

BOOK89R

Notes:

"Interaction #1" on front

"Interaction" on front

"Interaction #1 on spine

Blank pages: page opposite page 1, 300, inside back cover sheets

- pages 7, 39, and 41 have 1 (8.5x11) graph taped to each page
- pages 16, 40, 56, and 96 have 2 small sheets stapled to each page
- following pages have a graph taped to each page: 17, 32, 33, 44, 46, 48, 65, 67, 73, 75, 76, 94, 97, 98, 99, 100, 101, 102, 103, 108, 114, 187, 235, 239, 240
- pages 66/67 have a calendar sheet (3/12/67) and 1 small torn piece of paper between the pages
- pages 88/89 have small torn piece of paper between pages
- page 105 has post-it-note with "slabs" wrote on it
- pages 110 and 178 each have a blue post-it-note on page
- pages 192 and 202 have 1 small sheet taped to it
- page 201 had something taped to it - tape is still there, but nothing else
- pages 235/236 also has red plastic paper clip at bottom of page

Scanned by:

Sheila Finch

RSICC /Oak Ridge National Lab.

September 2, 1999

SOME INSTRUCTIONS FOR USE OF THIS NOTEBOOK

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 safeguarding of this notebook in accordance with security regulations.

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

Every page or entry should bear a date and the signature of the person who made the entry.

Entries should be made in ink whenever it is reasonable to do so.

Alteration or amplification of entries made on previous dates should be made as separate entries under their own dates and cross referenced to the previous entries.

Charts, drawings and graphs drawn on special paper should be glued or otherwise securely fastened in place and should individually bear a date and signature. Do not obscure any information.

The notebook should be periodically reviewed by one or more independent persons in the department and should be signed and dated by them. Likewise, they should make a statement that they have "read and understood the foregoing material." Witnessing stamps for this purpose are available in your department's office.

It is advisable to preface each new item, such as a heat treatment, process or reaction, etc., with a very brief description of the purpose, objective or approach.

Description of the invention or discovery should be complete enough to be understood by anyone skilled in the art.

Reference to name or catalogue number should be made when standard items are being discussed; i.e., Westinghouse pump.

In cases where work is conducted in cooperation with others, it is often necessary to meet with them from time to time and discuss new developments. The occurrences of such conferences should always be entered in your notebook regardless of recording elsewhere, giving the date, who was present (if possible), and an outline of the subjects discussed. This often will establish error in occasional claims of other parties that you have appropriated information from them revealed during an interview, and thus provide you with patent protection.

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No. 1 of 330 copies, Series A"
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BY

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POST OFFICE BOX P
OAK RIDGE, TENNESSEE

NOTEBOOK NO. 420

89
AUG

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Assigned to: A. D. Callahan
Department: Physics Div.
Location: Bldg. 9213, Y-12
Date: March 1, 1955

89
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89
AUG

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.

This notebook must be returned to Laboratory Records-Bldg. 4500 when completed or upon termination of assignee.

CLASSIFICATION CANCELLED

DATE 5-27-60
Edgar J. Murphy
Page

CG-ORIGINATING ORGANIZATION DIRECTOR
OAK RIDGE NATIONAL LABORATORY
AUTHORITY DELEGATED BY AEC 9-10-57

Subject

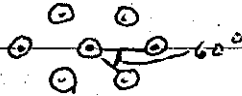
Interaction Experiments

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No. 1 of 330 copies, Series A"

Interaction # 1

H/x \approx ⁴⁵50 (see analysis on page 16)

Reactor: seven (7) 6" al. cylinders in hexagonal array.



Spacing: the cylinders are 24.5" edge to edge.

Expt. # 1 Time 2:55 ^{AM} PM Date 3/29 1955
 Purpose Determine Crit. ht. of hex array of 7 al. cyls with no reflectors at H/x = 50
 Personnel: Exp, Hillary

INSTRUMENT CHECK

Date 3/29 1955 Time 2:55 ^{AM} PM Source No. _____
 Instrument Value Scale Source Response Count/In scale
 DC-1 _____
 DC-2 _____
 DC-3 trip
 Log N trip
 R-1 responds
 R-2 _____
 P. M. trip

START-UP CHECK LIST

Equipment Checked by JWH Personnel Check by JWH
 Instrument and Safeties Checked and Reset by Exp
 "Source In" Checked by JWH Source No. _____
 Emergency Equipment in Control Room Checked by JWH
 Red Light On by JWH
 Start-Up OK'd by JWH Time 3:20 ^{AM} PM Date 3/29 1955

NOTE: Probe zeroed and system reads 0.02" too low, JWH.

	fuel wt.	source	safety	Cy	m _{eff}	Cy	m _{eff}
4:05 PM	34.30"	in	up	8	19	15	58
4:17	21.74"	"	"	7	52	15	17
4:21	18.69"	"	"	7	34	14	35
	14.92"	"	"	4	50	14	35
	9.82"	"	"	14	31	14	13
	0.00"	"	"	12	0	12	53

2

3/31/55

Reactor zero at 34.8 cm

4/25
4/25

Expr. 42 Time 10⁰⁰ AM Date 4/11 1955
 Purpose Determine critical ht. of single
 6" al^u reactor completely reflected except
 for test samples
 Personnel: Fox, Riley

INSTRUMENT CHECK

Date 4/1 1955 Time 10⁰⁰ AM Source No. _____
 This _____
 Instrument, Value, Units, Range, Distance, Start-Up Scale

DC-1 _____
 DC-2 _____
 DC-3 trip 90 x 10⁰ _____
 Log N trip _____
 R-1 trip _____
 R-2 _____
 P. M. trip _____

START-UP CHECK LIST

Equipment Checked by JWJ Personnel Check by JWJ
 Instrument and Safeties Checked and Reset by JWJ
 "Source In" Checked by JWJ Source No. _____
 Emergency Equipment in Control Room Checked by JWJ
 Red Light On by JWJ AM
 Start-Up OK'd by JWJ Time 10⁰⁰ PM Date 4/1 1955

Fuel wt. H₂O wt. source safety
 71.9 28.33" 123.5^{*}cm 88.7 out up just crit.

73.2 28.85" 107.2 cm (72.4)

73.1 (28.80) ≈ 107.9 (73.1)

11⁰⁰ Fuel temperature = 77° F (by thermocouple)

H₂O " = 77° F

$$\text{Crit. Vol} = 73.13 \times 182 = 13,313 \text{ cm}^3$$

$$\text{Mass} = 13,313 \times 0.5376 = 7.12$$

* measured from floor of "Big Sid"

4/11 ~ 50⁴⁵

Expt. # 3	4/11 1955
Purpose: Determine critical ht. of 7 olef reactors (6" dia) in hexagonal array completely reflected except top tamper.	
Personnel: Fox, Hilkey	

Equipment Controlled by	JWZ
Instrument	JWZ
Source	JWZ
Emergency	
Red Light	JWZ
Start-Up OK	JWZ
1:37 PM 4/11 1955	

Edge to Edge spacing = ~ 24.5"

H ₂ O ht	Fuel ht	C ₄	C ₅	Scale of 100
+ 105.8 cm	12.46"	8 ¹	4 ²	
+ 105.5"	"	8 ³	3 ¹²	
"	24.89	10 ¹¹	4 ⁶	
+ 108.3 cm ^{73.5}	28.78 (73.1)			just crit.
+ 140* cm	28.33*			just crit.
+ 122.6* cm	28.33*			

* See experiment on page 3. Crit. ht. of single reactor same as ht. of 7 reactors with this spacing - hence no interactions.

Equal ht. interpolation = 73.15 cm

Crit vol = $7 \times 182 \times 73.10 = 93,131$

" Mass = $93131 \times 5376 = 50.10$ kg U₂₃₅

+ add 3 cm to values - zero correction

4/2 ~ 45

Expr. 4 Time AM Date 4-4 1955
 Purpose C.C. 7-6" Reactors in
contact - Hexagonal Cluster
BARC
 Personnel: LWG, JKF

INSTRUMENT CHECK

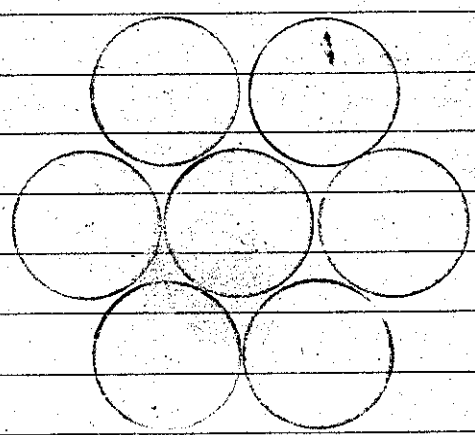
Date 195 Time AM Source No.
 Trip
 Instrument Value Scale Source Distance Start-Up Route
 DC-1 ✓ TRIP
 DC-2 ✓
 DC-3 TRIP
 Log N
 R-1
 R-2 ✓
 P. M. ✓

START-UP CHECK LIST

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

Scale 64

Sol'n ht	C ₄	C ₅
3.12"	6.0	85.0
4.92	10.75, 50	103.75, 82
6.49	21.0, 285	129.5, 65
7.43	34.25, 165	166, 51
7.94	57.2, 105	217, 39
8.42	120, 05	352, 24



8.84 slightly super critical Av. Edge to Edge
 8.85 " sub. Separation of
 out vol. = $7 \times 182 \times 2249 = 28,651$ Reactors = ~ 1.56
 out Man = $28,651 \times 53.76 = 1,540,000$ kg Var. from 1.25
 to 1.250

4/4 1955

Expt.	5	4/4	1955
Purpose	C.C. for 7-6" reactors in Regional area with a 48" separation with H ₂ O reflector		
Personnel	Joseph Hilkey		
Equipment		Back by	
Instru			
"Sou:			
Emerg			
Red Lig.			
Start-Up	C. G. W. S.	4/8	1955

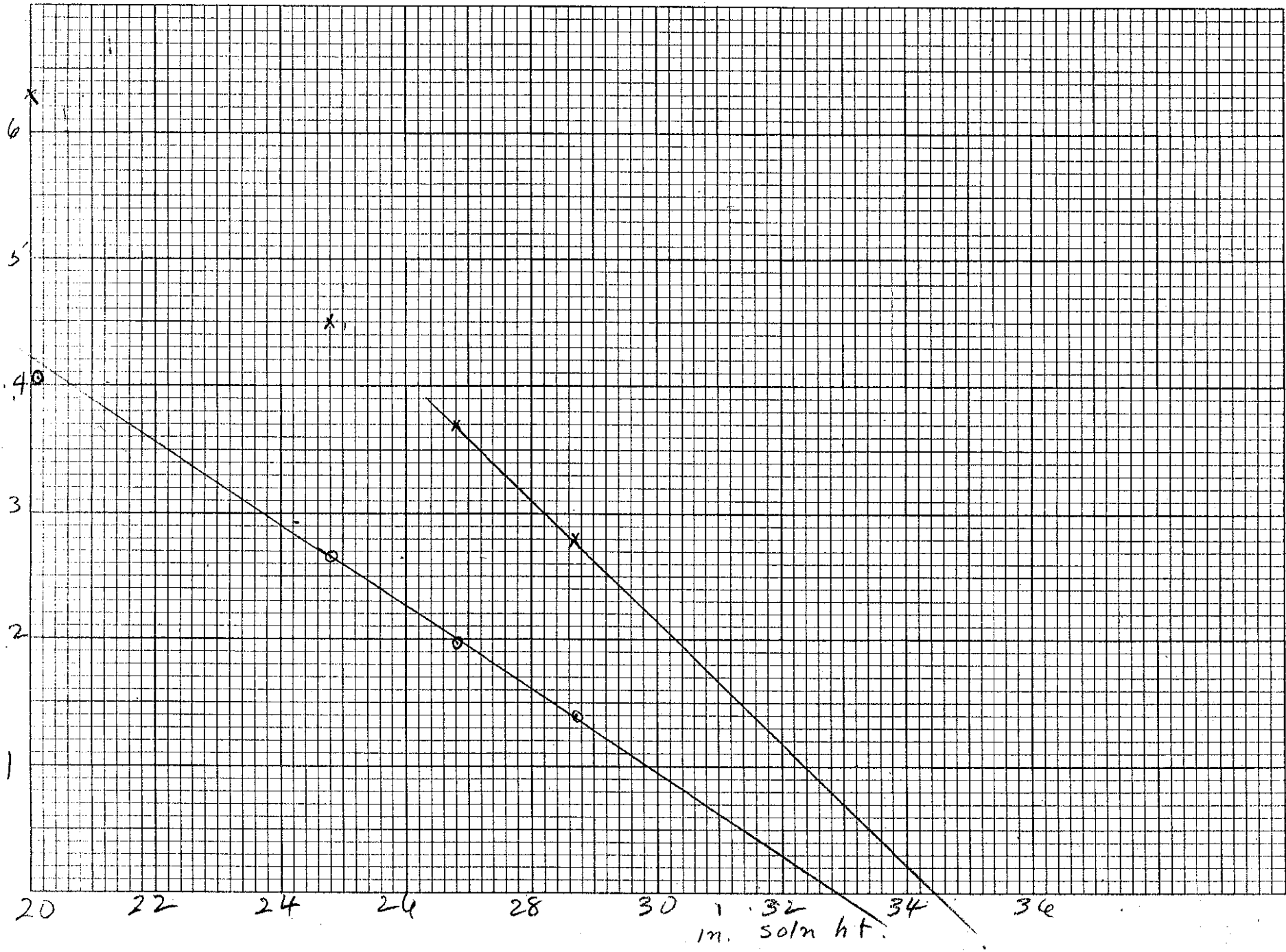
Water ht	Solu Ht.	
+ 38 cm	6.55"	slightly sub.
+ 41.5"	5.90	critical
—	5.64	—
+ 46.5"	5.09	
+ 47.0"	5.02 (47.2)	slightly just crit
	$\times 2.54 = 12.75 \text{ cm}$	

3:25 PM Temperature in solution = 79°F (thermocouple)

$$\text{Crit Vol} = 7 \times 182 \times 12.75 = 16.24 \text{ l}$$

$$\text{|| mass} = 16.243 \times 5376 = 8.73$$

+ add 3cm to values



4x 250 45

Expt. 6 Time AM Date 4-5-1955
 Purpose Crit. Cond 7-6" Reactors
3" Edge to Edge ± 10"
Hex pattern Bare
 Personnel: J.W.G., J.K.E.

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No.
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK by Time AM Date 1955

INSTRUMENT CHECK

Date	195	Time	AM	PM	Source No.
Instrument	Trip Value	Scale	Source Distance	Start-Up Scale	
DC-1	Trips				
DC-2	<input checked="" type="checkbox"/>				
DC-3	TRIPS				
Log N	"				
R-1	"				
R-2					
P. M.	"				

	fuel ht.	source safety	C _f	M _f ¹	C _s	M _s ¹
11 ³⁸ A.M.	28.77"	in up	64 ³⁰ × 64	.140	326 ²⁴ × 64	.282
"	"	"	63 ⁶	.143	329 ²⁵	.28
11 ⁴⁵	26.99"	"	45 ²⁹	.198	247 ²⁹	.392
11 ⁵⁰	24.80"	"	34 ⁹	.263	203 ¹⁰	.454
11 ⁵⁴	20.12"	"	22 ¹⁷	.405	145 ⁵⁴	.43
12 ⁰⁷	9.99"	"	8 ⁶²	9.0	92 ¹⁵	92.25

Extrapol. Crit ht = ~ 33.6" ≈ 85 cm
 " " Vol = 7 × 182 × 85.4 ≈ 108 l
 " " Mass = 108 × 5376 ≈ 580 kg U₂₃₅

45
4/4 2 40

Expt. <u>7</u>	Time <u>4:45</u>	Date <u>4-5-1955</u>
Purpose <u>C.C. 7-6" cylinders - 311</u>		
<u>Edge to Edge</u>	<u>Wax pattern</u>	
<u>(left) except for top</u>		
Personnel: <u>L.W.G.</u>	<u>J.R.F.</u>	

START-UP CHECK	
Equipment Checked by <u>J.R.F.</u>	<input checked="" type="checkbox"/>
Instrument and Safeties <u>J.R.F.</u>	<input checked="" type="checkbox"/>
"Source In" Checked <u>J.R.F.</u>	<input checked="" type="checkbox"/>
Emergency Equipment <u>J.R.F.</u>	<input checked="" type="checkbox"/>
Red Light On by <u>J.R.F.</u>	<input checked="" type="checkbox"/>
Start-Up OK'd by <u>J.R.F.</u>	1955

Fuel ht in Water ht

9.20 (57.9) (+) 58.2

slightly supra

" (+) 58.0

" sub

exit ht = 23.36 cm

exit vol = $7 \times 182 \times 23.36 = 29.76 \text{ l.}$ " mass = $29.76 \times .5376 = 16.00 \text{ kg}$

+ add .3 cm to value - zero correct

4/5 ~ 50

9

Feed cyl



Expr. 8 Time 3 AM PM Date 4/5 1955
 Purpose CC. for 3-6" reactors; 3" edge to edge spacing between each (60° apart)
Base
 Personnel: _____

START-UP CHECK-LIST
 Equipment Checked by _____ Personnel Check by ✓
 Instrument and Safeties Checked and Tested by ✓
 "Source In" Checked by _____ Source No. _____
 Emergency Equipment in Control Room Checked by _____
 Red Light On by ✓ AM
 Start-Up OK'd by _____ Time _____ PM Date 4/5 1955

	fuel wt	source	safety	ex	M ⁻¹	C ₅	M ₅ ⁻¹
<u>10</u> 3 <u>PM</u>	54.62"	in	up	19 ² ^{x16}	.692	292 ² ^{x16}	.908
	49.90"	"	"	19 ⁵	.702	289 ⁷	.916
<u>3</u> ²⁵	44.92"	"	"	18 ¹⁴	.71	280 ²⁸⁰ ¹⁴	.944
	30.04"	"	"	19 ⁹	.692	283 ⁵	.938
<u>3</u> ⁴²	10.26"	"	"	14 ⁷ ^{x16}	} 13.5	264 ⁶ ^{x16}	} 245.0
	"	"	"	12 ⁷		269	
	"	"	"	13 ²		260 ¹²	

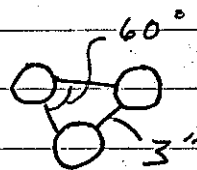
EX trap to D ht.

