	AM _____	PM _____	Duration _____ min. Log-N _____
Anal. Req. _____	gms U/gm _____	Sp. Gr. _____	
Critical Mass _____	Atomic Ratio _____		

Signed

Date 2-2-54

Began filling 8⁰⁰ AM

Hot on pumps looked 8³⁰ AM

Resumed filling 10³⁰ AM

12⁵⁰ PM 40 cm 77°F

2¹⁵ 50.1 cm adding water

INSTRUMENT CHECK					
Date	2-2	1955	Time	8 ¹⁰	AM
				PM	Source No. X
Instrument	Trip	Value	Scale	Source Distance	Start-Up Scale
DC-1					
DC-2					
DC-3		90%	100		
Log N		5.2			X 10
R-1					5.2
R-2					
P. M.		90V		3"	250V

Expr. 12 Time 2⁰¹ AM PM Date 2-2 1955
 Purpose Reflected Critical
 Personnel: DK JCB

START-UP CHECK LIST
 Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Reset by DK
 "Source In" Checked by DK Source No. PH15
 Emergency Equipment in Control Room Checked by DK
 Red Light On by DK Time 2⁰¹ AM
 Start-Up OK'd by DK Time 2 PM Date 22 1955

2⁴⁰ PM 53.3 cm 87 cm water Reflector - began crit - in 40 min period. temp 81°F
53.2 cm " " " " 5.2 " Just Crit.

2⁵⁰ Drained water - blue back 56. + re-read = 53.4 cm.

Further dilutions

#25 41.41
 2.73
 38.68 [1825.7]

#30 39.41
 2.768
 36.642 [1779.5]
~~2.768~~

added 47.2 cc/kg sol.

#26 38.88
 2.50
 36.36 [1771.6]

#36 40.475
 2.797
 37.678 [1778.5]

29 39.9
 2.56
 37.34 [1762.58]

#77 39.62
 2.13
 36.49 [1722.3]

32 38.73
 2.9
 36.83 [1738]

Remainder 18.125
 2.875
 15.250 [720]

Signed

INSTRUMENT CHECK				
Date	2-10	1955	Time	12 ³⁰ PM
			Source No.	8
Instrument	Trip	Value	Scale	Start-Up Scale
DC-1				
DC-2				
DC-3	90	100		X 10
Log N	5			5
R-1	6	X 1000 X 1000		30 X 100
R-2				
P. M.	980V	3"		750

Expr. 13 Time 12³⁰ AM Date 2-10 1955
 Purpose Obtain Reflected Critical
 Personnel: _____

START-UP CHECK LIST
 Equipment Checked by DTC Checked by _____
 Instrument and Safeties Checked by DTC
 "Source In" Checked by DTC PN-15
 Emergency Equipment Checked by DTC
 Red Light On by DTC
 Start-Up OK'd by DTC Time 2⁰⁵ PM Date 2-10 1955

2⁰⁵ PM Fuel 54.5 water at 95cm temp = 79.5°F
 Fuel 78.0 water at 95cm temp = 82°F Subcritical

2⁵⁵ PM Fuel 83.5cm water at 95cm temp = 85°F
 2min Counts

	1	2	3	Fuel	
257	2+12	346+38	2+2	83.5cm	} log N = .025
259	1+17	260+23	1+37		
304	0+45	263+35	1+56		
	2+6	255+21	2+1		
	1+63	264+19	1+55		

3 ¹⁴	1+30	93+45	0+41	60cm	} log N = .0098 temp 84°
	0+48	86+31	0+30		

3 ²⁸	0+37	47+7	0+26	} log N = .0048
	0+38	45+58	0+23	

3³⁸ water Reflector temp 87° Fuel temp 85.5°

3 ⁴⁶ PM	0+58	36+38	0+15	49.5cm	} log N = .0056 BKpd.
	0+57	36+38	0+21		

Signed _____

INSTRUMENT CHECK

Date 2-11 1955 Time 8³⁰ AM
 Trip _____ Source No. 11-15
 Instrument Value Scale Source Distance Start-Up Scale
 DC-1 _____
 DC-2 _____
 DC-3 _____
 Log N _____
 R-1 _____
 R-2 _____
 P. M. _____

Repaired to source

Expt. 13-1 Time 8³⁰ AM
 Purpose Repeat of 13 at lower temp
 Date 2-11 1955
 Personnel: _____

START-UP CHECK LIST

Equipment Checked by DJK Personnel Check by DJK
 Instrument and Safeties Checked and Initial'd by DJK
 "Source In" Checked by DJK Source No. 11-15
 Emergency Equipment in Control Room Checked by DJK
 Red Light On by DJK
 Start-Up OK'd by DJK Time 8³⁰ AM
 Date 2-11 1955

Time	Fuel Temp	Water Temp	1	2	3	Log N	
<u>8³⁰ AM</u>	<u>49.5 °F</u>	<u>78.7 cm</u>	<u>71.5 °F</u>	<u>0+24</u>	<u>63+36</u>	<u>0+18</u>	<u>10032</u>
				<u>0+24</u>	<u>56+41</u>	<u>+23</u>	
<u>8⁵⁰</u>	<u>53.7 72.5 °F</u>	<u>77.6</u>	<u>71.5 °F</u>	<u>0+50</u>	<u>72+41</u>	<u>0+27</u>	<u>10044</u>
<u>9²⁰</u>	<u>60 cm 72 °F</u>	<u>81.5 cm</u>	<u>71 °F</u>	<u>1+3</u>	<u>151+35</u>	<u>1+1</u>	<u>10095</u>
<u>9³⁵</u>	<u>81 cm 71 °</u>	<u>90 cm</u>	<u>71 °</u>	<u>1+39</u>	<u>4360</u>	<u>1+47</u>	<u>1028</u>

Sub Critical

SUMMARY OF CRITICAL CONDITIONS

Expt. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM _____ Duration _____ min. Log N _____
 Anal. Req. _____ gms U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

Expr. 14-1 Time 2³⁰ AM
 PM Date 2-15 1955
 Purpose Reflected sphere with concentrated solution
 Personnel: _____

START-UP CHECK LIST
 Equipment Checked by DLK Personnel Check by DLK
 Instrument and Safety Control and _____
 "Source In" Checked by DLK _____
 Emergency Equipment in Control Room checked by DLK
 Red Light On by DLK
 Start-Up OK'd by DLK Time 2³⁰ AM
 PM Date 2-15

INSTRUMENT CHECK
 Date 2-15 1955 Time 1³⁰ AM
 PM Source No. Y
 Instrument Value Scale Source Distance
 DCI _____
 T-1 _____
 T-2 _____
 T-3 _____
 T-4 _____
 T-5 _____
 P. M. _____
Required

Water temp 85°F } at start of exp.
 Fuel temp 85°F

3⁵⁵ PM water at 88 cm Fuel 55.8 cm Source dist Very slightly
86°F 83.5°F Sugar Critical 7400 cm

SUMMARY OF CRITICAL CONDITIONS
 Expr. _____ Reflector _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM _____ PM Duration _____ Log N _____
 Anal. Req. _____ gms U / gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

START-UP CHECK LIST

Equipment Checked by JHC Personnel Check by JHC
 Instrument and Safety Checked and Tested by JHC
 "Source In" Checked by JHC Source No. PN 15
 Emergency Equipment in Control Room Checked by JHC
 Red Light On by JHC
 Start-Up OK'd by JHC Time 11:30 AM Date 2-16-1965

INSTRUMENT CHECK

Date 2-16-1965 Time 11:30 AM Source No. 8
 Instrument Value Status Distance Start-Up Scale
 DC-1 _____
 DC-2 _____
 DC-3 _____
 Log N _____
 R-1 _____
 R-2 _____
 P. M. _____

Request to Source x10
5 sec
 x100
5 sec
 750V

Expr. 14-2 Time _____ AM _____ PM Date _____ 195 _____

Purpose Re Run at higher temp

Personnel: JHC JWS

Room temp over night set at 70°F Air temp in tank 95°F } at $11:20$
 Sal temp 88°F }

Sal height at stand 56.7 cm

$11:50$ AM Water 69.1 cm 85°F Sal. 56.7 cm temp 88°F

$11:58$ AM water 90 cm Sal 56.7 cm Sub Critical.

Just Critical at 56.8 cm Water at 90 cm 16.1 f
 88°F 85°F

All sal'n drained & mixed in outside container

(bottle (?) filled $1/2$ full each & then finish filling each.)

Expr. 14-3 Time 5:30 AM _____ PM Date 2-16 195 2

Purpose Request 14-2 after more

stripping

Personnel: JHC JWS

Water temp 83.5° - 91 cm
 Sol temp 83.5° - 50 cm

$5:55$ 56.7 cm fuel Water 91 cm (slight period source out)
 temp fuel 83°
 temp refl 83°

Critical Height = 56.3 cm (read in Pen 201 after draining water)

Signed

Sample taken (Composited from each of several containers)

Req 655319 [5-11] 111.7982 Analysis by phone 2-21-55 0.30572 gm U/gm
 19.2680 1.537 mg H₂ at 26°C
 92.5302 gms.

Solution withdrawn from spheres:

# 26	41.160		# 30	41.060	40.365
	<u>2.505</u>			<u>2.769</u>	<u>2.875</u>
	38.655 Kg	102.23cc		38.291 Kg	37.490 Kg 99.146cc
					101.26cc

# 27	41.580		# 32	41.200	
	<u>2.127</u>			<u>2.900</u>	
	39.453 Kg	104.30		38.300 Kg	101.29cc

# 29	40.600		# 36	40.285	
	<u>2.556</u>			<u>2.798</u>	
	38.044 Kg	100.61		37.487 Kg	99.138cc

$$\text{Total Kg} = 267.710 \text{ Kg} \times .30572 = 81.8443 \text{ Kg H}$$

$$\frac{\text{H}}{\text{U}} = 52.28 = 1069.3 \text{ H/U}$$

Plotting H_c vs H/U on curve indicates asymptote (same at 53)

so to get to H/U 52.5 from 52.28 = 2.65cc/Kg cal.