10

4/11 ~ 50

411 ~ 50

Expt. 9 Time AM Date 4-6 1955
 Purpose C.I. for 3-6" Reactors - 3"
Edge to Edge Hex. pattern
Reflected except for top
 Personnel: _____



Other Reactors
 Valved off
 & moved back
 ~ 18"

START-UP CHECK LIST

Equipment Checked by _____
 Instrument and Safeties Checked by _____
 "Source In" Checked by _____
 Emergency Equipment in _____
 Red Light On by _____
 Start-Up OK'd by _____ Time _____ Date _____ 1955

INSTRUMENTS

Date _____ 1955

Instrument	Area	Scale
DC-1		
DC-2		
DC-3	Trips	80 x 100
Log N	4	
R-1		
R-2		
P. M.		

Soln ht Water ht.

12.27 (65.7cm) (+) 65.1 just out

12.24 (65.4) (+) 65.6 " "

Crit ht (equal) = $12.25 \times 2.54 = 31.11 \text{ cm}$

Out vol = $3 \times 182 \times 31.11 = 16.99 \text{ l}$

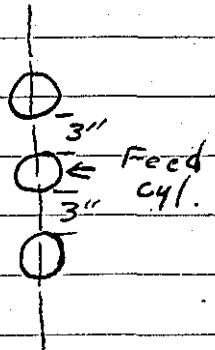
Out mass = $16.99 \times 5376 = 9.13 \text{ kg}$

+ add 3cm to values

4/1 x 2 50⁴⁵

11

Expt. 10	Time	AM	PM Date 4-6	1955
Purpose C.C.	3-6"	Reactors	1 m	
Line separated 3" Edge to Edge - 1 Refl. except for top				
Personnel: L.W.G. J.K.F.				



START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. <input checked="" type="checkbox"/>
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by _____	Time _____ PM Date _____ 1955

Other Reactors moved back & Valved off.

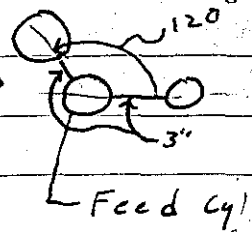
Soln ht Water ht
 14.22" (70.6 cm) (H) 70.8 just crit
 $14.22 \times 2.54 = 36.11 \text{ cm.}$

Soln. Temp. 77°F (Thermocouple)
 Crit vol. = $3 \times 182 \times 36.11 = 19.712 \text{ l}$
 " mass = $19.72 \times .5376 = 10.60 \text{ kg U}_2\text{SO}_5$

+ add 3 cm to value of H₂O ht

$\frac{4}{1} \times 250$

Expr.	11	date	4/6	1953
Purpose	C.C. for 3 6" dia. reactors with two in line and one 120° from line			
	H ₂ O reflected except for top tamper.			
Personnel:	Jax & Gile			



Equipment Checked	<input checked="" type="checkbox"/>	by	<input checked="" type="checkbox"/>
Instrument ok	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
"Source In"	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Emergency	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Red Light On	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Start-Up OK'd by	JWA	1:14 PM	4/6 1953

Water ht Water ht
 (+) 70.3 in 14.16" (70.5 in) just cut
 $14.16 \times 2.54 = 35.97 \text{ cm}$

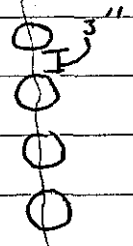
$$\text{Cut Vol} = 3 \times 182 \times 35.97 = 19.64 \text{ l}$$

$$\text{man} = 19.64 \times .5374 = 10.56$$

(+) add 3 in to water ht.

4/5
4/5 ~ 50

Expt. 12	Time 3 ³⁰ AM	PM Date 4/6 1955
Purpose C.C. for 4-6" ad. reactors in a line with 3" spacing reflected essent for top		
Personnel: _____		



START-UP CHECK LIST	
Equipment Checked by _____	Personnel Check by _____
Instrument and Safeties Checked and Reset by _____	
"Source In" Checked by _____	Source No. _____
Emergency Equipment in Control Room Checked by _____	
Red Light On by _____	
Start-Up OK'd by JWZ	Time 3 ³⁰ AM PM Date 4/6 1955

Fuel wt. H₂O ht.

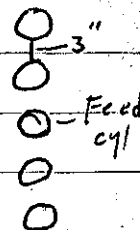
$\frac{4.00}{2.00}$ 13.65" (~~69.2~~^{49.47}) (+) 69.3 cm {from bottom of big lid} just cut.
 13.65 x 2.54 = 34.67 (cut ht. is slightly low, one cut. pit. allow no method of interpolation)

Cut vol. = 4 x 182 x 34.67 = 25.24 L
 " mass = 25.24 x .5376 = 13.57 kg U₂₃₅

(+) add 3 cm to water ht.

H/f = 45

Expt. <u>13</u>	Time <u>8:30</u>	Date <u>4/7</u>	195 <u>5</u>
Purpose <u>C.C. for 5-6" at reactors in a</u> <u>line with 3" edge to edge spacing</u> <u>H₂O reflected except for tops.</u>			
Personnel: _____			



Equipment Checked by _____	Checked by _____
Instrument and Safety _____	_____
"Source In" Checked _____	_____
Emergency Equipment _____	_____
Red Light On by _____	_____
Start-Up OK'd by <u>JWY</u>	Date <u>4/7</u> 195 <u>5</u>

fuel wt H₂O source
 9°/km. 13.38" (68.8) 68.6 cm out just crit.
 13.38 x 254 = 33,98 cm

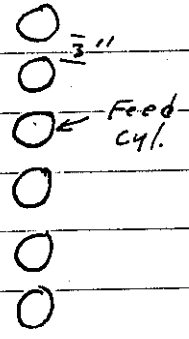
$$\text{Crit vol} = 5 \times 182 \times 33,98 = 30,92 \text{ l}$$

$$11 \text{ man} = 30,92 \times 5376 = 16,62 \text{ kg}$$

Out

1/2 = 45

Feed cyl



Expr. 14 Time 10³⁸ AM PM Date 4/7 1955
 Purpose CC for 6-6" of reactors in a line
with 3" edge to edge spacing
H₂O reflected except for top
 Personnel: For, Helvey

START-UP CHECK LIST

Equipment Checked by Personnel Check by

Instrument and Safeties Checked and Reset by

"Source In" Checked by Source No.

Emergency Equipment in Control Room Checked by

Red Light On by

Start-Up OK'd by JWH Time 10³³ AM PM Date 4/7 1955

Fuel ht. 33.50 cm H₂O ht
13.19" (68.3 cm) 68.3 cm

Out vol = $6 \times 182 \times 33.50 = 34.58 \text{ l}$ cut man. $\rightarrow 34.58 \times 0.5376 = 19.167$

Expr. 15 Time 1²⁵ AM PM Date 4/7 1955
 Purpose CC for 2-6" reactors in line
with 3" spacing edge to edge
H₂O reflected except for top
 Personnel: _____

START-UP CHECK LIST

Equipment Checked by Personnel Check by

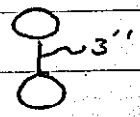
Instrument and Safeties Checked and Reset by

"Source In" Checked by Source No.

Emergency Equipment in Control Room Checked by

Red Light On by

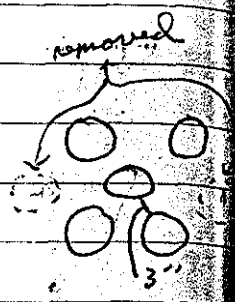
Start-Up OK'd by JWH Time _____ AM PM Date 4/7 1955



Fuel ht. 16.26" (76.1 cm) H₂O
76.3 cm
 $\approx 41.30 \text{ cm}$

Fuel Temp. 74 °F
 Out vol = $2 \times 182 \times 41.30 = 15.03 \text{ l}$
 mass = $15.03 \times 0.5376 = 8.08 \text{ kg}$

Expt. No.	116	Time	3:45	Date	4/7 1955
Purpose	CC Pot 5-6" at reactors with 3" edge spacing in hex. pattern completely bare				
Personnel	Fox, Killey				
START					
Equipment Checked by	✓				
Instrument and Safeties Checked by	✓				
"Source In" Checked by	✓				
Emergency Equipment in	✓				
Red Light On by	✓				
Start-Up OK'd by	WZ				
				Date	4/7 1955



	Fuel Wt.	source	safety	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹
4 ⁰⁰ 7.1m	37.96"	in	up	31 ^{13x16}		346 ^{4x14}	
4 ⁰⁵	36.06"	"	"	33 ⁴		372 ⁶	
4 ¹¹	33.01"	"	"	31 ¹³		347 ³	
4 ¹⁷	25.08"	"	"	31 ¹²		351 ²	
4 ²⁴	11.54"	"	"	23 ¹⁵		324 ¹	

Sample Taken 4/7/55

Sample bottle # P-173 Reg. # 354711

Gross 91.368
Tare 26.940
net 64.428

$$\frac{\text{gms U}_{235}}{\text{gm}} = .3209$$

$$\frac{\text{gms U}_{235}}{\text{cm}^3} = .5304$$

$$\frac{H}{X} = 1.298 \times .3443 = \frac{.4469}{.6531}$$

$$= \frac{26.11 \times .5531}{.3209} = 45.0$$

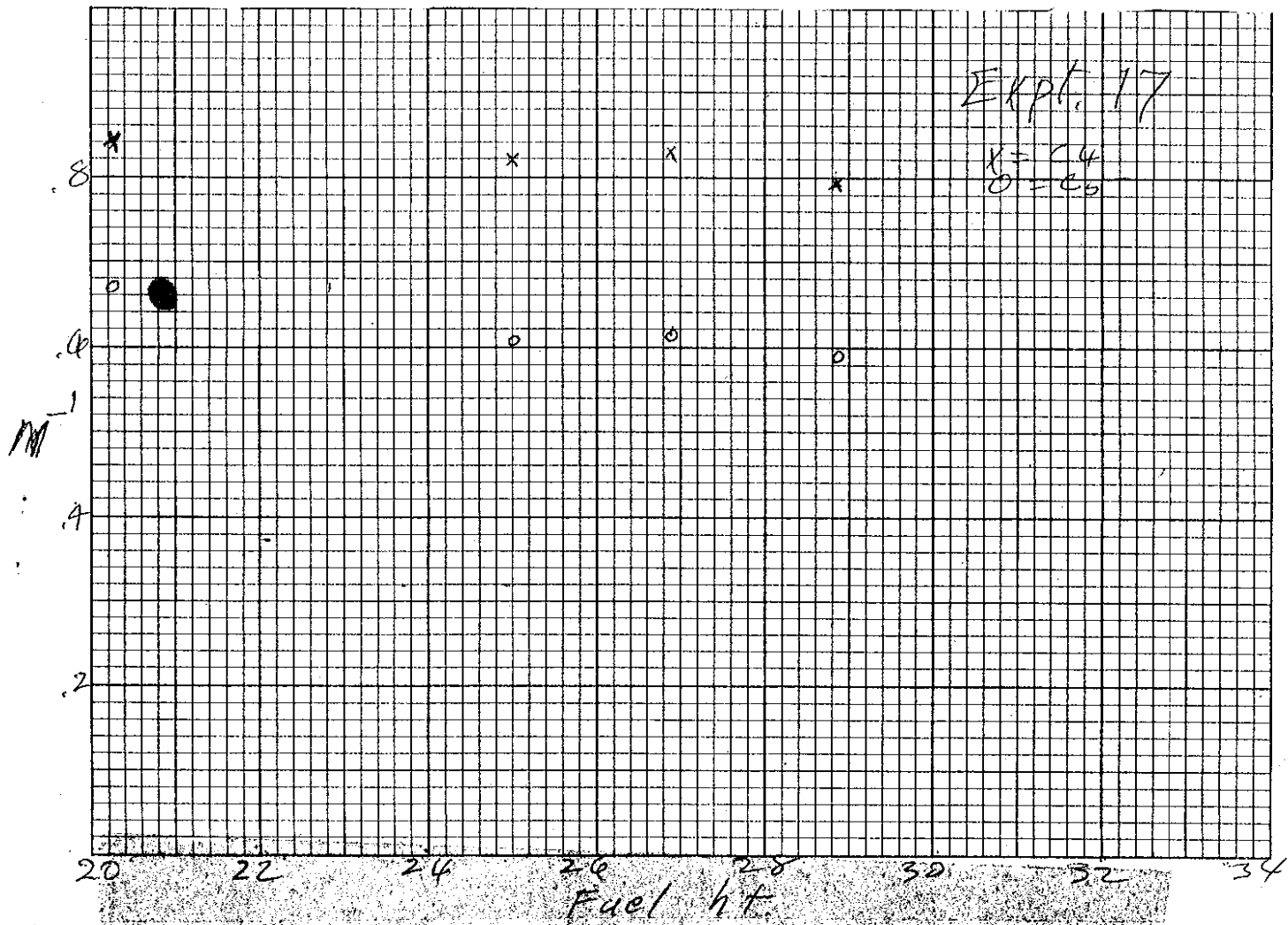
354711	
BATCH NUMBER	REQUISITION NUMBER
REPORT TO: L. W. Gilley	
BUILDING NO. 9213	
DESCRIPTION OF MATERIAL:	
UO ₂ F ₂ in solution	
Special	
IF NOT TO BE COMPOSITED CHECK HERE.....	
ASSAY REQUESTED AT <input type="checkbox"/> DT <input type="checkbox"/>	AT CODE NO.
ANALYSIS REQUESTED	REPORTED ANSWERS
GRAM/GRAM T ✓	. 34431
Sp. gr. ✓	1.6527 @ 28°C
M _x = 45.0	
SIGNED: md	APR 22 1955
BY:	DATE

REQUEST for P.S. 01408 SPECTROGRAPHIC ANALYSIS	Req. No. 4096 354711
By Dept 2230 Time 9 P M	Mat. Type Code 1937
Sampled by RRR Date 4-20	Dept. Code No.
Cont'r No. 354711	Batch Numbers
Gross 11.8140	UO ₂ F ₂ Rush
Tare 5.0624	Complete Spec.
Net 6.7516	
Analy. Ans	By Date

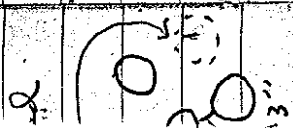
Spectrographic Analysis
Answers in P.P.M.

Ag <1	Al 24	As	Au	B 3
Ba <10	Be	Bi	Ca 80	Cd
Co	Cr 110	Cs	Cu 3	Fe 2700
Ga	Ge	Hg	In	K <50
Li	Mg 18	Mn 16	Mo	Na <10
Ni 210	P <100	Pb <10	Rb	Sb
Si <10	Sn <10	Sr	Ti	Tl
U	V	Zn <40	C	RE

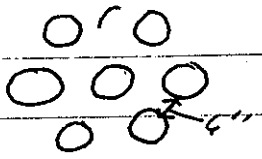
Signed Al - Bd Date 4-21-55



EUGENE DIETZGEN CO.
MADE IN U. S. A.



Expr. 17 Time 1:27 AM PM Date 5/2 19553
 Purpose CC for 7-6" detector with
6" edge to edge spacing in hexagonal
pattern - completely bare
 Personnel: Law, Hilley



INSTRUMENT CHECK

Date 195 Time 1:27 AM PM Source No. V
 Trip
 Instrument Value Scale Source Distance Start-Up Scale
 DC-1 _____
 DC-2 trip 10x90 @ 85
 DC-3 trip 1x100 @ "
 Log N trip 5m
 R-1 responds
 R-2 _____
 P. M. trip

START-UP CHECK LIST

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

	fuel wt.	C _F	M _F ¹	C _S	M _S ¹	source
3 ⁴⁵ P.M.	9.76"	25 ¹² 764	} 25	43 ⁴⁶ 404	} 44	14
	"	24 ⁴²		44 ⁶		"
3 ⁵⁷	20.23"	29 ⁵³ .84		64 ⁴⁵ .47		
	25.02"	30 ²⁴ .82		72 ⁴⁹ 1405		
	26.91"	30 ⁹ .83		72 ³⁴ 61		
	28.84"	31 ³⁴ .795		74 ²³ .59		

Ex trap. to infinite crit. ht.

Reactor $\beta_{eff} = 34.86$

Expt. 18 Time 8²⁹ AM on 5/3 1955
 Purpose CC for 7-6" al reactors with 6" edge to edge spacing in hexagonal pattern completely reflected except for top
 Personnel: Andy Hillon

INSTRUMENT

Date 5/3 1955 Time 8²⁰

Instrument

DC-1 _____ Trip Scale

DC-2 trip

DC-3 trip

Log N trip

R-1 ribands

R-2 _____

P. M. trip

Equipment Checked by _____
 Instrument and Safety _____
 "Source In" Checked by YWX _____
 Emergency Equipment _____
 Red Light On by YWX _____
 Start-Up OK'd by YWX _____
195

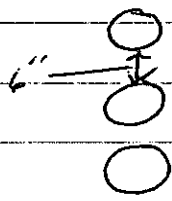
Fuel wt H_2O
 $9 \frac{1}{2}$ A.M. $18.80''$ 82.7 cm just cut.
~~22.22~~ 47.75 cm

ent vol = $7 \times 182 \times 47.75 = 60.83 \text{ l}$

|| mass = $60.83 \times 5.376 = 32.70$

* From floor of big lid.

Expr. 19 Time 10⁰⁵ AM PM Date 5/3 1955
 Purpose CC for 3-6" of reactors in line with 6" edge to edge spacing reflected except for tap
 Personnel: _____

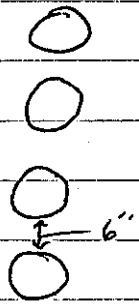


START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by JWA Time 10⁰⁵ AM PM Date 5/3 1955

Fuel ht. H_2O
 $59.26 \text{ cm} \quad 23.33" (94.5) \quad 94.4 \text{ cm} \quad \text{just out}$
 $\text{Out vol.} = 3 \times 182 \times 59.26 = 32.36 \text{ l}$
 $\text{Mass} = 32.36 \times 53.76 = 17.40$

Expr. 20 Time 1⁰⁰ AM PM Date 5/3 1955
 Purpose CC for 4-6" of cylinders in line with 6" edge to edge spacing reflected except for tap
 Personnel: Jax, Harrison, Silbey



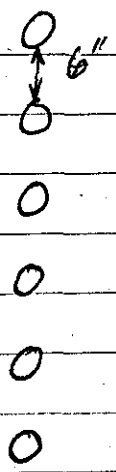
START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by JWA Time 1⁰⁵ AM PM Date 5/3 1955

Fuel ht H_2O
 $150 \quad 23.00" \quad 58.4 \text{ cm} \quad \text{just out}$
 $\approx 58.42 \text{ cm}$

$\text{Out vol} = 4 \times 182 \times 58.42 = 42.53 \text{ l}$
 $\text{Mass} = 42.53 \times 53.76 = 22.86$
 * Measured from bottom of reactor
 Fuel Temp $77^\circ F$

Expt. 21 Time 8²⁰ to 514 1955
 Purpose CC for 6-6" of cylinders in line
with 6" edge to edge spacing
reflected except for top
 Personnel: Fox, Minner, Cross, Hilley



INSTRUMENTS

Date _____ 195__ Time _____

Instrument _____

DC-1 _____

DC-2 trip

DC-3 trip

Log N trip

R-1 trip responds

R-2 _____

P. M. trip

Equipment Checked by _____

Instrument and Safety _____

"Source In" Checked by _____

Emergency Equipment _____

Red Light On by _____

Start-Up OK'd by gwh _____ 195__

Fuel wt. H₂O wt.
22.60" 57.2^{*}cm just out. Water Temp 75°F
 ≈ 57.40 cm

Cent Vol = $6 \times 182 \times 57.40 = 62.68$ l
 " Mass = $62.68 \times 5376 = 33,70$ kg.