Date

Expr. 15 Time 1⁰⁰ AM PM Date 2-21 1955
 Purpose Critical reflected after dilution
 Personnel: JH FWA

INSTRUMENT CHECK

Date 2-21 1955 Time 1⁰⁰ AM PM Source No. 8

Instrument	Trip Value	Scale	Source Distance	Start-Up Scale
DC-1	—	—	—	—
DC-2	—	—	—	—
DC-3	—	—	—	—
Log N	—	—	—	—
R-1	<u>90%</u>	<u>X100 X1000</u>	<u>critical</u>	<u>X25 X100</u>
R-2	—	—	—	—
P. M.	<u>6"</u>	<u>1100V</u>	<u>6"</u>	<u>680V</u>

START-UP CHECK LIST

Equipment Checked by JH Personnel Check by JH
 Instrument and Safeties Checked and Reset by JH CC
 "Source In" Checked by JH Source No. PH-15
 Emergency Equipment in Control Room Checked by JH
 Red Light On by JH
 Start-Up OK'd by JH Time 1³⁰ AM PM Date 2-21 1955

No is available for chemsample at 2¹⁵ PM - Water Hgt 89cm

300 PM - water = 83°F Fuel 89.5cm 81½°F
83°F Fuel 56cm 81°F

3³⁵ PM Critical at 56.5cm fuel 88cm H₂O Fuel 81°F water 83°F

2/22/55 - Plotting Height Crit vs H.U curve appears exponential with asymptote between 53 + 54
to dilute to #/u = 53 = 5.77cc H₂O/kg sol.

Expr. 16 Time 4³⁰ AM PM Date 2-22 1955
 Purpose Check Critical conditions after dilution Estimated #/u = 52.99
 Personnel: JH FWA

INSTRUMENT CHECK

Date 2-22 1955 Time 4³⁰ AM PM Source No. _____

Instrument	Trip Value	Scale	Source Distance	Start-Up Scale
DC-1	—	—	—	—
DC-2	—	—	—	—
DC-3	—	—	—	—
Log N	—	—	—	—
R-1	—	—	—	—
R-2	—	—	—	—
P. M.	—	—	—	—

START-UP CHECK LIST

Equipment Checked by JH Personnel Check by JH
 Instrument and Safeties Checked and Reset by JH
 "Source In" Checked by JH Source No. PH-15
 Emergency Equipment in Control Room Checked by JH
 Red Light On by JH
 Start-Up OK'd by JH Time 4³⁰ AM PM Date 2-22 1955

Fuel temp 76° water 88°F

5¹⁵ PM 57.3 critical fuel 77½° water 82°F

SUMMARY OF CRITICAL CONDITIONS

Expr. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM PM Duration _____ min. Log N _____
 Anal. Req. _____ gms U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____
 Signed _____

68 Date
2-23-55

diluted by adding 11.5cc water per Kg solution
approx $\frac{H}{u} = 54$ or $\frac{H}{x}$ of 1100

Expt. <u>17</u>	Time <u>2:45</u> ^{AM}	PM Date <u>2-23</u> 195 <u>5</u>
Purpose <u>Check after diluting & 1/4 of 1100</u>		
Personnel: <u>DK LAJ</u>		

INSTRUMENT CHECK				
Date	Time	AM	PM	Source No.
<u>2-23</u>	<u>1955</u>			
Instrument	Value	Scale	Balance	Start-Up Sc
DC-1				
DC-2				
DC-3				
Log N				
R-1				
R-2				
P. M.				

START-UP CHECK LIST	
Equipment Checked by <u>DK</u>	Personnel Check by <u>LAJ</u>
Instrument and Safeties Checked and Reset by <u>DK</u>	
"Source-In" Checked by <u>DK</u>	Source No. <u>PN15</u>
Emergency Equipment in Control Room Checked by <u>DK</u>	
Red Light On by <u>LAJ</u>	
Start-Up OK'd by <u>DK</u>	Time <u>2:45</u> ^{AM}
	PM Date <u>2-23</u> 195 <u>5</u>

2:45 PM Water at 88cm temp 83°F
fuel at 43cm temp 81°F

3:55 PM Critical at 60.8 cm 83 1/2°F in water
82 1/2°F in sphere

SUMMARY OF CRITICAL CONDITIONS	
Expt. _____	Reflector _____
Solution _____	Height _____ Volume _____ Temp _____
Reflector _____	Height _____ Temp _____
Time Critical _____	AM Pad - Duration _____ m.a. Log N _____
Anal. Req. _____	gas U/gm _____ Sp. Gr. _____
Critical Mass _____	Atomic Ratio _____

Signed

Analysis before debuting = 0.30572 gm U/gm = .395601 gm UO₂F₂
 .6044 gm H₂O

per Kg = 305.72 gm U
 604.4 gm H₂O
 added 5.7
 2.65
16.5

H₂O Total 624.25

Est $\frac{H}{U} = \frac{624.25}{305.72} \times 26.44 = 53.99 = \frac{H}{U} 1104$

Est new $\frac{H}{U} = 54.5$

$\frac{54.5}{26.44} \times 305.72 = 630.17 \text{ gm H}_2\text{O}$
 $\frac{624.25}{6.92}$

Add 6.92 cc H₂O/Kg solution.