* measured from bottom of reactor

Expr. 22 Time 10⁵⁵ AM PM Date 5/4 1955
 Purpose CC for 2-6" al reactors with
6" edge to edge spacing*
reflected export for top
 Personnel: Joy Bivins, Hilley

0
6"
0

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by YWB Time 11³⁰ AM PM Date _____ 1955

fuel ht. H_2O
^{11²⁰ AM} 24.88" (63.19)^{*} 63.3 cm just cut.
 Crut Vol. = $2 \times 182 \times 63.19 = 23,00 \text{ l}$
 $11 \text{ mass} = 23,00 \times .5376 = 12.36 \text{ kg}$

Expr. 23 Time 1²² AM PM Date 5/4 1955
 Purpose CC for 2-6 al reactors with
9" edge to edge spacing
reflected export for top
 Personnel: Joy Bivins, Cross, Hilley

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by YWB Time 1²⁵ AM PM Date _____ 1955

fuel ht. H_2O
^{2¹⁰} 28.24" 71.6^{*} cm just cut.
 $\approx 71.73 \text{ cm}$
 Crut Vol = $2 \times 182 \times 71.73 = 26.11 \text{ l}$
 $11 \text{ mass} = 26.11 \times .5376 = 14.04 \text{ kg}$
^{*} Measured from bottom of reactor

350 F

Expr. 24 Date 5/4 1955
 Purpose CC for 3-6" al. reactors in line
with 6 1/2" edge to edge spacing
reflected except for top caloper
 Personnel: Fox, Edwin, Cross, Hillery

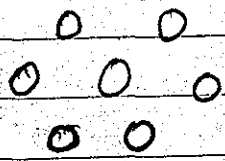
START-UP CHECKLIST
 Equipment Checked by ✓ by ✓
 Instrument and Safeties Checked by ✓
 "Source In" Checked by ✓
 Emergency Equipment in ✓
 Red Light On by ✓
 Start-Up OK'd by J.W.R. 2:45 1955

Water wt.	Fuel wt	Remarks
70.6	27.79 (70.6)	slightly sub
"	27.81 \approx 70.64	just crit.
$\text{crit vol} = 3 \times 182 \times 70.64 = 38,576$		
$\text{crit. m.} = 38,576 \times 5376 = 20,725$		

Expr. 25 Time 8:15 AM Date 5/5 1955
 Purpose CC for 7-6" cyls. in hex.
with 9" separation E. to Edge
refl except for top
 Personnel: L. W. G. E. J. R. F.

START-UP CHECKLIST
 Equipment Checked by ✓ by ✓
 Instrument and Safeties Checked by ✓
 "Source In" Checked by ✓ 2:8
 Emergency Equipment in ✓
 Red Light On by ✓
 Start-Up OK'd by ✓ Time 195

Just checked ok.



Fuel wt	H ₂ O wt.	Remarks
⁹⁰² 25.90	$\approx 65.78 \approx 65.9$	just crit.

$\text{crit vol} = 7 \times 182 \times 65.78 = 83,800$
 $\text{Mass} = 83,800 \times 5376 = 45,050 \text{ kg. } \checkmark$

Expr. 26 Time 10⁴⁰ AM PM Date 5/5 1955
 Purpose CC for 5-6" al reactor in line
with 9" edge to edge spacing
completely reflected except for top
 Personnel: For, Swin, Hilkey

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No.
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by JWS Time PM Date 5/5 1955

fuel wt. H₂O wt.

11¹² - 29.41 (69.62) 69.9 cm

just crit

Out vol = $5 \times 182 \times 69.62 = 63,35 \text{ l}$ C.M. = $63,35 \times 1,5376 = 34.06$

Expr. 27 Time 1³⁸ AM PM Date 5/5 1955
 Purpose CC for 7-6" al reactor in
hexagonal pattern with 12" edge to
edge spacing completely reflected except for top
 Personnel: For, Swin, Hilkey

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No.
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by JWS Time 1⁴⁰ PM Date 5/5 1955

fuel wt H₂O wt

3⁴⁰ PM 28.40" 72.2 cm

just crit.

$\approx 72.14 \text{ cm}$

Out vol = $7 \times 182 \times 72.14 = 91,91 \text{ l}$

11 mass = $91,91 \times 1,5376 = 49.41 \checkmark$

=20.75

chep

Expr. 28	Time 3:45	195
Purpose: CC for 3-6" ab. reactors in line with 12" edge to edge spacing completely reflected except for top		
Personnel:		
START		
Equipment Checked by	<input checked="" type="checkbox"/>	check by
Instrument and Safeties Ch.	<input checked="" type="checkbox"/>	
"Source In" Checked by	<input checked="" type="checkbox"/>	
Emergency Equipment in Control	<input checked="" type="checkbox"/>	
Red Light On by	<input checked="" type="checkbox"/>	
Start-Up OK'd by	GWJ	Time 3:45 5/15/195

$4 \frac{15}{PM}$ fuel wt H_2O ht
 $28.84''$ $73.3 cm$ just crit.
 $4 \frac{19}{PM}$ Fuel temp. = $80.0^\circ F$ by thermocouple.
 $\approx 73.25 cm$

$$\text{Crit. Vol.} = 3 \times 182 \times 73.25 = 39.99 \text{ l}$$

$$\text{Mass} = 39.99 \times 0.5374 = 21.50 \text{ kg U}_{235}$$

Expr. 29 Time 8³⁰ AM PM Date 5/6 1955
 Purpose CC for single 6" of aql.
reflected except for top
(this is repeat of exp. # 2)
 Personnel: Jay, Miller

INSTRUMENT CHECK

Date 5/6 1955 Time 8³⁰ AM PM Source No. _____

Instrument	Value	Scale	Source	Distance	Start-Up	Scale
DC-1						
DC-2	<u>trip</u>					
DC-3	<u>trip</u>					
Log N	<u>trip</u>					
R-1	<u>suspend</u>					
R-2						
P. M.	<u>trip</u>					

START-UP CHECK LIST

Equipment Checked by _____ Personnel Check by _____
 Instrument and Safeties Checked and Reset by _____
 "Source In" Checked by _____ Source No. _____
 Emergency Equipment in Control Room Checked by _____
 Red Light On by _____
 Start-Up OK'd by JWA Time: 8³⁰ AM PM Date 5/6 1955

$28.97 + 1.02 = 30$
 fuel wt H_2O wt 73.60
 $28.97''$ 73.6 cm just cut, 2.60
 ≈ 73.58 cm + 2.6 cm bottom correction 76.2
 cont. vol. = $182 \times 76.2 = 13,87$ l
 " mass = $13.87 \times .5376 = 7.46$

Expr. 30 Time 12¹² AM Date 5/6 1955
Purpose cc for 7-6" al. cyl in hep.
pattern with 15" id. to edge spacing
reflected except for top
Personnel: Fox, Quinn, Crow, Kelley

START UP
Equipment Checked by
Instrument and Safeties
"Source In" Checked by
Emergency Equipment
Red Light On by
Start-Up OK'd by JWH 6/5 1955

Fuel Wt. H₂O out
12¹³ P.M. 28.93" 93.6 cm just out.
Fuel temp. = 79.0° F by thermocouple
≈ 73.48° C
Out Vol = 7 × 182 × 73.48 = 93.61 l
1.9 man = 93.61 × .5376 = 50.32 kg

Expt. 31 Time 3²⁵ AM PM Date 5/6 1955
 Purpose cc for fuel use 2-6" al
 reactors with ~1/8" spacing
 reflected except for top
 Personnel: Fox, Cross, Hillery

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by JWH Time 3³⁰ AM PM Date 5/6 1955

4⁰² Fuel wt H₂O
 9.67" 24.6 cm just crit.
 Fuel temp. = 77.5 °F by thermocouple
 ≈ 24.56 cm
 Crit Vol = 2 × 182 × 24.56 = 89.4 l
 || Mass = 8.94 × 1,5396 = 4.81 kg

Expt. <u>32</u>	Time <u>8:30</u>	Date <u>5/19</u>	195 <u>5</u>
Purpose <u>CC for 3-6" cyl. in line</u> <u>with ~1/8" edge to edge spacing</u> <u>completely reflected except for steps</u>			
Personnel: <u>Fox, Cross, Hillier</u>			

INSTRUMENTS			
Date <u>5/19</u>	195 <u>5</u>	Time <u>8:30</u>	Scale <u>Y</u>
Instrument			
DC-1			
DC-2	<u>trip</u>		
DC-3	<u>trip</u>		
Log N	<u>loop</u>		
R-1	<u>responds</u>		
R-2			
P. M.	<u>trip</u>		

START-UP	
Equipment Checked by <u>✓</u>	Checked by <u>✓</u>
Instrument and Safety <u>✓</u>	
Source In Check <u>✓</u>	
Emergency Equipment <u>✓</u>	
Red Light On by <u>✓</u>	
Start-Up OK'd by <u>HWY</u>	195 <u>5</u>

fuel wt. H_2O wt
 9⁰⁵ AM. 8.13" 20.7 cm just crit
 ≈ 20.65 cm
 Crit vol $\approx 3 \times 182 \times 20.65 = 11.285$ l
 11 mass = $11.285 \times .5376 = 6.06$

B
0
0

Expt.	33	Time	9 ²⁵ AM	Date	5/9 1963
Purpose	cc for 3-6" cyl in line with 1/8" edge to edge spacing completely bare				
Personnel:	Fox, Swin, Alley				

Fuel Wt.	Source	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹
7.57"	in	2 ¹⁵ x 64	} 2.41	25 ¹⁴ x 69	} 2.5166
7.57"	"	2 ⁴²		26 ⁴	
16.33"	in	2 ⁴³	2	33 ⁴⁰	
22.71"	"	3 ³²	3.5	34 ⁴⁰	
28.37"	"	3 ²	} 3.17	37 ²⁰	}
"	"	3 ²⁰		34 ¹⁴	
Safety rod raised in 22"					
39.77"	"	3 ⁴	}	36 ³⁰	}
"	"	3 ¹⁸		37 ¹	

Extrap. to inf.

R
O
O
O

Expr. 34	Time 12 ⁵⁵ AM	Date 5/9 1955
Purpose CC for 4-6" cyl in line with ~4 1/2" edge to edge spacing reflected except for top		
Personnel: Fox, Swin, Mee, Hilley		
START UP		
Equipment Checked by	<input checked="" type="checkbox"/>	by <input checked="" type="checkbox"/>
Instrument and Safeties	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Emergency Equipment in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/>	
Start-Up OK'd by	JWH	Time 1:00 PM Date 5/9 1955

Safety rod lowered
 Fuel wt. H₂O wt.

1:40 P.M. 7.76" (19.71) 19.7 cm just crit.
 Cont vol = 4 x 182 x 19.71 = 14,358 ; C, M = 14,358 x .5376 = 7,711

Expr. 35	Time 2:00	Date 5/9 1955
Purpose CC for 4-6" cyl in line with ~4 1/2" edge to edge spacing base		
Personnel: Fox, Swin, Mee, Hilley		

	Fuel wt	source	C ₄	M ₄	C ₅	M ₅
	7.76"	in	36	44	23	27
	"	"	3	2	23	18
	14.8"	"	4	17	30	21
2:13	20.93"	"	4	14	34	43
	28.128"	"	4	29	36	59
	safety rod raised ~23"					
	35.44		4	22	36	21
	"	"	4	37	36	18

Extrapolated to 0

R
00000

Expt. 36 Time 3³⁰ AM PM Date 195
 Purpose CC for 6-6" cyl. in line
with 1/8" edge to edge spacing
completely spherized except for top
 Personnel: Fop, Cross, Gilley

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No.
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by gwb Time 3³⁰ AM PM Date 5/9 1955

^{4.03} fuel wt H₂O
 7.41" 18.9cm just nit
 ≈ 18.82
 crit vol. = $6 \times 18.2 \times 18.82 = 20.55 \text{ l}$
 || man = $20.55 \times 53.76 = 1105$

Expr. 37 Time 8³⁰ AM Date 5/10 1955
 Purpose cc for 6-6" abcyd. in line
with 1/8" edge to edge spacing
~~completing up hole except for top Bar~~
 Personnel: Fox, Hillery

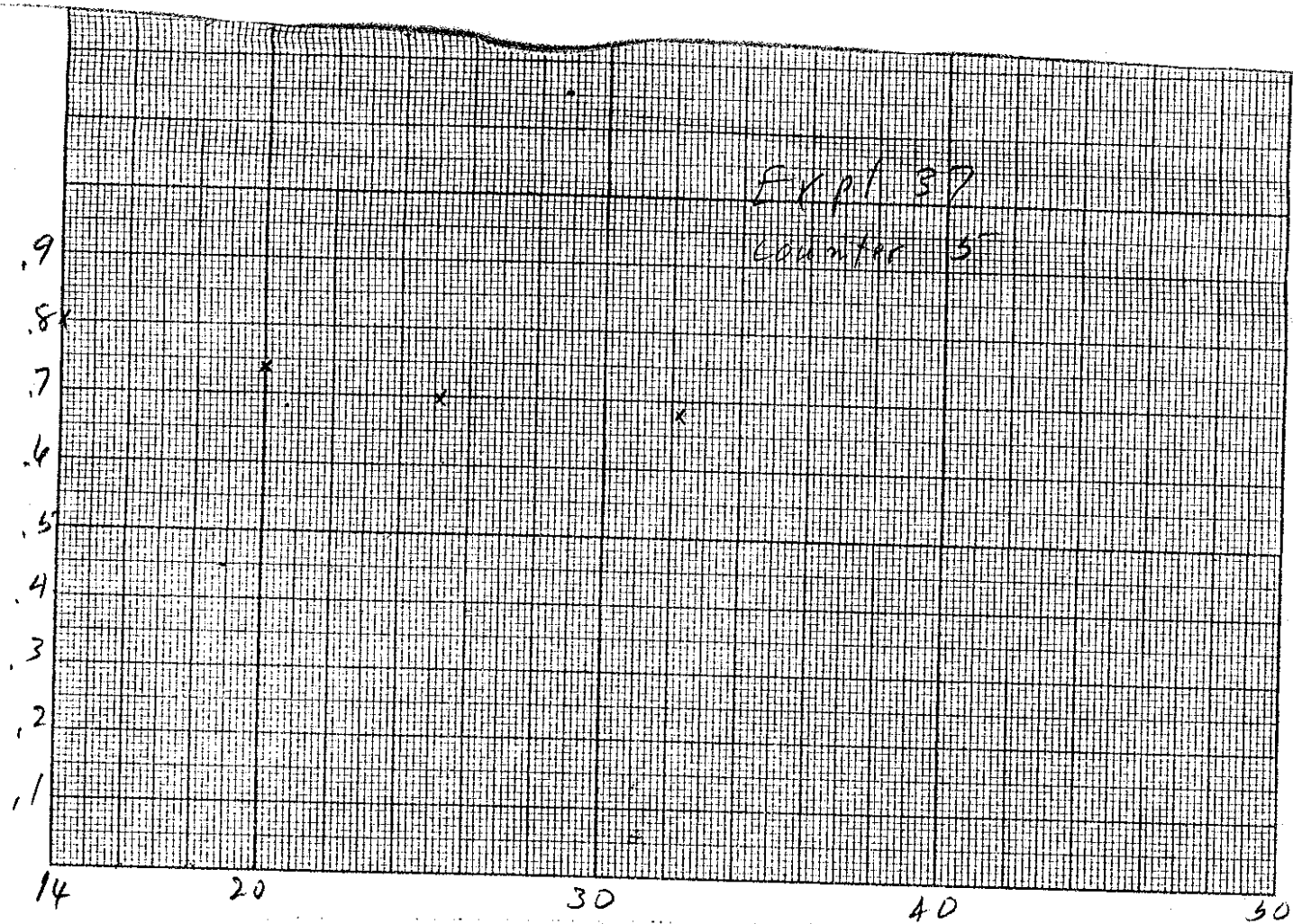
B
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 O
 O

Date 5/10 1955 Time 8³⁰
 Instrument V Scale
 DC-1 _____
 DC-2 trip 240 on 28 R10
 DC-3 " 285 " 100 x 1
 Log N trip
 R-1 reports
 R-2 _____
 P. M. trip

START-UP CHECKLIST
 Equipment Checked by ✓ check by ✓
 Instrument and Safeties Checked and Ready ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by HWA Time 8³⁰ Date 5/10 1955

	50/20 ht	C4	C5
	8.43"	6 ¹⁴	44 ³²
		6 ²	42 ³²
8 ⁵⁰	14.4"	7 ⁸ 80	54 ¹⁴ 80
	20.09"	7 ⁴ 83	59 ⁴¹ 174
	25.21"	6 ⁶³ 86	62 ⁴¹ 70
	32.23"	7 ⁶ 80	64 ³⁰
9 ²³	"	7 ⁵⁸	64 ² 48

Ext rap to D

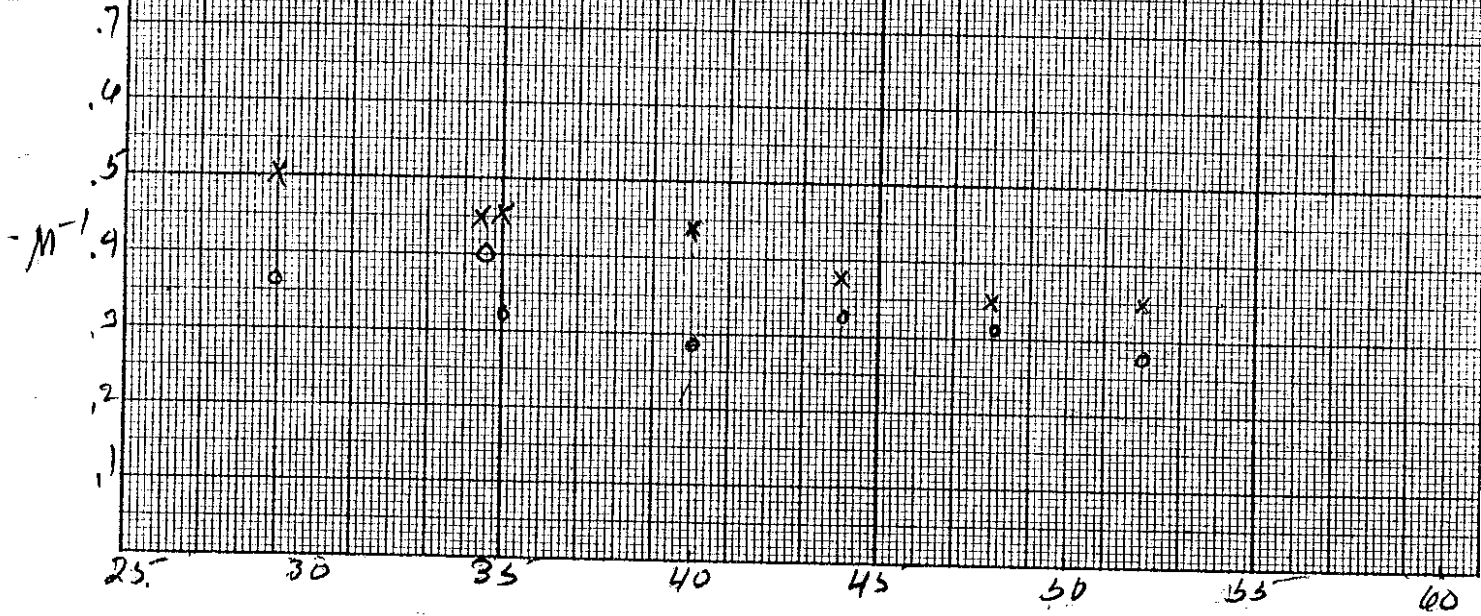


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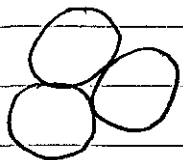
NO. 340. M DIETZGEN GRAPH PAPER
MILLIMETER

EXPT 38

$V = C_1$
 $D = C_2$



Expr. 38 Time 10⁰⁵ AM Date 3/10 1955
 Purpose C.G. 3-6" Cyls. - 1/4"
Separation hex. pattern
 Personnel: Bare
L.W.G., R.G., W.T.M., J.R.P.