Expr. 18 Time 1:30 AM PM Date 2-24 1955
 Purpose check criticality after debuting
 to $\frac{H}{U}$ of 54.5 ($\frac{H}{U} = 1185$)
 Personnel: JAC PWS

INSTRUMENT CHECK
 Date 2-24 1955 Time 1:30 AM PM Source No. Y
 Instrument _____ Start-Up Scale _____
 DC-1 _____
 DC-2 _____
 DC-3 _____
 Log N _____
 R-1 _____
 R-2 _____
 P. M. _____

START-UP CHECK LIST
 Equipment Checked by JAC Personnel Check by JAC
 Instrument and Safety Checked and Ready by JAC
 Source Initial checked by JAC Source No. PN-15
 Emergency Equipment in Control Room Checked by JAC
 Red Light On by JAC
 Start-Up OK'd by JAC Time 2:10 AM PM Date 2-24 1955

9⁰⁵ PM 50 cm fuel 74 1/2 °F 90.5 cm water 74 1/2 °F

3⁴⁶ PM 64.0 cm fuel 74 °F 90 cm water 74 1/2 °F Just Critical
 log N = 0.05
 64.5 cm approx 100 cm period -

3⁵⁸ PM Shut down by dumping water -
 Requires 35 sec to come back on log N to fall after
 aspirating water drain switched - from water = 90 cm.

SUMMARY OF CRITICAL CONDITIONS
 Expr. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM _____ PM Duration _____ min. Log N _____
 Anal. Req. _____ gms U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____
 Signed _____

70

Date

2-25-55

B- Foils - Monitor 7-1 (Inducium)

2"	1"	0	2	4	8	10	12 $\frac{1}{2}$	13 $\frac{1}{2}$
20	6	19	11	26	28	29	30	31

Reflector edge

Expt. 18-1	Time 9 ⁰⁰ AM	PM Date 2-25 1955
Purpose Exposure of Boron Ind foil in reflected sphere		
Personnel: DLH JWH		

START-UP CHECK LIST	
Equipment Checked by DLH	Personnel Check by DLH
Instrument and Safeties Checked and Reset by DLH	
Source In" Checked by DLH	Source No. PH-15
Emergency Equipment in Control Room Checked by DLH	
Red Light On by LSW	2 AM
Start-Up OK'd by DLH	Time 9 PM Date 2-25 1955

INSTRUMENT-CHECK				
Date	195	Time	AM	Source No.
Instrument	Trip	Value	Scale	Start-Up
DC-1				
DC-2				
DC-3				
Log N				
R-1				
R-2				
P. M.				

9⁰⁵ AM fuel Hgt = 64.0 temp 72°F9¹⁰ AM Critical at 0.01 on log N fuel temp 72°F water 74°F
64.0 cm fuel 86 cm water9²⁸ AM started exposure timing log N = 0.368at Pwr log N = 1.0 9³⁰ AMFinal Crit. Hgt = 63.5 cm fuel temp 73 $\frac{1}{2}$ °F water temp 78 $\frac{1}{2}$ °FShut down 9⁴⁸

Draining Solution:

Sampled - 5-1 Reg 635320
 12- 129.5252
 19.7450
 109.7802 gms. net

0.29834 gm U/gm
 1.5552 at 26.4°C
 ↑
 corrected Sp by
 phone
 was 1.5155

Signed

Volume critical 172 liters at 78 1/2 °F

Analysis = 0.29834 gm U/gm approx 174. 1.5155 = 77.812 kg U
 approx 4.887% 3.804 kg U 235

Expt. 18-2 Time 10⁴⁵ AM Date 3-1 1955
 Purpose Exposure unshielded fuel capsule
in reflected sphere
 Personnel: _____

INSTRUMENT CHECK

Date 3-1 1955 Time 10⁴⁵ AM Source No. _____
 Trip _____
 Instrument Value Scale Source Distance Start-Up Scale

DC-1				
DC-2				
Log	<u>30 x 100</u>			<u>x 50</u>
R-1	<u>5m</u>			<u>5m</u>
R-2	<u>10%</u>			<u>x 100</u>
P. M.	<u>6" x 110V</u>			<u>700V</u>

START-UP CHECK LIST

Equipment Checked by DJK Personnel Check by DJK
 Instrument DJK
 "Source In" checked by DJK "PN-15"
 Emergency Equipment DJK
 Red Light On by DJK
 Start-Up OK'd by DJK Time 10⁴⁵ AM Date 3-1 1955

Foil loading

Monitor = 7-4

Reflector Sphere

3	1	20	18	9	10	11	17	15
2"	1"	0"	0"	2"	5"	9"	11"	18 1/2"

in sphere at 10⁵⁰ AM

12⁰⁰ Critical at 64.0 cm

12¹² fuel at 65.5 cm approx 50 sec period - fuel = 77 °F water = 81 1/2 °F

12³⁵ Shut down log N at 2 for exposure.

$$H^1U = \frac{.61395 \text{ gm } H^2O}{.29834 \text{ gm } U} \times 26.44 = 54.41 = 111.29 \text{ H}^1U / \text{U}^{235}$$

SUMMARY OF CRITICAL CONDITIONS

Expt. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM _____ PM Duration _____ min. Log N _____
 Anal. Req. _____ gm U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

72 Date 3-2-55

Foil loading - 7-1 monitor - Cd covered lead foil B-sinus
reflector sphere

2"	1 1/2"	1"	1/2"	0	0	1	5	11	132
33	9	27	34	21	25	18	8	32	29

Expr. 18-3 Time 9²⁰ AM Date 3-2 1955
 Purpose Cd covered lead foil source in
reflector sphere
 Personnel: DJK JWB

INSTRUMENT CHECK
 Date 3-2- 1955 Time 9²⁰ AM Source No. 1
 Trip _____
 Instrument Value Scale Source Distance Start-Up
 DC-1 _____
 DC-2 _____
 DC-3 _____
 Log N _____
 R-1 _____
 R-2 _____
 P. M. _____

START-UP CHECK LIST
 Equipment Checked by DJK Personnel Check by DJK
 Instrument and Safeties Checked and Reset by DJK
 "Source In" Checked by DJK Source No. PV-15
 Emergency Equipment in Control Room Checked by DJK
 Red Light On by DJK Time 9²⁰ AM
 Start-Up OK'd by DJK Time _____ Date 3-2 1955

9³² fuel at 64.3 cm

10¹⁸ Critical 64.5 cm fuel 77°F water 81° 9/cm

10²⁶ 65.5 cm approx 100 amp period
 Shutdown

Cd foils in reflector were displaced at end of run.

SUMMARY OF CRITICAL CONDITIONS
 Expr. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Weight _____ Temp _____
 Time Critical _____ AM _____ PM Duration _____ min. Log N _____
 Anal. Req. _____ gms U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Expr. <u>18-4</u>	Time <u>12⁰⁰ AM</u>	PM Date <u>3-2</u>	195 <u>5</u>
Purpose <u>Bone Au foil traverse in</u>			
<u>27" sphere</u>			
Personnel: <u>JL SW</u>			

Fails. monitor 7-3 (note lead small blgd. on Prep. Counter sheet 1-18-3)

(128) (130) (139)
2 1 0

0 2 7 11 13 $\frac{1}{2}$
(126) (135) (127) (136) (138)

11¹⁶ Fuel at 64.5 - Foil loaded. Temp 78°F water = 90cm 81°

11⁵⁵ Began foil exposure on 135 sec period.

12¹⁶ PM shut down
Pwr level = log N at 2

foil counts barely sufficient -

SUMMARY OF CRITICAL CONDITIONS					
Expr. <u>18-4</u>	Reactor <u>27" Refined Sphere</u>				
Solution <u>UO₂F₂</u>	Height <u>64.5</u>	Volume	Temp <u>78°F</u>		
Reflector <u>water</u>	Height <u>90cm</u>	Temp <u>81°F</u>			
Time Critical <u>11⁵⁰ AM</u>	Duration <u>26</u>	min.	Log N <u>2</u>		
Anal. Req.	gms U/gm	Sp. Gr.			
Critical Mass	Atomic Ratio				

Signed

Expr. 18-5 Time 1 25 AM Date 3-3 1955
 Purpose Cd covered Au foils in 27"
reflected sphere
 Personnel: DTC JWD

START-UP-CHECK LIST
 Equipment Checked by DTC Personnel Check by DTC
 Instrument and Safeties Checked and Reset by DTC
 Source In' Checked by DTC Source No. PN-15
 Emergency Equipment in Control Room checked by DTC
 Red Light On by JTF
 Start Up OK'd by DTC Time 1 25 AM Date 3-3 1955

Monitor fail F-1 Foil wgt measured - Primary Au app = Log N 2
 Foil loading Cd front = .95 ref Log N 20

	(155)	156	157	158	159
	0	1"	2"	9"	13 1/2"
2	1 1/2	1	1/2	0	
(150)	(151)	(152)	(153)	(154)	

1:50 AM Fuel 76° water 80°
 64.5 cm 90 cm just critical
 period

Shut down at 2:22 PM from Log N = 20

SUMMARY OF CRITICAL CONDITIONS

Expr. _____ Reactor _____
 Solution H₂O Height 64.5 Volume _____ Temp 76°
 Reflector H₂O Height 90cm Temp 80°
 Time Critical 150 min Duration 32 min Log N 20
 Anal. Req. _____ gram-U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

Date 3-4-54

Fail loading

monitor = 7-3

	0	7	13 1/2
	(30)	(19)	(15)
2	1	0	
18	10	61	

Expr. 18-6 Time 11⁰⁰ AM PM Date 3-4 1955
 Purpose cd covered fuel capsule
 Personnel: LWA DK

INSTRUMENT CHECK

Date 3-4 1955 Time 11⁰⁰ AM PM Source No. Y

Instrument	Trip Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2				
DC-3				
Log N				
R-1				
R-2				
P. M.				

START-UP CHECK LIST

Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Set by LWA
 "Source In" Checked by DK Source No. PN-15
 Emergency Equipment in Control Room Checked by DK
 Red Lights On by DK 11⁰⁰ AM
 Start-Up OK'd by DK Time 11⁰⁰ AM Date 3-4 1955

11⁰³ AM 64.8 cm fuel 76°F 91 cm H₂O just critical 79°

11⁰⁴ fuel at 66 cm - approx 100 sec period -

11⁴⁰ Fuel at 65 cm temp 77.1°F 91 cm H₂O temp 79° log N = 20

Shutdown at 11⁴⁴ AM by dumping fuel -
 The capsules inside sphere dropped into dump well -
 fuel drained + attempted to recover fails -