START-UP CHECK LIST

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

Sol'n ht.	C ₉	C ₅
8.57"	5.15	28.52
"	5.25	29.34
12.48"	6.48	39.4
15.80"	7.27	48.54
20.00"	8.53	58.60
28.89"	10.32	79.40
35.21"	11.28	89.14
40.12"	12.0	100.32

Safety rod raised. Instruments show drop in reactivity (not connected with safety rod movement)

11.17	52.61"	10.38	91.22
"	"	11.47	110.21
"	48.17"	11.37	99.51
"	44.07	10.38	94.3
"	34.56"	8.62	78.2
"	10.39"	4.2	31.1
"	"	4.3	30.2

Extrap to < 70", Probability 0.

Expt. 3839 Time 9⁰⁵ AM Date 5/11 1955
 Purpose CC for 3-6" cyl. in hex. array
with a 1/8" edge to edge spacing
completely reflected except for top
 Personnel: Jay, Cross, & Hilley

INSTRUMENT

Date 5/11 1955 Time 9⁰⁵ AM
 Trip _____
 Instrument Volt 3-3 Scale 100 X 1 Scale
 DC-1 _____
 DC-2 trip @ 65 on 10 X 10 scale
 DC-3 trip @ 85 " 100 X 1 "
 Log N trip x 5 sec
 R-1 responds to source
 R-2 _____
 P. M. trip

START-UP CHECK LIST

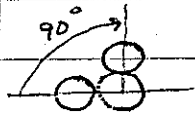
Equipment Checked by ✓ _____
 Instrument and Safeties Checked by ✓ _____
 "Source In" Checked by ✓ _____
 Emergency Equipment in _____
 Red Light On by ✓ _____
 Start-Up OK'd by JWA 9²⁵ Date 5/11 1955

fuel wt. H₂O
 10¹⁰ 6.99" 17.8cm just cut
 ≈ 17.75cm

$$\text{crit. vol.} = 3 \times 182 \times 17.75 = 9.69 \cdot l$$

$$\text{" Man} = 9.69 \cdot v. 53.76 = 5.21$$

Expt. 3940 Time 11⁰⁰ AM PM Date 5/11 1955
 Purpose cc for 3-6" al. cyl with ~1/8" edge to edge spacing. array is two in line with third at 90° from line
 Personnel: Fox, Hurn, Mee, Hilley

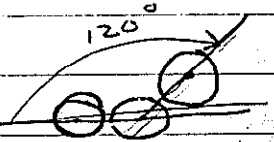


Reflected except for top

Fuel wt. H₂O wt.

^{11³⁰}
 Crit Vol = $3 \times 182 \times 19.6 = 10.64 \text{ l}$ just crit
 $\text{C.M.} = 10.64 \times 53.76 = 572$

Expt. 41 Time 1²⁰ AM PM Date 5/11 1955
 Purpose cc for 3-6" al. cyl with ~1/8" edge to edge spacing. array is two in line with third at 120° from line
 Personnel: Fox, Mee, Hurn, Hilley



Completely reflected except for top

START-UP CHECK-LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safety Checked and ✓
 "Source In" Checked by ✓
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start Up OK'd by JWA Time 1²⁰ PM Date 5/11 1955

Fuel wt. H₂O wt.

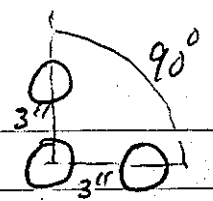
^{1⁵⁰}
 Crit Vol = $3 \times 182 \times 20.4 = 11.14 \text{ l}$ just crit.

$\approx 20.40 \text{ cm}$

$\text{Crit, Vol} = 3 \times 182 \times 20.40 = 11.14 \text{ l}$

$\text{Man} = 11.14 \times 53.76 = 5.99 \text{ kg}$

Expt. 42 Time 3:22 AM PM Date 5-11 1955
 Purpose C.C. 3-6" reactors at 90°
Separated 3" Edge to Edge
repl. except for top
 Personnel: LWG CLK KF



START-UP CHECK LIST

Equipment Checked by ✓ Check by ✓
 Instrument and Safeties Checked and ✓
 "Source In" Checked by ✓ No. 38
 Emergency Equipment in ✓
 Red Light On by ✓
 Start-Up OK'd by _____ Time _____ 195____

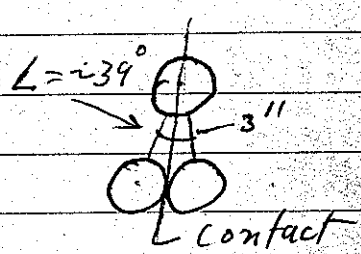
Fuel wt. ~~Head~~ ht 35.74 cm ≈ 14.07" 35.7 cm
 $cont vol = 3 \times 182 \times 35.74 = 19,511$; $C.M = 19,511 \times .5376 = 10,496$

Expt. 43 Time 9 AM PM Date 5-12 1955
 Purpose C.C. 3-6" cyls. as in
Diagram repl. except for top
 Personnel: LWG CLK KF

START-UP CHECK LIST

Equipment Checked by ✓ Person _____ Check by ✓
 Instrument and Safeties Checked and ✓
 "Source In" Checked by ✓ No. 38
 Emergency Equipment in Control Room ✓
 Red Light On by ✓ AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 195____

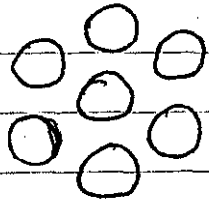
instr checked ok



fuel wt. 9.21" 23.4 cm just cut
 $≈ 23.39$
 $cont vol = 23.39 \times 3 \times 182 = 12,77$ l
 $1. mass 12,77 \times .5376 = 6.87$

Expr. 44 Time 10:25 AM Date 5-12 1955
 Purpose C.C. 7-6" Reactors in hex
Array 2" Edge to Edge Bake
 Personnel: L.W.G., M.C., Cross, Fox

37
B.



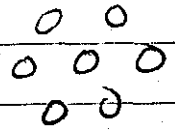
START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1955

$\approx 51.56 \text{ cm}$
 John ht. $20.30''$ just critical
 Crit. Vol = $7 \times 182 \times 51.56 = 65,691$, C.M. = $65,691 \times .5376 =$

35,3014 kg

Expr. 45 Time 11 AM Date 5-12 1955
 Purpose C.C. 7-6" Reactors in hex
Array 2" Edge to Edge Regl. except
for top
 Personnel: L.W.G., M.C., Cross, Fox

R



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1955

John ht water ht
 $6.89 (17.50)$, $17.5''$ just Crit.

Crit. Vol. = $7 \times 182 \times 17.50 = 22,30$
 " mass = $22.30 \times .5376 = 11.99 \text{ kg}$

Expt. 46 Time 3:15 ^{AM} PM Date 5-12- 1955
 Purpose C.C. 7-6" reactors hex.
Pattern - 4" Edge to Edge
Retn. except 1 for TOP
 Personnel: KWLG JRP

START UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties
 "Source In" Checked by Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by _____ Time _____ PM Date _____ 1955

John ht. H₂O ht.

12.15
 ≈ 30.86 cm

3085

just out

Out. vol = 30.86 x 7 x 182 = 39.32

11 Man = 39.32 x .5376 = 21.14

Expt. 47 Time 9:45 ^{AM} PM Date 5-13 1955
 Purpose C.C. 7-6" R. Hex. Array
4" E.H.E. Bare
 Personnel: LW Ct. Fox

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1955

John ht

6.98

11

11

12.07

15.93

11

C₄

2.34

3.45 } 3.2

2.54

5.0 6.4

6.73

6.2 4.9

C₂

23.57

24.20 } 24.3

24.37

37.75 16.44

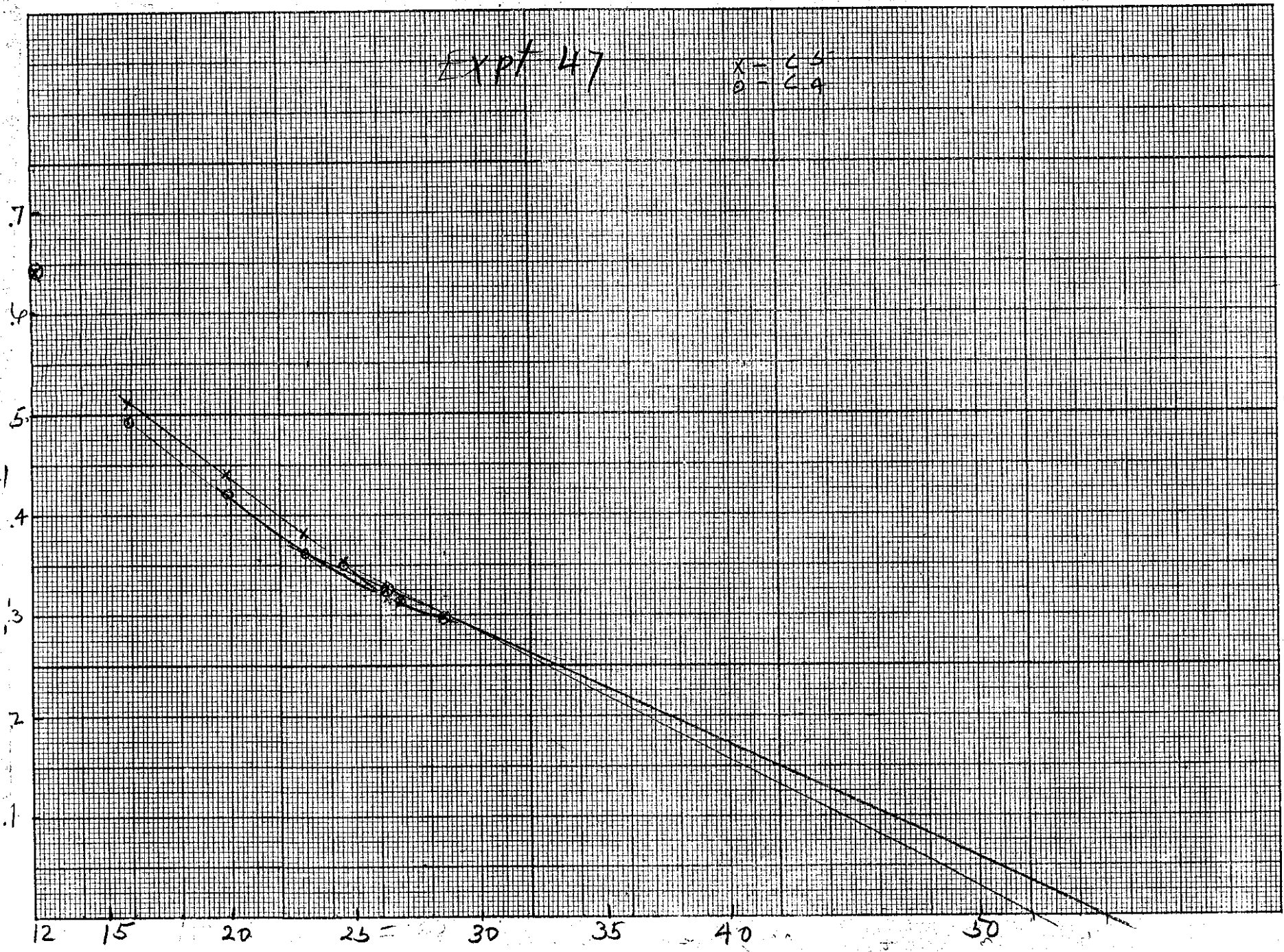
46.3

47.2 .52

EXPT 47

$$\frac{x}{y} = \frac{c_1}{c_2}$$

M⁻¹



174

Expt 47 cont

Soln ht. inches	C ₄ (3.2)	C ₅ - (24.3)	39
19.93	7.6	55.3	
"	7.75 ⁻ .42	55.5 ⁻ .44	
22.96	8.75	62.25	
"	8.25	65.75	
"	9.25 ⁻ .36	63.5 ⁻ .38	
24.44	9.5	68.5	
"	8.25 9.25	69.25 ⁻ .38	
"	9.5 ⁻ 9.25	69.75 ⁻ 69.0	
"	9.0 ⁻ .347	68.50 ⁻ .352	
26.81	10.5	75.5	
"	10.5 ⁻ 10.2	78.1 ⁻ 77.5 ⁻	
"	10.15	77.0	
"	10.1 ⁻ .314	78.4 ⁻ .314	
"	10.4 ⁻ 10.2	76.2 ⁻ 76.8	
"	9.9	75.5	
"	10.3 ⁻ .314	78.7 ⁻ 314	
28.52	10.4	80.6	
"	11.0	83.5	
"	10.9 ⁻ 10.9	81.3 ⁻ 82.0	
"	11.0	83.6	
"	11.1 ⁻ .296	81.4 ⁻ .296	
26.26	9.7	75.5	
"	9.5 ⁻ 9.7	72.5 ⁻ 74.5	
"	10.1	74.7	
"	9.75 ⁻ .330	75.1 ⁻ .326	

Ex trap to $\approx 53'' \approx 134$

• Crut vol = $7 \times 182 \times 134.6 = \approx 171 \text{ l}$

• mass = $\approx 171 \times .5376 = \approx 92$

40

5/18/55

Sample taken:

Sample bottle # P-197

Reg. # 354712

Gross 91.4148

Tare 23.6917

$$.34765 \times 93.2 = .3240 \frac{\text{gm}^25}{\text{gm}}$$

net 67.7231

$$\frac{\text{gm}^25}{\text{cm}^3} = .3240 \times 1.463 = .5388$$

$$1.298 \times .3477 = \begin{array}{r} 1.00000 \\ 45125 \\ \hline .54875 \end{array}$$

$$\frac{H}{X} = \frac{24.11 \times .54875}{.3240} = 44.2$$

354712

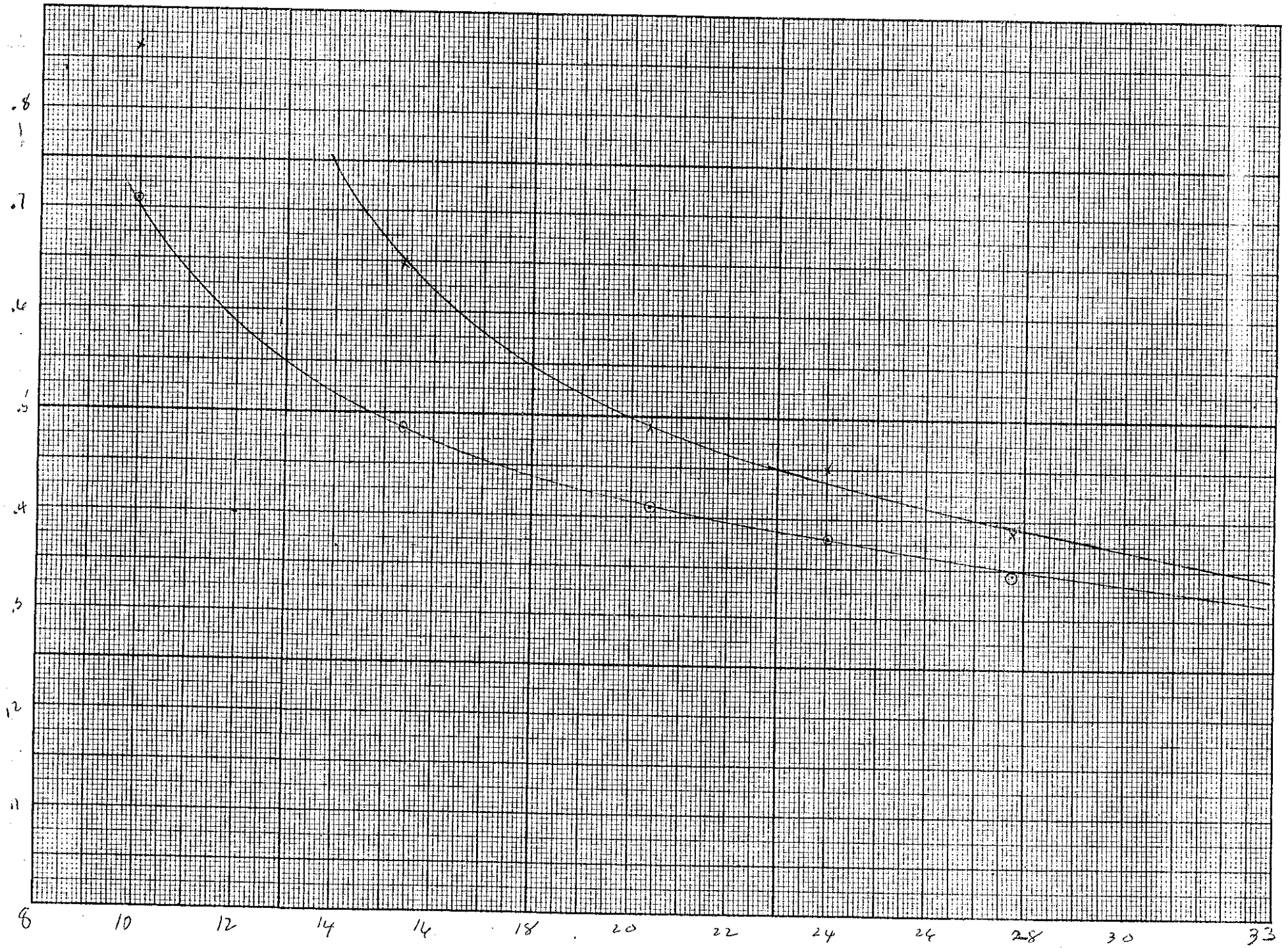
BATCH NUMBER		REQUISITION NUMBER	
REPORT TO: <u>L.W. Gilley</u>			
BUILDING NO. <u>9213</u>			
DESCRIPTION OF MATERIAL:			
<u>UO₂F₂ solution</u>			
<u>~ 0.3 to 0.4 gm U/gm</u>			
<u>special</u>			
IF NOT TO BE COMPOSITED CHECK HERE..... <input checked="" type="checkbox"/>			
ASSAY REQUESTED		AT CODE NO.	
AT <input type="checkbox"/>	DT <input type="checkbox"/>		
ANALYSIS REQUESTED		REPORTED ANSWERS	
GRAM/GRAM T		<u>34765</u>	
<u>sp. gr.</u>		<u>Sp. gr. - 1.6630</u>	
SIGNED:			
BY:		DATE: <u>25</u> <u>1955</u>	

REQUEST for - <u>1</u> <u>01456</u>		Req. No. <u>5041</u>	
SPECTROGRAPHIC ANALYSIS		<u>354712</u>	
By Dept <u>2230</u> Time <u> </u> M		Mat. Type Code <u>1937</u>	
Sampled by <u>EW</u> Date <u>5-19</u>		Dept. Code No. <u> </u>	
Cont'r No. <u> </u>		Batch Numbers	
Gross <u> </u>		<u>UO₂F₂ solution</u>	
Tare <u> </u>		<u>354712</u>	
Net <u> </u>			
Analy. Ans <u> </u>		By <u> </u>	
		Date <u> </u>	

Spectrographic Analysis
Answers in P.P.M.