SUMMARY OF CRITICAL CONDITIONS

Expr. _____ Reactor _____
 Solution UO₂F₂ 64.8 cm Temp 78°
 Reflector H₂O 91 cm Temp 79°
 Time Critical 11¹² Duration 27 min. Log N 20
 Anal. Res. _____ gm U/gm Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

Foil Placement Monitor 7-3

① ③ 6
 0 7 ~~18~~
 2 1 0
 ⑧ ⑩ ⑪

Expr. 18-7 Time AM Date 195
 Purpose Repeat of 18-6 after losing
3 Cad covered capsules
 Personnel: DKJ KE

INSTRUMENT CHECK

Date 3-7 1955 Time 2:15 AM
 Trip _____ Source No. _____
 Instrument Values Seals Slides Distance Start-Up

DC-1 _____
 DC-2 _____
 DC-3 _____
 Log N _____
 R-1 _____
 R-2 _____
 P. M. _____

START-UP CHECK LIST

Equipment Checked by DKJ Personnel Check by DKJ
 Instrument and Safeties Checked and Reset by DKJ
 "Source In" Checked by DKJ Source No. PN-15
 Emergency Equipment in Control Room Checked by DKJ
 Red Light On by DKJ
 Start-Up OK'd by DKJ Time 2:10 PM Date 3-7 1955

2:30 PM Fuel temp 74°F Water 79°F

2:45 64.0 water 90 cm just critical.

2:49 64.8 cm approx 100 cm period 74 1/2 °F water 90 cm 79 °F

2:56 log N = 7.36 (Beginning exposure time & log 20)

3:05 63.9 cm 75°F log N = 20

3:16 pm Shut down by dumping water.

SUMMARY OF CRITICAL CONDITIONS

Expr. _____ Reactor _____
 Solution _____ Height _____ Volume _____ Temp _____
 Reflector _____ Height _____ Temp _____
 Time Critical _____ AM _____ PM _____ Duration _____ Min. Log N _____
 Anal. Req. _____ gms U/gm _____ Sp. Gr. _____
 Critical Mass _____ Atomic Ratio _____

Signed

Date

Expt. 19-1 Time 2:35 PM Date 3-17 1955
 Purpose Measure AK/DM
 Personnel: DK JTT

INSTRUMENT CHECK
 Date 3-17 1955 Time 2:30 AM
 Source No. PN15
 Instrument Van. Beta. Scaler Start-Up Scale
 DC-1 _____
 DC-2 Response - no temp x 10
 DC-3 120 x 100 coated Purflin x 10
 Log N 5 sec
 R-1 100 x 1000 contacts
 R-2 _____
 P. M. 680V 1/2" 680V

START-UP CHECK LIST
 Equipment Checked by DK Personnel Check by DK
 Instrument and Safeties Checked and Ready by DK
 Source Int. Checked by DK Source No. PN-15
 Emergency Equipment in Control Room Checked by DK
 Red Light On by JTT
 Start-Up OK'd by DK Time 2:35 PM Date 3-17 1955

Safety Rod removed

2:45 PM Fuel at 58.5 cm Temp - 71°F no Reflector

3:05 Reflector water to 90.5 cm - temp 79°F

3:21 Fuel 62.6 cm 74°F water 90.5 cm 79°F Source OK'd for Critical

62.8 cm from log N = 0.02 to log N = 0.05436 in 7.9/min

3:37 63.2 cm from log N = 0.10 to log N = 0.2718 = 3.6/min

Fuel 75°F Water 79°F
63.5 cm from log N = 0.7 to log N = 1.9 = 1.9/min

3:47 62.3 cm to lower power levels
3:48 62.7

4:05 PM 62.7 cm 76°F water 90 cm 79°F

4:10 PM 64.0 cm from log N = 0.5 to log N = 1.355 = 1.1/min

64.5 cm from — R-1 Scrapped - Power level too high

4:25 PM Shut down until A.M

Signed

Expr. 19-2 Time 8³⁰ AM Date 3-18 1955
 Purpose Continuation of 19-1
 Personnel: IWA BK

INSTRUMENT CHECK

Date 3-18 1955 Time 8³⁰ AM Source No. _____

Instrument	Value	Units	Source Distance	Start-Up S
DC-1				
DC-2				
DC-3	<u>110 x 100</u>			<u>7.10</u>
Log N	<u>5.00</u>			<u>5.00</u>
R-1	<u>10.90</u>			<u>10</u>
R-2				
P. M.	<u>6800</u>			<u>68</u>

START-UP CHECK LIST

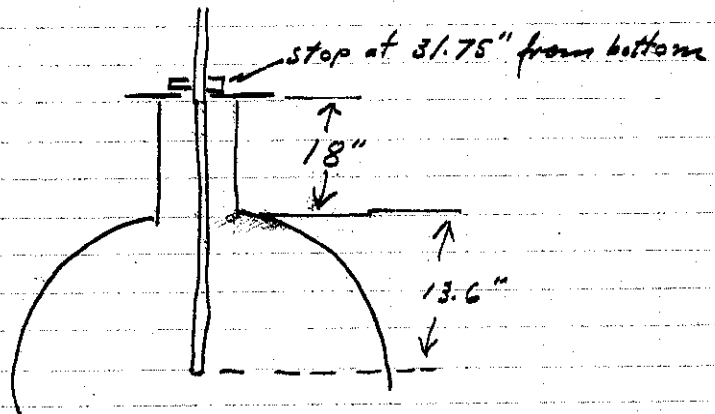
Equipment Checked by DAC Personnel Check by BK
 Instrument and Settings Checked and Approved by BK
 "Source In" Checked by DAC No. PN15
 Emergency Equipment in Control Room Checked by BK
 Red Light On by DAC
 Start-Up OK'd by DAC Time 8³⁰ AM Date 3-18 1955

8⁵⁵ Fuel at 60cm began adding water.