Ag <1	Al 106	As	Au	B 1.8
Ba <10	Be	Bi	Ca 150	Cd
Co	Cr 190	Cs	Cu 8	Fe 440
Ga	Ge	Hg	In	K <50
Li	Mg 44	Mn 16	Mo	Na <10
Ni 225	P 140	Pb 20	Rb	Sb
Si 24	Sn <10	Sr	Ti	Tl
U	V	Zn <40	C	RE

Signed al - Bd Date 5-24-55



$H/x = 44.2$

Expt. 48 Time 1:25 AM Date 5/19 1953
 Purpose CC for 7-6" alcyl. with 4" edge to
edge spacing and each cyl. wrapped with at
least 0.025" cadmium to det. of ~36" - base otherwise
 Personnel: Fox, Killey

INSTRUMENT CHECK

Date 5/19 1953 Time 1:25 AM Source No. _____
 Instrument _____
 DC-1 _____
 DC-2 trip
 DC-3 trip
 Log N trip
 R-1 responds
 R-2 _____
 P. M. trip

B-ld
0 0
0 0 0
0 0

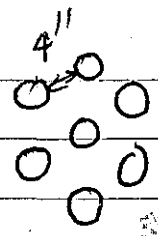
START-UP CHECK-LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Ready ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by W. A. Time 1:25 AM Date 5/19 1953

Dist. Mt.	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹	Notes
6.53"	1 ⁶² x 64	1.8	11 ²⁶ x 64	11.5	~ 58"
"	1 ⁴⁵		11 ⁴⁰		
9.99"	2 ²⁸	2.53	13 ¹⁹	13.33	.864
"	2 ⁴¹		13 ²³		
15.36"	3 ⁴⁵	3.7	17 ⁴⁷	17.73	.648
20.34"	4 ²⁵	4.39	23 ³³	23.51	.49
24.02"	4 ³³	4.75	26 ²	25.7	.45
	5 ²⁸		25 ⁴⁷		
26.05"	4 ²¹	3.45	27 ²⁵	29.77	.387
	4 ²²		28 ²		
	4 ²¹		28 ¹⁴		
27.77"	5 ²⁰		29 ¹⁴		
	5 ¹⁴		30 ⁴⁴		

~~Extrap to~~
~~CIV = 1.878~~
~~CM = ~100 by~~
 Indefinite

Expr. 49 Time 3³⁰ AM 5/19 1955
 Purpose cc for 7-6" dia. cyl. with 4" edge to edge space
with ~0.028" dia. wrapped around each cyl. to fit
of ~36" reflected
 Personnel: Foley, Lewis, Mee, Kelley



CK LIST
 Equipment Checked by _____
 Instrument and Sa _____
 "Source In" Chr _____
 Emergency Exp _____
 Red Light On _____
 Start-Up OK at _____
 Date 5/19 1955

Swep ht.	H ₂ O	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹
27.77"	80.9cm	5	4.67	1	1
"	"	4.5			
"	"	4.5			
23.95"	"	2.55	2.71	0.55	1.02
"	"	2.41			
17.95"	"	1.72	2.02	1.09	1.09
"	"	2.32			
7.90		3.0		1.09 1.33	

Extrapolated to 0

Expr. 50 Time 9¹⁰ ^{AM}/_{PM} Date 5/20 1955
 Purpose cc for 7-6" cly wrapped in cd
with 1/8" edge to edge spacing in Rep assay
base otherwise
 Personnel: _____

INSTRUMENT CHECK

Date 5/20 1955 Time 9¹⁰ ^{AM}/_{PM} Source No. _____
 Trip _____
 Instrument _____
 DC-1 _____
 DC-2 trip
 DC-3 trip
 Log-N _____
 R-1 responds
 R-2 _____
 P. M. trip

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ ^{AM}/_{PM}
 Start-Up OK'd by AWA Time 9¹⁰ ^{AM}/_{PM} Date 5/20 1955

fuel ht.	C ₄	M ₄	C ₅	M ₅
6.81"	25 ²		17 ²⁵	
"	24 ⁵⁴		17 ³⁹	

9⁴⁰ 10.25" 2604^{cm} source out - just crit.

$C.V. = 26.04 \times 7 \times 182 = 33,187$; $C.M. = 33,187 \times 5376 = 17,84 \text{ kg}$

Expr. 51 Time 10²² ^{AM}/_{PM} Date 5-20 1955
 Purpose cc for 7-6" clys. cd wrapped
1/8" edge to edge Refl. except
for trip
 Personnel: L.W.G. M.C. Gullison, Fox

Source Water ht.
 8.06 20.5 just crit.
 $\approx 20.47 \text{ cm}$

$C.V. = 7 \times 182 \times 20.47 = 26.08$
 $C.M. = 26.08 \times 5376 = 14.02 \text{ kg}$

Expt. 52 Time 1:40 Date 5/20/1955
 Purpose C.C. 7-6" U.S. hex array
Cd wrapped, 2" Edge to Edge
 Personnel: JRF, LWC

START-UP CHECKLIST
 Equipment Checked by Person Lock by
 Instrument and Safeties Checked and OK'd by
 "Source In" Checked by
 Emergency Equipment
 Red Light On by
 Start-Up OK'd by

1:32 PM

Subst.	C4	C5
6.05 "	9.27 9.5	6.57 6.35
"	9.75	6.25
9.99	14.25 67	9.5 67
14.01	22.5 42	15.75 40
16.10	28.5 33	18.0 35
17.91	34.0	23.5
"	34.5 285	24.5 265
21.0	57.75 165	37.8 168
"	58.60	37.0
23.91	250 038	157.7 04
24.64	just crit.	
≈ 62.59 cm		

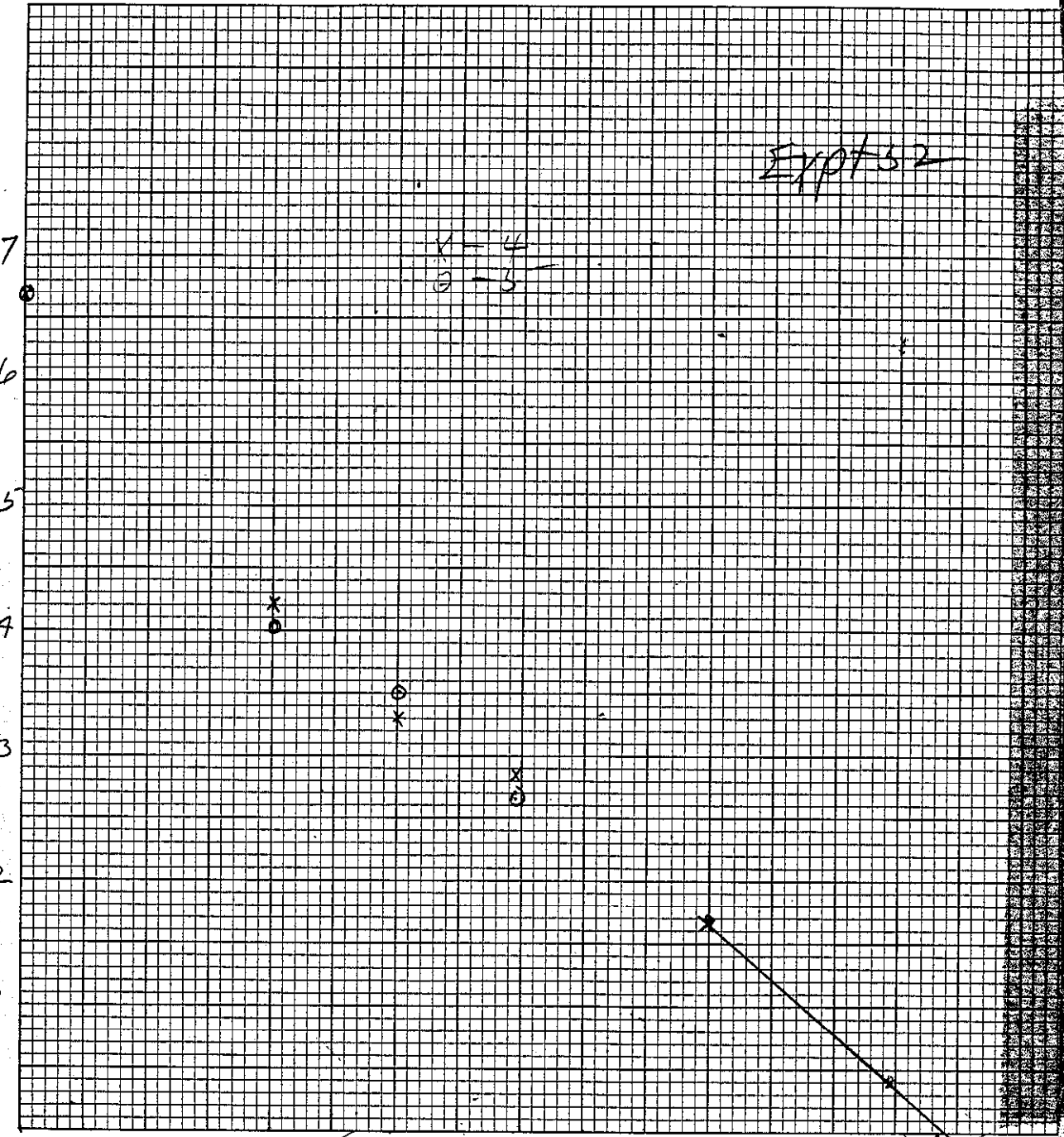
$$C_1 V = 7 \times 182 \times 62.59 = 79.741$$

$$C_1 M_1 = 79.74 \times 5376 = 42187$$

EXPT 52

$\lambda = 4$
 $\theta = 5$

.7
.6
.5
.4
.3
.2
.1



10 15 20 25

Ht. in.

KEUFFEL & ESSER CO.
MADE IN U. S. A.

Expr. 53 Time 3:05 ^{PM} Date 5-20-1955
 Purpose C.C. 7-6" cys hex array
cd wrapped, 2" edge to edge
water refl. except for top
 Personnel: LW CT JKF

START-UP CHECK LIST

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

Water ht	Soln. ht	C4	C5
75 cm	27.32"	279 .89	286 .90
"	"	282	277
"	25.18	275.5	277.92
"	19.98	275.96	276.92
"	10.75	250 .250	253 .254
"	"	250	255

Extrap. to ∞
 But data poor

Expt. 5.4 Time 9:25 AM Date 5/23 1955
 Purpose CC for 7-6" of cyl with 20.056" d wrapped with 3" edge to edge spacing BARC
 Personnel: _____

INSTRUMENT

Date 5/23 1955 Time 9:25 AM

Instrument Values Size Source Name Range Full Scale

DC-1 trip 2.75 am 20X10

DC-2 trip 2.85 am 100X1

Log N trip 2.5 am

R-1 response

R-2 _____

P. M. trip

long extrap
 ~ 52"
 ~ 132 cm

Equipment Checked

Instrument an

"Source In"

Emergency Ec

Red Light On

Start-Up OK'd by JWA 9:30 Date 5/23 1955

fuel wt.	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹
C.V. = ~ 1482 6.34"	9.42	9.86	6.31	6.49
CM = ~ 90 1/2 hrs	10.4		6.44	
"	9.59		6.15	
12.04"	15.37	.414	10.44	.63
"	16.26 16.00		9.61	
20.42"	24.25	.414	14.36	.42
"	23.2 23.12		16.41	
24.53"	27.45	.355	17.0	.39
"	27.38 27.14		16.29	
26.37"	27.02 27.12	.343	19.3	.34
	30.9 28.20		18.32 20.4	
27.57	31.40 30.29 29.23	.32	19.24, 20.0, 20.35	

EXPT 54

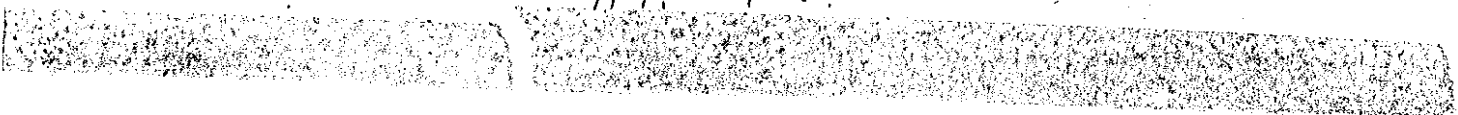
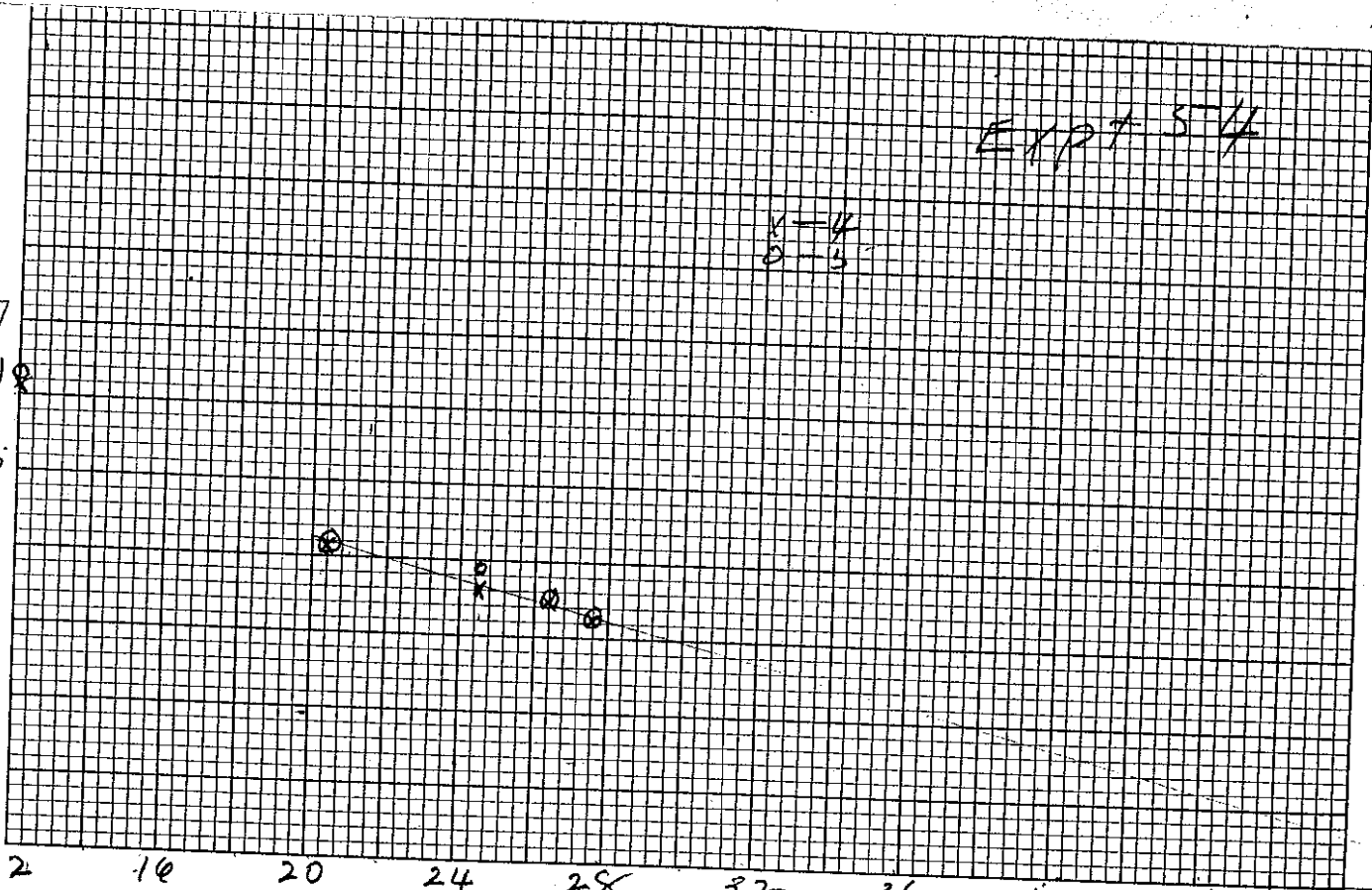
$V = 4$
 $D = 3$

M-18
.7
.5
.3
.1

12 16 20 24 28 32 36 40 44 48

Ht. 1m.

52



Expt. 55 Time 10:55 AM Date 5/23 1953
 Purpose C.C. 7-6" R 3" Edge to Edge
Hex array; cd wrapped Reflected
except for top
 Personnel: LWGT JKF

47

START-UP CHECK LIST

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

Fuel ht.	H ₂ O ht.	C4	C5
27.57	71.4	250/253	204/202
"	"	257	199
24.29	"	253	196
19.67	"	253 ⁶²	193 ³⁷
"	"	253 ³³	190 ²¹
7.84"	"	233/231 ²	174/173 ¹³
"	"	233/233 ²⁴	174/174 ²⁵

Probably extrap to 2

Expr. 50 2:30 PM 5-23-57

Purpose C.C. 7-6" Cyls. Hex. Array, 1 "Edge to Edge"
cd wrapped, Bare

Personnel: LW CF JRF

STATION CHECK LIST

Equipment Checked by K back by L

Instrument and Safety ✓

"Source In" Ch. 58

Emergency Equip. ✓

Red Light On ✓

Start Up OK ✓

195

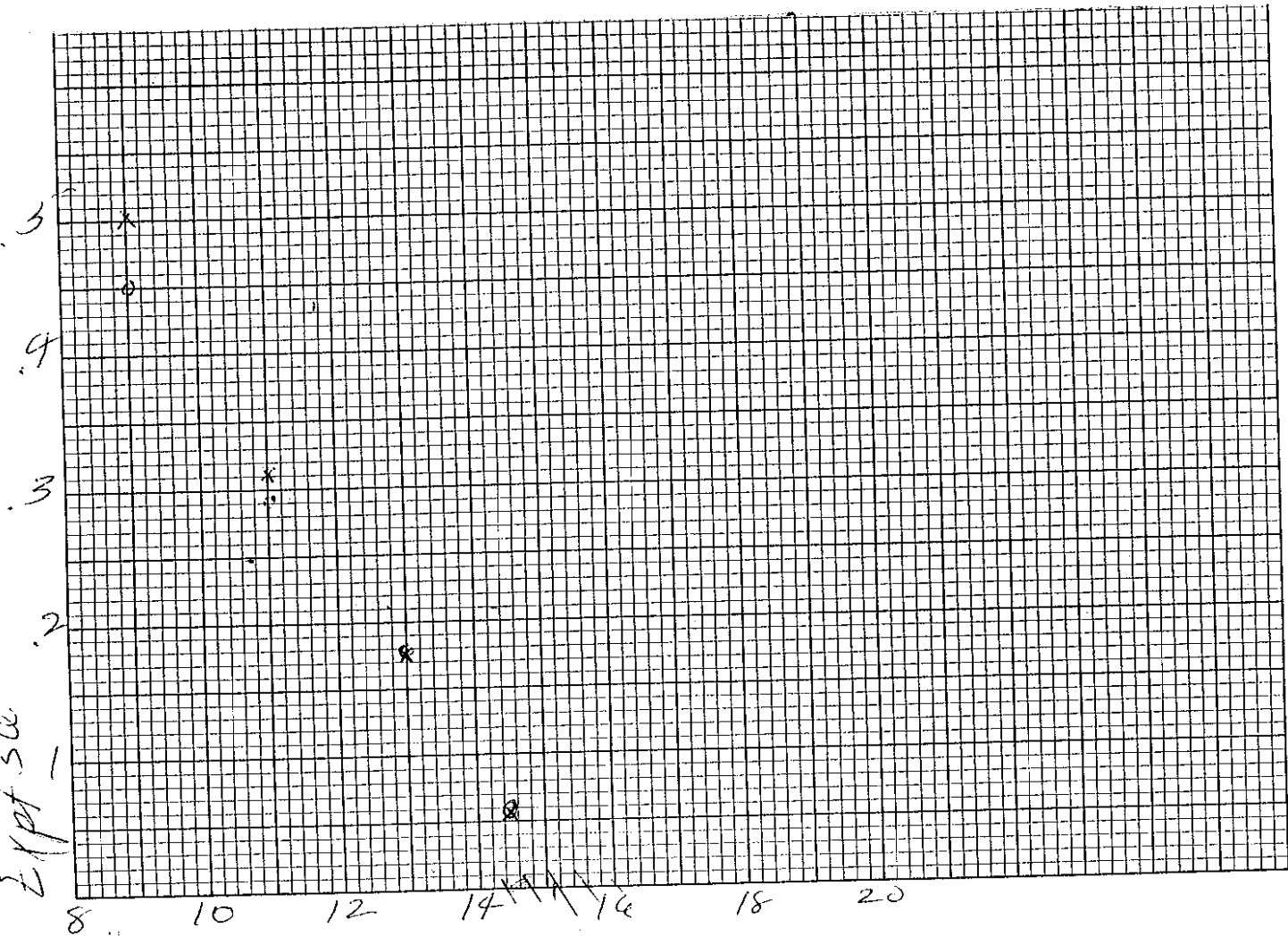
John Mt.	C4	C5
5.01 "	17 ⁴⁰ 17.5	7 ²⁴ } 7.4
"	17 ²⁰	7 ²⁸ }
8.99	36 ⁴² .50	16 ⁵⁰ .45
11.00	56 ²³ .31	25 ⁶⁰ .29
12.95	100 ⁴⁶ .175	41 ²⁰ .179
14.47	309.75 .054	133.15 .055
15.10	first crit.	
Σ 38.35		

crit vol. = $7 \times 182 \times 38.35 = 48.86 \text{ l.}$

1. mass = $48.86 \times 5376 = 26.27 \text{ kg}$

358-13K KEUFFEL & ESSER CO.
Two Millimeters, Centimeter lines heavy.
MADE IN U. S. A.

Expt 5a



Expr. 57 Time AM Date 5-23-55
 Purpose Same as F. 56 except
repl. except for top

49

R-cd

000"
000
00

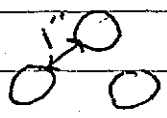
Personnel: LABORATORY CHECKLIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No.
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up Op'd by Water Time AM Date 195

Vol. at Water ht
 $17.44''$ 44.3 cm just exit
 ≈ 44.30 cm

C. Vol. = $7 \times 182 \times 44.30 = 56.43$ l

C. M = $56.43 \times 5370 = 30,34$ kg.

B-cd



Expr. 58 " 10³⁰ AM Date 5/24 1955
 Purpose cc for 3-6" al cyl in hex array
cd wrapped with 1" edge to edge
spacing bare
 Personnel: Ford, Hilley

INSTRUMENT CHECK

Date 5/24 1955 Time 10³⁰ AM Source No. _____
 Instrument V. 10 Range 100 Distance _____ Start-Up Scale _____
 DC-1 _____
 DC-2 trip ~ 80 on 10x20
 DC-3 " 90 on 100x1
 Log N trip
 R-1 responds
 R-2 _____
 P. M. trip

Equipment Checked by _____
 Instrument at _____
 "Source In" _____
 Emergency _____
 Red Light On
 Start-Up OK'd by R.W.H. 10³⁰ 5/25 1955

fuel wt.	C ₄	M ₄	C ₅	M ₅
6.18"	11 ²⁸		11 ⁵³	
"	11 ³		11 ⁴¹	
11.96"	15 ¹²		13 ¹⁸	
"	14 ⁶²		14 ³	
19.12"	14 ²⁵		14 ⁵¹	
30.05"	15 ²³		12 ⁵⁷	
"	15 ²⁹		13 ³⁴	

Ex trap to ∞

51
R-CD
OO
OK, "

Expr. 59 Time 10⁰⁰ AM PM Date 5/24/1955
 Purpose C.C. 3-6" cyl. Hex pattern
1" E. to E. CD, wrapped r/r fl.
EXCEPT FOR TOP
 Personnel: L.W.G. J.K.F. C. Cross

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 38
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start Up OK'd by _____ Time _____ PM Date _____ 195

			Scale 25u	
John ht	Water ht	C4	C5	
45.13"	107cm	.85 140	293.25	93
"	"	.85 140	295	93
41.37	"	.85 139	299	"
35.21	"	.85 140	302	92
24.87	"	.85 140.5	297	"
8.62	"	119	276.5	278.5
"	"	118	279	

System inf. rope

Water Temp 76.5° F

Expr. 60 Time 8³⁰ Date 5/25 1953
 Purpose cc for 7-6" cyl in dep array -
no cadmium - 1" edge to edge spacing
completely bare
 Personnel: Fox, Hilley

INSTRUMENT CHECK

Date 5/25 1953 Time 8³⁰ AM
 Trip _____ Source No. _____

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>trip</u>			
DC-3	<u>trip</u>			
Log N	<u>trip</u>			
R-1	<u>trip</u>			
R-2				
P. M.	<u>trip</u>			

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by J.W.H. Time 8³⁵ AM Date 5/25 1953

fuel ht source

8⁵⁵

13.00" = 33.00 cm

C.V. = 42.04 l C.M. = 22.60 kg

Expr. 61 Time 9⁰⁵ Date 5/25 1953
 Purpose cc of above array refl.
 Personnel: L.W.H. J.R.F.

ash ht water ht

5.42"

13.70 cm

= 13.77 cm

C.V. = 1274 x 13.77 = 17.54 l

C.M. = 17.54 x 5376 = 9.43 kg

6/3/55 Note: approx. 8 liters of solution at 1/4 wt added to system

-53-

8" cylinders put in sid.

$$H/X = 44.2 \text{ from}$$

last previous analysis

Expr. 62 Time 12:55 AM PM Date 6/3/55 195
 Purpose CC of single 8" ab. cyl. base
 Personnel: Jay, Cross, Halley

This value probably more true than later analysis

INSTRUMENT CHECK

Date 6/3 1955 Time 12:55 AM PM Source No. _____
 Trip _____
 Instrument V_{max} S₀'s Source Distance Start-Up Scale

DC-1				
DC-2	<u>trip</u>			
DC-3	<u>trip</u>			
Log	<u>trip</u>			
R-1	<u>trip</u>			
R-2	<u>trip</u>			
P. M.	<u>trip</u>			

av. analysis used

$$H/X = 44.3$$

factor .5376

START-UP CHECK LIST

Equipment Checked by _____ Personnel Check by _____
 Instrument and Safeties Checked and Reset by _____
 "Source In" Checked by _____ Source No. _____
 Emergency Equipment in Control Room Checked by _____
 Red Light On by _____
 Start Up OK'd by YWA Time 1:00 AM PM Date 6/3 1955

Fuel ht.	C ₄	M ₄	C ₅	M ₅
50.06"	16 ¹⁰ x 14		18 ⁴ x 16	
"	16 ¹¹		17 ²	
44.85"	17 ¹		17 ¹²	
36.67	16 ⁸		19 ³	
"	14 ¹²		16 ¹³	
29.93	18.		15 ³	
"	17		16 ⁸	
21.95	16 ¹¹		15 ⁹	
10.7	13 ^L		13 ²	
"	15 ^L		13 ¹²	

Expr. 63 Time 2:25 Date 6-3 1955
 Purpose C.C. 1-8" Dia Reactor
Ref. except. for top
 Personnel: CROON, FOX, CROSS, L.W.G.

START UP ON

Equipment Checked by
 Instrument and Safeties checked and reset by back by
 "Source In" Checked by
 Emergency Equipment
 Red Light On by SS
 Start-Up OK'd by J.K.P.

195

22.78
 1.50
 24.28

Soln ht Water ht
 3.5 9.56
 3.7cm 8.97" (22.78) + better correction 1.5cm
 22.8 cm just crit.

$C.V. = 325 \times 24.28 = 7,891$ $C.M = 7,891 \times 53.06 = 4,244 \text{ kg}$

Expr. 64 Time 10:00 AM Date 6/6 1955
 Purpose cc for 7-8" dia cyl. base
Hex. array - edge to edge spacing ~ 1/8"
 Personnel: L.W.G. CROSS, FOX

INSTRUMENT CHECK

Date 6/6 Time 10:00 AM Source No. _____

Instrument	Value	Scale	Source	Dist. from	Start-Up Scale
DC-1					
DC-2	<u>trip</u>				
DC-3	<u>trip ~ 85</u>	<u>cm</u>	<u>1X100</u>		
Log N.	<u>trip</u>				
R-1	<u>trip</u>				
R-2					
P. M.	<u>trip</u>				

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by L.W.G. Time 10:10 PM Date 6/6 1955

Fuel ht. Source
 18.29 cm 7.20" out
 $C.V. = 2275 \times 18.29 = 41,610$ just crit. $C.M = 22,37$

Expr.	65	Time	10 ²⁵ AM	PM	Date	4/6	1955
Purpose	CC for 7-8" ab. cyl in hex. array with 1/8" edge to edge spacing						
	reflected current for top						
Personnel:	L. W. G. J. H. T.						

START-UP-CHECK-LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/> Source No. 58
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/> AM
Start-Up OK'd by	J. H. T. Time _____ PM Date _____ 1955

John Mt. Water Mt. Remarks

(11.94) 4.70" 11.9cm just cut.
 $C, V = 2275 \times 11.94 = 27.16 \text{ l}$ $C, M = 27.16 \times 5376$

Expr.	66	Time	1 ²⁵ AM	PM	Date	4/6	1955
Purpose	CC for 7-8" ab. cyl in hex. array with 1" edge to edge spacing						
	base						
Personnel:	Fox, Cross, Gillay						

= 14.60 kg

START-UP-CHECK-LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/> Source No. _____
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/> AM
Start-Up OK'd by	J. H. T. Time 1 ²⁵ PM Date 4/6 1955

Fuel Mt. source

8.51" out just cut.
 $\approx 21.62 \text{ cm}$

$C, V = 2275 \times 21.62 = 49.18 \text{ l}$
 $C, M = 49.18 \times 5376 = 26.44 \text{ kg.}$

Expr.	67	Time	2 ⁵⁵ PM	Date	6/6	1955
Purpose	cc for 7.8" al cyl in bed					
	away with 1" edge to edge spacing					
	reflected except for top					
Personnel:	Fog, Cross, Hiller					

CS LIST	
Equipment Check	Book by
Instrument	
Source Is	
Emergency	
Red Light	
Start-Up Ok'd by	G.W.R. 6/6 1955

Fuel wt. source H₂O

112.8 cm just cut

$$5.03'' \approx 12.78 \text{ cm}$$

$$C.V. = 22.75 \times 12.78 = 29.07 \text{ l}$$

$$C.M. = 29.07 \times 5376 = 15,63 \text{ kg}$$

354713

BATCH NUMBER	REQUISITION NUMBER
REPORT TO: <u>L.W. Gilley</u>	
BUILDING NO. <u>9213</u>	
DESCRIPTION OF MATERIAL: <u>Originally pure H₂O which may now contain impurities of Fe, Cd, etc. and also traces of U.</u>	
IF NOT TO BE COMPOSITED CHECK HERE..... <input checked="" type="checkbox"/>	
ASSAY REQUESTED AT <input type="checkbox"/> DT <input type="checkbox"/>	AT CODE NO.
ANALYSIS REQUESTED	REPORTED ANSWERS
GRAM/GRAM T	<u>.00000001</u>
<u>Spec.</u>	<input checked="" type="checkbox"/>
<u>Fluorometric</u>	<input checked="" type="checkbox"/>
SIGNED: _____	
BY: <u>md</u>	DATE: <u>JUN 3 1955</u>

ANALYTICAL REPORT 04559

Report to: CHEM. LAB. Requisition Number 354713

Material Type 1937-AL, ETC. + ALSO TRACES OF U. Batch Number LW
 { ORIG. PURE H₂O WHICH MAY NOW CONTAIN IMPURITIES OF FE, CD, AND ALSO TRACES OF U. }

PAY SPEC. ATTENTION TO CO, FE & B.

Answers are in: (circle) PPM Percent Other _____

Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hg	In	K	Li	Mg		
	.2			.01		<u>100%</u>		40	.3	<.05	<.1			<.05	<.5							.01	.15

Mn	Mo	Na	Ni	P	Pb	Pd	Rb	Sb	Si	Sn	Sr	Ti	Tl	V	Zn								
<.05		3.8	<.05	2.5					3.8					<.05									

																		C	U	Zr	Hf	RE	

Remarks: _____ By ad AW Date 6-3-55

Expr. 68 Time 8³⁰ AM PM Date 10-7 1955
 Purpose C.C. 3-8" Reactors triangular array - 1" edge to edge
 Personnel: L.W.G. Cross, Fox

57
00
00

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

9 nts checked OK.

fuel wt. source

35.05 ≈ 13.80" out just crit.

$$C, V = 3 \times 325 \times 35.05 = 34.17 \text{ l}$$

$$C, M = 34.17 \times .5376 = 18.40 \text{ kg}$$

Expr. 69 Time 8⁵⁰ AM PM Date 6/7 1955
 Purpose "C for 3-8" reactors in triangular array - 1" edge to edge spacing
refilled about for top
 Personnel: Fox, Hillary

fuel wt. H₂O

15.15^{2cm} 6.11" 15.5cm just crit.

$$C, V = 3 \times 325 \times 15.52 = 15.13 \text{ l} ; C, M = 15.13 \times .5376 = 8.13$$

Expr. 70 Time 3⁰⁵ AM PM Date 6/7 1955
 Purpose "C for 3-8" array in triangular pattern with
 Personnel: _____

Expr.	70	Time	12:45 PM	Date	6-7 1955
Purpose	C.C. 7-8" cyls. in hex array = 2" edge to Edge Barre				
Personnel:	LWCF Cross Fox				

START UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and "Source In" Checked by <input checked="" type="checkbox"/>	
Emergency Equipment in Control Room checked by <input checked="" type="checkbox"/>	No. 58
Red Light On by <input checked="" type="checkbox"/>	
Start-Up OK'd by 967	Time: 12:45 PM Date: 6-7 1955

Fuel ht source

25.75 cm - 10.14" out just cut.

$$C.V = 7 \times 325 \times 25.76 = 58,60 \text{ l}$$

$$C.M = 58.60 \times 5376 = 31,50$$

Expr.	71	Time	1:30 PM	Date	6-7 1955
Purpose	C.C. 7-8" D. Cyls. in hex. 2" E to E. Refl				
Personnel:	LWCF Fox				

Fuel ht water ht.