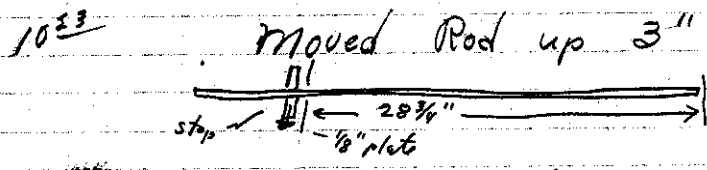
9¹² AM Fuel at 62.5cm 74°F Water at 90cm 79°F just critical

64.4 log k = .3 to log k = 0.81 0.76 min

9⁵⁵ Boron Rod inserted in sphere as illustrated



10¹⁵ Fuel 64.7cm temp 76.5°F Water 90cm = 79°F just Critical Rod In



10⁴⁰ 63.6cm Fuel 77° 89.5cm water 79° just Critical

11⁰⁰ AM Water drained - Rod removed Sightless read directly = 63.9cm

11¹⁰ AM Fuel 63.9cm 77°F water 90cm 80°F

From log N = 0.03 to log N = .081 = 1.93 min

From log N = 0.1 to log N = 2.718 = 1.90 min

11¹³ Fuel drained to 63.2cm - just critical
(Read directly)

11²⁴ Water drained out fuel drained to 60.3cm read directly at 1^{SE}
76.2°F

Re-run for clean crit - 4^{PM}

4¹⁸ PM 63.7cm 76°F water at 90 80°F

63.0cm just critical -

	Htc	Temp
therm window	62.5	74°
direct readings of S.G.	63.0	76°
	63.2	77°
therm window	62.6	74°
	62.7	76°
	60.8	82 1/2°

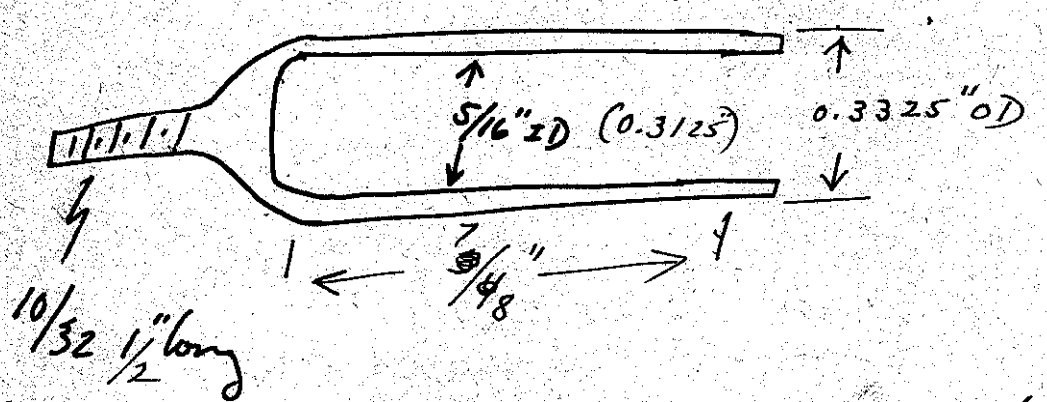
Safety Rod Removed

64.0°C 74°F - Safety Rod in place

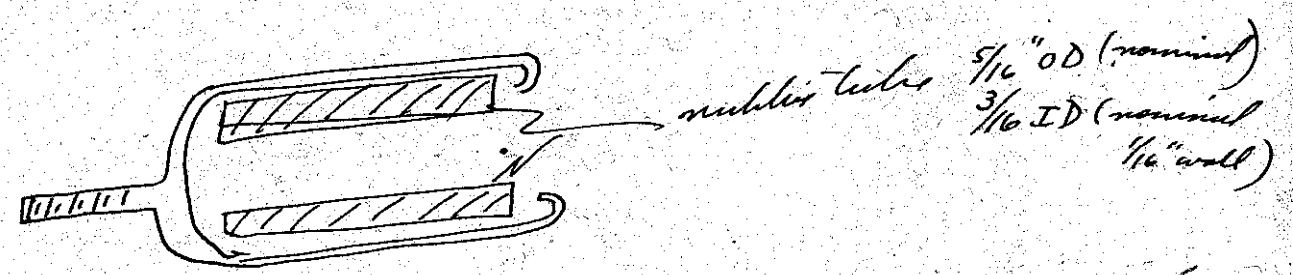
	Vol. C	Mc		
62.5cm =	170.5 L	77.089 Kg	3.769 Kg	- .135 Kg
63.0 =	171.0 L	77.315 Kg	3.780 Kg	- .124 Kg
63.2 =	171.2 L	77.405 Kg	3.784 Kg	- .116 Kg
	1.5155 Sp. Gr.			
	.29834 gm 4/gm			
63.8cm =	172.1 L	77.812 Kg	3.804	