5.89" 14.95 cm just cut.
= 14.96 cm

$$C.V = 7 \times 325 \times 14.96 = 34,03 \text{ l}$$

$$C.M = 34,03 \times 5376 = 18,30 \text{ kg.}$$

Expt. <u>72</u>	Time <u>2³⁰</u> ^{AM}	PM Date <u>6/7</u> 195 <u>5</u>
Purpose <u>cc for 3-8" al. cyl. in triangular</u> <u>array - 2" edge to edge</u> <u>base</u>		
Personnel: <u>Fox, Hilley</u>		

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input type="checkbox"/>
Instrument and Safeties Checked and Reset by <input type="checkbox"/>	
"Source In" Checked by <input type="checkbox"/>	Source No. <input type="checkbox"/>
Emergency Equipment in Control Room Checked by <input type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	
Start-Up OK'd by <u>L.W. A.</u>	Time <u>2³⁰</u> ^{AM} PM Date <u>6/7</u> 195 <u>5</u>

Fuel wt. source

17.80" out just cut.
45.21 cm

$$C, V = 3 \times 325 \times 45.21 = 44,081 ; C, M = 44,081 \times 5376 = 2370$$

Expt. <u>73</u>	Time <u>3⁰⁵</u> ^{AM}	PM Date <u>6/7</u> 195 <u>5</u>
Purpose <u>cc for 3-8" al. cyl. in triangular</u> <u>array with 2" edge to edge spacing</u> <u>reduced except for top</u>		
Personnel: <u>Fox, Cross, Hilley</u>		

Fuel wt. H_2O

6.96 17.7 cm just cut.

Fuel temp. = 76 °F by thermocouple.

17.68 cm

$$C, V = 975 \times 17.68 = 17,242$$

$$C, M = 17,242 \times 5376 = 927$$

Expt. 74	Time 9 ³⁰ AM	Date 6/8	1955
Purpose C.C. for 7-8" cyl in hex array with 3" edge to edge spacing bare			
Personnel: Fox, Cross, Helley			

INSTRUMENT CHECK			
Date 6/8	1955	Time 9 ²⁰	Source No.
Instrument			
DC-1			Scale
DC-2	trip		
DC-3	trip	280 on 100 X 1	
LOG N	trip		
R-1	trip	responds	
R-2			
P.M.	trip		

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel check by <input checked="" type="checkbox"/>
Instrument and Safeties checked by	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/>
Emergency Equipment in Control Room checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/>
Start-Up OK'd by	JWS Time 9 ²⁰ AM Date 6/8 1955

fuel wt. source
 29.79g ~ 11.73" out just crit.
 $C.V. = 2275 \times 29.79 = 67.77 \text{ l}$ $C.M = 67.77 \times 5376 = 36.43$

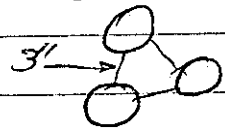
Expt. 75	Time 10 ⁰⁵ AM	Date 6/8	1955
Purpose C.C. for 7-8" cylinders sep. 3" EFB E in Hex array Refl.			
Personnel: JWS JRF			

start-up ok., instr ok

Subst	H ₂ O wt	Remarks
	6.95 (17.65g)	17.6 just crit.
	$C.V = 2275 \times 17.65 = 40.15 \text{ l}$	$C.M = 40.15 \times 5376 = 21.58 \text{ kg}$

Expr. 76 Time 12⁴⁵ AM PM Date 6-8- 1955
 Purpose C.C. 3-8" D. Reactors in
hex array 3" E. to E. separation
Bare
 Personnel: J.W.C. J.K.F.

B 61

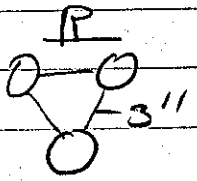


START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by J.K.F. Time 11 PM Date 11 1955

Fuel ht. source
 22.02" (65.93) out just crit.
 $C.V = 975 \times 55.93 = 54,531$; $C.M = 54,531 \times .5376 = 29,32 \text{ kg}$
 Water Temp 76 F

Expr. 77 Time 1¹⁰ AM PM Date 6/8 1955
 Purpose C.C. for 3-8" array in hex pattern
with 3" edge to edge spacing
reflected
 Personnel: Foy Kelly



Fuel ht. H₂O ht.
 7.79" 19.7 cm just crit.
 14.79 cm

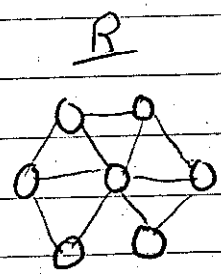
$C.V = 975 \times 14.79 = 14,301$
 $C.M. = 14,301 \times .5376 = 7,688$

Expr. 98 Time AM Date 6/8 1955
 Purpose CC 7-8" D. cylinders in hex. array 4" E to E. Sep.
Bare
 Personnel: LW 6 Crass, Fox

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No.
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by LW 6 Time 3³⁰ AM Date 6/8 1955

fuel wt. source
 33.53 13.20" out just cut.
 $C.V. = 33.53 \times 2275 = 76,282$; $C.M = 76,282 \times 5376 = 411,0$ kg

Expr. 79 Time 8⁵⁵ AM Date 6/9 1955
 Purpose CC for 7-8" d. cyl. in hex. array with 4" edge to edge spacing. Reflected sheet on top
 Personnel: Fox, Hilkey



INSTRUMENT CHECK
 Date 6/8 1955 Time 9⁵⁵ AM Source No.
 Instrument Vols. Serial No. Range Start-Up Scale
 DC-1
 DC-2 trip ~ 98 on 20 X 10
 DC-3 trip ~ 85 on 100 X 1
 Log N trip ~ 7m.
 R-1 responds
 R-2
 P. M. trip ~

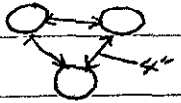
START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No.
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by LW 6 Time 9⁵⁵ AM Date 6/8 1955

fuel wt. H₂O wt.
 19.76 7.78" 19.7cm just cut
 $C.V = 19.76 \times 2275 = 44,951$; $C.M = 44,951 \times 5376 = 241,17$

63

B

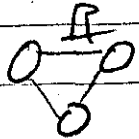
Expr. 80 Time 10¹⁵ AM PM Date 6/8 1955
 Purpose cc for 3-8" ab. cyl. in triangular array with 4" edge to edge spacing
~~Base~~
 Personnel: Jay, Killey



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Serial No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by JWS Time 10¹⁵ AM PM Date 6/8 1955

kg Fuel Wt. same
68.76 out just cut.
 $C.V = 68.76 \times 975 = 67,041$; $C.M = 67,041 \times 5376 = 36,041 \text{ kg}$

Expr. 81 Time 10¹⁵ AM PM Date 6/8 1955
 Purpose cc for 3-8" ab. cyl. in triangular array with 4" edge to edge spacing
~~updated report for tape~~
 Personnel: Jay, Killey



Fuel Wt. H₂O Ht. Remarks
21.26 8.37" 21.3cm just cut.
 $C.V = 21.26 \times 975 = 20,731$; $C.M = 20,731 \times 5376 = 11,14$

~~Expr. 82 Time 2⁵⁰ AM PM Date _____ 195_____
 Purpose _____
 Personnel: _____~~

B

Expt. 82	Time 2 ¹⁰	Date 6/9	1953
Purpose: cc for 7-8" al. cyl. in hex. away with 6" edge to edge spacing base			
Personnel: Jop, Hillery			

0 0 0
0 0 0

START-UP CHECKLIST	
Equipment Checked by	<input checked="" type="checkbox"/>
Instrument and Safety checked by	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/>
Emergency Equipment checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/>
Start-Up OK'd by JWA	Time 2 ¹⁵ Date 6/9 1953

Fuel ht. same
41.91 cm 16.50" out just cut.

$$C.V = 41.91 \times 2275 = 95.35 \text{ l}$$

$$C.M = 95.35 \times 5376 = 51.30 \text{ kg}$$

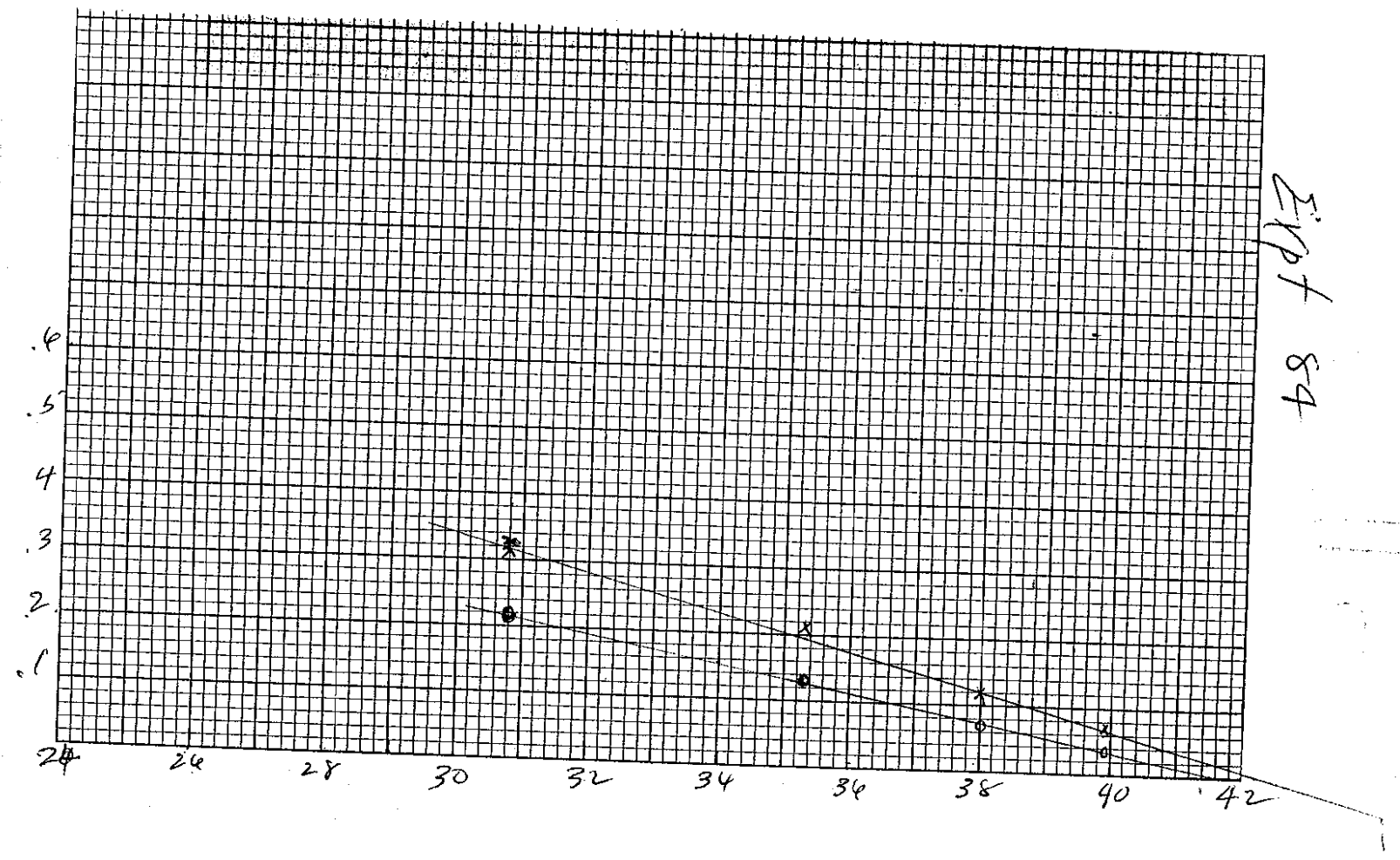
Expt. 83	Time 2 ⁵⁰	Date 6/9	1953
Purpose: cc for 7-8" al. cyl. in hex. away with 6" edge to edge spacing reflected insert for top			
Personnel: Jop, Hillery			

Fuel ht. H₂O ht same
8.73" 22.2" out just cut
≈ 22.17 cm

$$C.V = 22.17 \times 2275 = 50.44 \text{ l}$$

$$C.M = 50.44 \times 5376 = 27.12$$

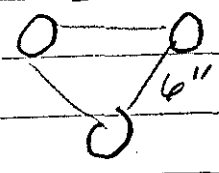
Exp 84



Expr. 84 Time 8:32 AM Exp. Date 6-10-1955
 Purpose 3-8" Reactors, hex. array, 6" E to E Bare
 Personnel: LVLK Cross Fox

65

B



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by YLF Time 9:17 PM Date 6-10-1955

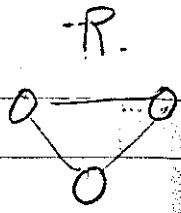
Inst. checked OK.

Obs. ht.	M ₁	C ₄	C ₅	M ₁
39.87"	.037	47.59	18.25	18.8 .064
39.87"		48.41	19.15	
38.02	.071	25.27	10.37	10.58 .12
"		25.32	10.37	
35.25	.123	14.87	6.0	5.9 .21
"		15.1	5.21	
30.79	.21	8.35	4.2	4.0 .31
20.66	.46	3.57	2.2	2.0 .42
		1.47	1.0	
		1.34	1.20	1.25

Extrapolated crit. ht. = ~ 42"
= ~ 107

$C.V = 107 \times 975 = \sim 104 \text{ l}$
 $C.M = 104 \times 5376 = \sim 56$

Expr. 85 Time 10²⁰ AM Date 6-10 1955
 Purpose C.C. 3-8" cyl. in hex array
6" edge to edge Refl except
for top
 Personnel: LW G JKF



START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and ✓
 "Source In" Checked by ✓ Source No 58
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JKF Date 195

~~8.90~~
 Fuel ht. H₂O
8.90 22.7 cm just crit.
22.61 cm

$C.V = 22.61 \times 975 = 22.041$
 $C.M = 22.041 \times .5376 = 11.85 \text{ kg}$

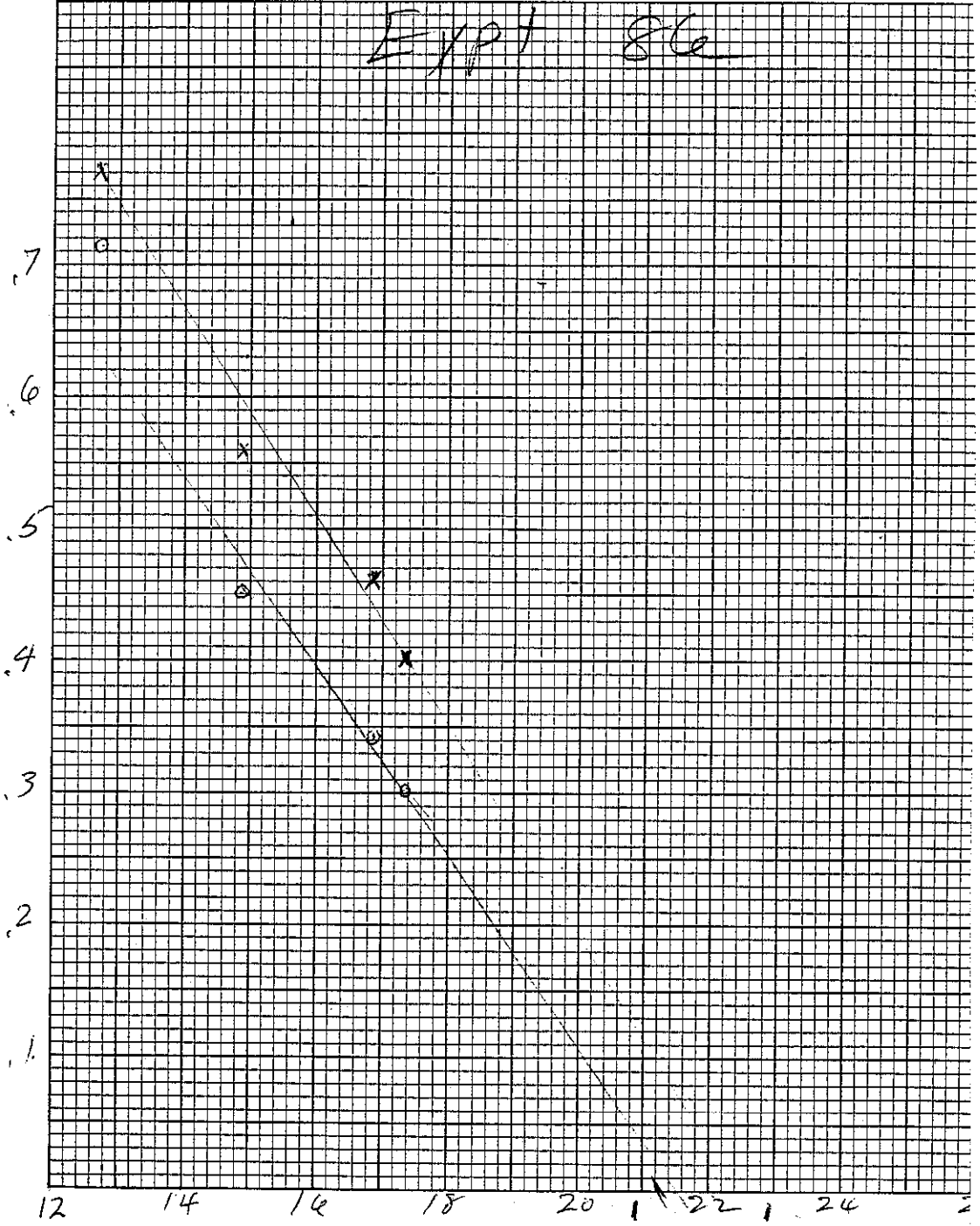
Expr. 63A Time 12³⁰ AM Date 6-10 1955
 Purpose C.C. for 1-8" cyl. Refl. except
for top Recheck of Expt. 63
 Personnel: LW G JKF

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and ✓
 "Source In" Checked by ✓ Source No 58
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by Date 195

~~8.97~~
 Fuel ht. H₂O
9.02" 22.9 cm just crit.
22.91 cm

$C.V = 22.9 \times 325 = 7.44 \text{ D}$
 $C.M = 7.44 \times .5376 = 4.00 \text{ kg}$

Expt 86



Expr. 86 Time 9:15 AM Date 6-13 1955
 Purpose C.C. 7-8" Reactors, hex. array, 9" edge to edge
Bare
 Personnel: LWLT Cross, Fox

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 Source In' Checked by ✓ Source No. 48
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JK Time 9:27 PM Date 1955

Inst. checked OK.