March 18 to March 29 -
Fuel drained into storage containers
and system disassembled, decontaminated
and reloaded.

channel (B-C)
total = Bone



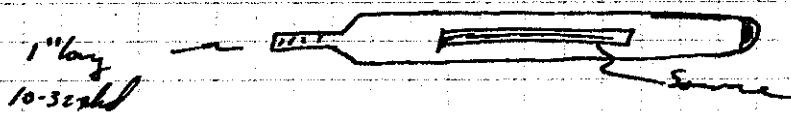
Insert rubber tube $3/4$ " long inside + crimp ends



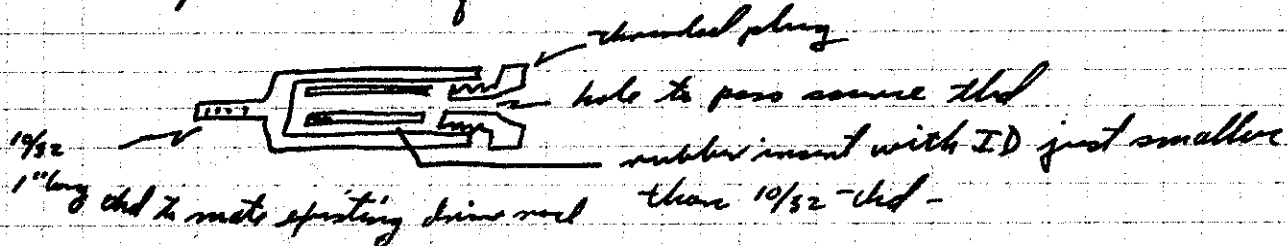
May 24, 1955

Quick attach - detach gadget for source handling

Most source handles are usually used in brass or metal holders -



To improve ease of attachment to source driver -



even without use of compression plug - the rubber insert grips the source and sufficiently to hold it securely.

A direct straight thrust will insert source, and a quick pull in a straight line will detach it -
Improvement over threading source in by hand.

Working model operates satisfactorily.

Note principle similar to "O" ring seals

P-135
138.2788
T = 28.1897

IV

P-271
133, 0286 III
26.2722

130.9632
P-47 25.2426

P-182 115.7118
25.7964

P-5-9 101,4062 Pq635314
20,7634

To _____
Date _____ Time _____

WHILE YOU WERE OUT
M 635313 Ry.
Of Discharge
Phone 7232 Discharge

Telephoned Please phone him
Called to see you Will call again
Wants to see you RUSH

MESSAGE gm/gm . 31543
Spec - 1.563

WCX-991 (Mar '48)

Signed

ANALYTICAL REQUISITION
EXCEPTION SHEET

Exception No. 963

Reported on List #1 dated 12-14-54

Inventory requisition: Yes No

Requisition No. 63531⁵

Reported Answer 316720

Net Sample Weight 125.73

Batch Numbers 6-2

Range 000240

Charge Code 1340-54

Credit Code 2230

Units —

Material Type Code 1037

Departmental Code 87

Should be

Requisition No. 635315

Reported Answer 316770

Net Sample Weight 125.73

Batch Numbers 6-2

Range 000240

Charge Code 1340-54

Credit Code 2230

Units —

Material Type Code 1037

Departmental Code 87

Explanation of correction: Wrong oxide factor used in calculation

Reason for error:

Name of person recording exception md

Date submitted 12-21-54

Approved for punching by _____

Date punched _____

Approved after punching by _____

ANALYTICAL REQUISITION
EXCEPTION SHEET

Exception No. 962

Reported on 12-14-54
List #1 dated

Inventory requisition: Yes No

Shown
Requisition No. 635314

Reported Answer .316700

Net Sample Weight 80.64

Batch Numbers

Range 000239

Charge Code 1340-54

Credit Code 2230

Units

Material Type Code 1037

Departmental Code 84

Should be
Requisition No. 635314

Reported Answer .31666

Net Sample Weight 80.64

Batch Numbers

Range .000239

Charge Code 1340-54

Credit Code 2230

Units

Material Type Code 1037

Departmental Code 84

Explanation of correction: wrong oxide factor used
in calculation on 1000 material

Reason for error:

Name of person recording exception md

Date submitted 12-21-54

Approved for punching by

Date punched

Approved after punching by

ANALYTICAL REQUISITION
EXCEPTION SHEET

Exception No. 961

Shown

Requisition No. 360311

Reported Answer 8480

Net Sample Weight 13.07

Batch Numbers Special

Range —

Charge Code 2710

Credit Code 2230

Units —

Material Type Code 1020

Departmental Code 25

Reported on
List #1 dated 12-17-54

Inventory requisition: Yes — No

Should be

Requisition No. 360311

Reported Answer .9999

Net Sample Weight 13.07

Batch Numbers Special

Range —

Charge Code 2710

Credit Code 2230

Units —

Material Type Code 1020

Departmental Code 25

Explanation of correction: Wrong answer reported for 1000 material

Reason for error:

Name of person recording exception MD

Date submitted 12-21-54

Approved for punching by —

Date punched —

Approved after punching by —

~~SECRET~~

CAUTION
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