Fuel ht.	C ₄	M ₄ ⁻¹	C ₅	M ₅ ⁻¹
17.37"	54 ² x 14	500 .30	35 ¹² x 14	350 .40
"	46 ¹²		35 ²	
"	50 ²		33 ¹²	
16.87	45 ²²	44.25 .34	30 ¹²	30.7 .44
"	43 ⁶		30 ¹⁰	
14.91"	33 ²	83.5 .45	25 ¹³	25.0 .56
"	33 ⁶		24 ⁴	
12.72"	21 ³	21.0 .715	18 ¹³	18.1 .77
"	21 ²		17 ⁸	
8.88"	14 ²	~15	14 ²	14.0
	15 ²		14 ²	
	14 ⁵		13 ¹¹	
	13 ²		14 ¹	

Extrapolated cut ht. = ~22.
 ~55.88cm

$C.V = 55.88 \times 2275 = \sim 127.8$
 $C.M = 127 \times .5316 = \sim 68$

Expt.	87	Time	10 ⁴⁵ AM	Date	4/13	1955
Purpose	cc for 7-8" cyl in hex array with 9" edge to edge spacing reflected except for top.					
Personnel:	Fox, Hilley					

START-UP CHECK LIST	
Equipment Checked by	_____ Check by _____
Instrument and Safeties Checked and	_____
"Source In" Checked by	_____
Emergency Equipment in Control Room	_____
Red Light On by	_____
Start-Up OK'd by	FWA Time 10 ⁴⁵ AM Date 4/13 1955

fuel ht H₂O ht
 22.73 cm 8.95" 22.7 cm just cut
 $C.V = 22.73 \times 22.75 = 51.71 \text{ l}$
 $C.M = 51.71 \times .5376 = 27.80$

Expt.	88	Time	1 ³⁵	Date	4/13	1955
Purpose	cc for 2-8" cyl in line with 1/8" edge to edge spacing					
Personnel:	Fox, Hilley					

START UP CHECK LIST	
Equipment Checked by	_____ Check by _____
Instrument and Safeties	_____
"Source In" Checked by	_____
Emergency Equipment	_____
Red Light On by	_____
Start Up OK'd by	FWA Time 1 ³⁵ Date 4/13 1955

fuel ht.
 68.25" 26.87" just cut.

$C.V = 68.25 \times 650 = 44.36 \text{ l}$
 $C.M = 44.36 \times .5376 = 23.85$

Expt.	89	Time	2 ⁰⁰ AM	Date	6/13	1955
Purpose	cc for 2-8" al. cyl. in line with 1/8" edge to edge spacing reflected except for tops					
Personnel:	Fox, Kelley					

OO

fuel ht. H₂O
 17.40cm 6.85" 17.3cm just crit.

$$C, V = 17.4 \times 650 = 11,31 \text{ l}$$

$$C, M = 11.31 \times 5376 = 4,08 \text{ kg}$$

Expt.	90	Time	3 ⁵⁰ AM	Date	6/13	1955
Purpose	cc for 3-8" al. cyl. in triangular array with 1/8" edge to edge spacing					
Personnel:	Fox, Kelley					

OO

fuel ht. same
 27.08cm 10.64 out just crit.
 $C, V = 27.08 \times 975 = 26,40 \text{ l}; C, M = 26.40 \times 5376 = 14,19$

Expt.	91	Time	4 ⁰⁰ AM	Date	6-13	1955
Purpose	CC 3-8" Reactors, Triangular array, 1/8" edge to edge, Refl except for top					
Personnel:	L. W. Fox					

OO

fuel ht H₂O
 14.55cm 5.73" 14.55cm just crit.

$$C, V = 14.55 \times 975 = 14,18 \text{ l}$$

$$C, M, = 14.18 \times 5376 = 7.62 \text{ kg}$$

Exp. 92 Time 8³⁰ AM Date 6/14 1955 000
 Purpose cc for 3-8" ab. cyl. in line
with ~1/8" edge to edge spacing
reflected except for top bare
 Personnel: For, Cross & Riley

INSTRUMENT LIST

Date 6/14 1955 Time 8³⁰ AM

Instrument # _____ Description _____

D-1 trip ~100 on 10x20

D-2 trip ~75 on 10x1

Log N. trip

R-1 trip

R-2 _____

P. M. trip

START-UP CHECK LIST

Equipment Checked by _____ Checked by _____

Instrument and Safety _____

"Source In" Checked by _____

Emergency Equipment in _____

Red Light On by _____

Start-Up OK'd by AWA Time 9³⁵ AM Date 6/14 1955

fuel ht. source
 (45.77 cm) 18.02" out j wet crit.
 $C, V = 45.77 \times 975 = 44,63$ $C, M = 44,63 \times 5376 = 23,99$

Exp. 93 Time 8⁵⁵ AM Date 6/14 1955 000
 Purpose cc for 3-8" ab. cyl. in line
with ~1/8" edge to edge spacing
reflected except for top
 Personnel: For, Cross & Riley

fuel ht. H₂O
 15.95 cm 6.28" 16.0 cm j wet crit.
 $C, V = 15,95 \times 975 = 15,53$ L
 $C, M = 15,55 \times 5376 = 8,36$

Expt.	94	Time	10 ²⁰ AM	Date	6/14/1955
Purpose	cc 4-8" cyls. in line				
	with $\frac{1}{8}$ " edge to edge				
Personnel:	LW-GT - IRF <u>Bare</u>				

B 71
0000

Fuel ht.

41.96 cm - 16.52"

just cut.

$$C, V = 41.96 \times 1300 = 54,53 \text{ l}$$

$$C, M = 54,53 \times 53,76 = 29,33 \text{ kg}$$

Expt.	95	Time	10 ⁴⁰ AM	Date	6/14/1955
Purpose	cc for 4-8" cyls. in line				
	with $\frac{1}{8}$ " edge to edge spacing				
Personnel:	Fox, Kelley				

R
0000

Fuel ht. H₂O ht.

15.62 cm - 6.15"

15.6 cm

just cut.

$$C, V = 15,62 \times 1300 = 20,31 \text{ l}$$

$$C, M = 20,31 \times 53,76 = 10,92 \text{ kg}$$

Expr.	96	Time	12:55	Date	6/14	Year	1955
Purpose	cc for 5-8" al. cyl. in line with ~ 4 1/2" edge to edge spacing						
Personnel:	Joy, Cross, Hilley						

00000

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> back by <input checked="" type="checkbox"/>
Instrument and Safety	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/>
Emergency Equipment	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/>
Start-Up OK'd by	J.W.S. 6/14 1955

Fuel ht.

15.81" 4014 cm

$$C_1 V = 4014 \times 1625 = 65,266 \text{ l}$$

$$C_1 M = 65,266 \times 0.5376 = 35,107 \text{ kg}$$

Expr.	97	Time	1:00	Date	6/14	Year	1955
Purpose	cc for 5-8" al. cyl. in line with ~ 1/2" edge to edge spacing collected except for top						
Personnel:	Joy, Hilley						

00000

Fuel ht. Water ht.

15.44 6.08"

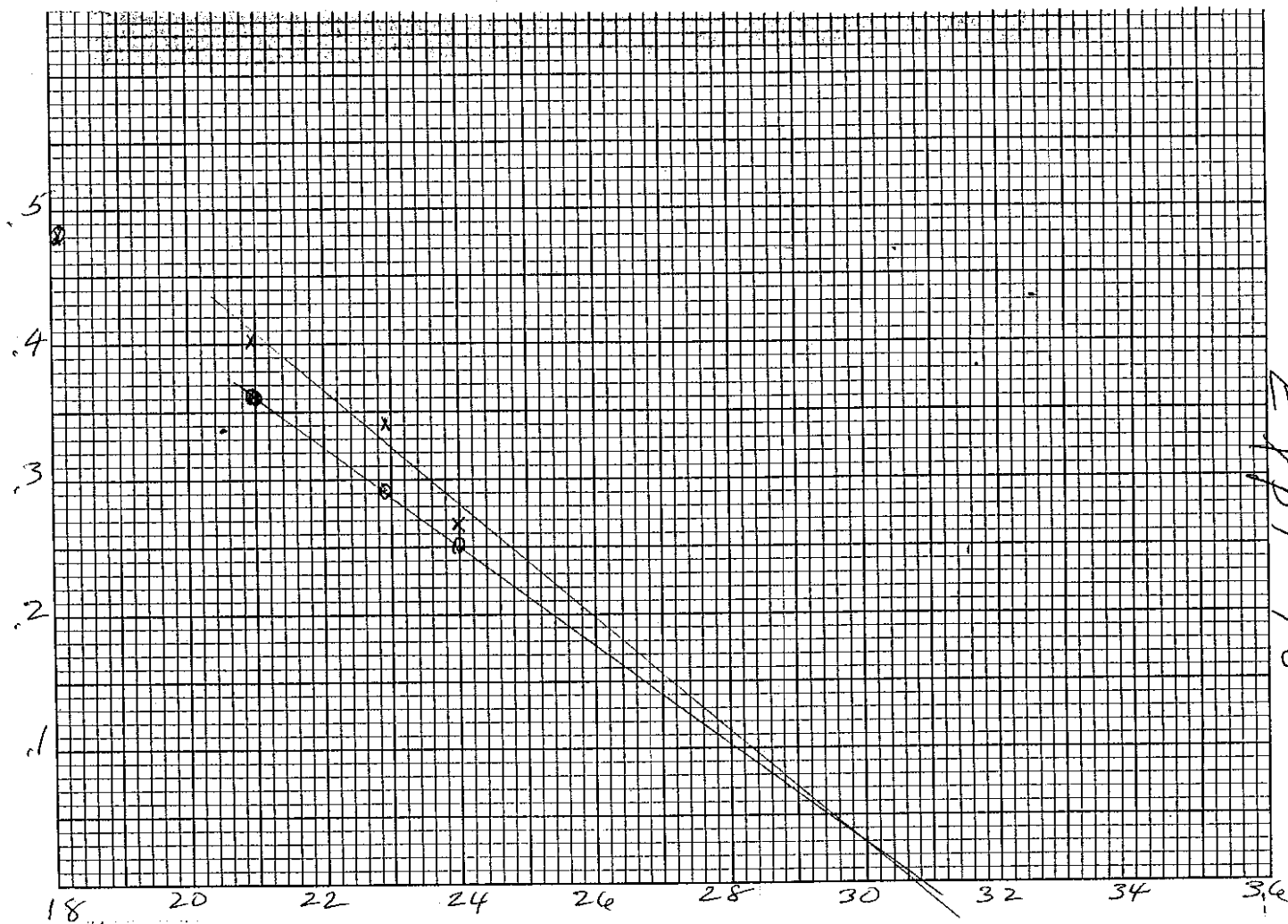
15.5 cm

just crit.

$$C_1 V = 15,44 \times 1625 = 25,09 \text{ l}$$

$$C_1 M = 25,09 \times 0.5376 = 13,49$$

358-15K KEUFFEL & ESSER CO.
Two Millimeters, Centimeter lines heavy.
MADE IN U. S. A.



EXPT 98

Expr. 98 Time 3¹⁵ AM PM Date 6/14 1955
 Purpose cc for 3-8" a/cyl. in line with
4" edge to edge spacing = 3"
 Personnel: Joy, Cross, Hilley

Bare
00000
3"

fuel wt.	C ₄	M ₄	C ₅	M ₅
24.00"	82 ²	81.3	32 ¹⁰	32.7
"	80 ⁸		32 ¹⁴	
22.91	70 ⁵	70.5	26 ²	25.7
"	70 ¹¹		24 ⁸	
20.95	56 ⁸	57.0	23 ⁹	21.5
"	57 ²		19 ¹⁴	
18.09"	45 ²	43.0	17 ¹³	18
"	43 ²		17 ¹⁵	
"	41 ¹		18 ³	
8.47"	20 ³	20.5	8 ⁴	8.7
"	20 ¹²		9 ¹	

$\approx 79 \text{ cm}$ Extrapolates to $\approx 31"$

$C.V = 79 \times 1625 \approx 12.8$
 $C.M \approx 12.8 \times 5376 \approx 69 \text{ kg}$

Expt. <u>99</u>	Date <u>6/15</u> 195 <u>5</u>
Purpose <u>cc for 5-8" di. cyl. in line with</u> <u>~3" edge to edge spacing</u> <u>reflected except for top</u>	
Personnel: <u>For, Kelley</u>	

R
 O O → O O
 3"

INSTRUMENTS	
Date <u>6/15</u> 195 <u>5</u>	Time
Instrument	Scale
DC-1	
DC-2 <u>trip ~ 98 on 20 R10</u>	
DC-3 <u>trip ~ 75 on 100 x 1</u>	
Log N <u>trip</u>	
R-1 <u>expand</u>	
R-2	
P. M. <u>trip</u>	

STATION	
Equipment Checked by <input checked="" type="checkbox"/>	Label <input checked="" type="checkbox"/>
Instrument and Scale <input checked="" type="checkbox"/>	
"Source In" Checked <input checked="" type="checkbox"/>	
Emergency Equipment <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	
Start-Up OK'd by <u>G.W.H.</u> <u>8:25</u>	Date <u>6/15</u> 195 <u>5</u>

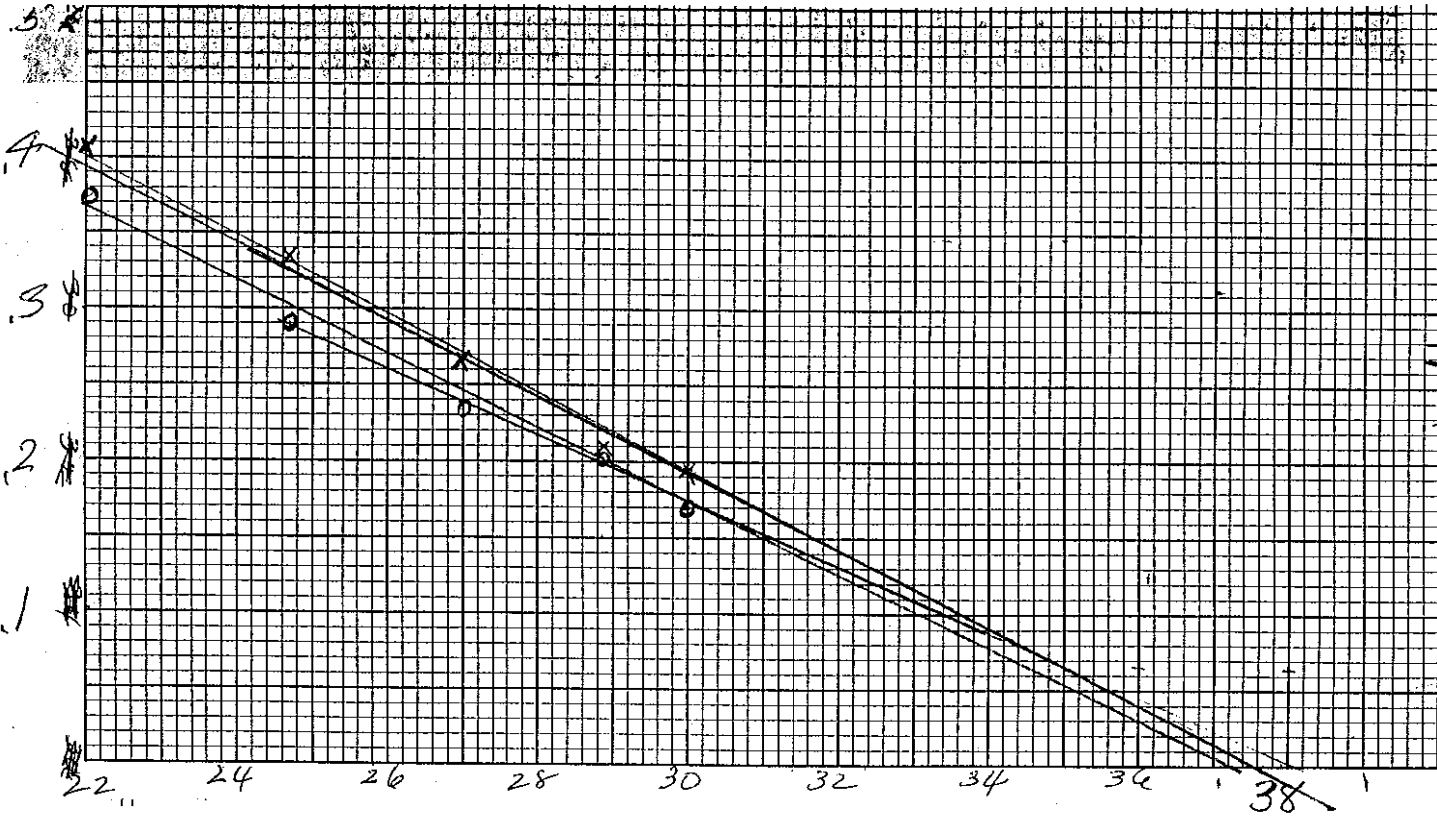
fuel ht. H₂O

20.19 cm 7.95" 20.1 cm just cut.

$$C.V = 20.19 \times 1.625 = 32.81 \text{ l}$$

$$C.M = 32.81 \times 53.76 = 17.44$$

358-15K KEUFFEL & ESSER Co
Two Millimeters, Centimeter lines to
MADE IN U. S. A.



Expt 100

Expt. 100 Time 9³⁰ AM Date 6/15 1955
 Purpose cc for 4-8" abryl. in line with
3" edge to edge spacing
 Personnel: Fox, Kelley

START-UP CHECK LIST

Equipment Checked by _____ Personnel Check by ✓
 Instrument and Safety's Checked and Approved by _____
 "Source In" Checked by _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by _____
 Start-Up OK'd by AWX Time 9³⁵ AM Date 6/15 1955

B
 0-0 0 0
 3"

fuel ht.	C ₄	M ₄	C ₅	M ₅
29.97"	117 ¹⁴ ^{x6}		38 ⁸ ^{x6}	
"	114 } 116	118	40 ¹⁰ } 37.6	195
"	115 ² }		39 ¹² }	
28.85	97 ¹⁰ } 97.3	.200	38 ⁴ }	37 .208
"	96 ⁹ }		35 ¹¹ }	
26.97	83 ² } 83	.235	27 ⁸ }	28.7 268
"	82 ⁵ }		29 ¹² }	
24.68	68 ⁷ } 67	.290	22 ¹⁰ }	23 .335
"	65 ¹ }		23 ⁸ }	
22.01	54 ⁰ } 52	.375	17 ¹² }	19 .405
"	44 ⁴ }		21 ⁶ }	
8.42	19 ¹ }	19.5	7 ⁴ }	7.7
	19 ¹² }		8 ⁰ }	

Extrap. + 0 ~ 38" ~ 37.5"
 ~ 95 a

C. V = 95 x 1300 = ~ 123.7
 C. M = 123.7 x .5376 = ~ 66.

Expr. 101 Time 10⁵³ AM PM Date 6-15-1955
 Purpose C.C. 4-8" R. in line, 3" edge to edge. Refl except for top
 Personnel: L.W. Ct J.K.F.

Fuel ht H_2O ht
 20129 7.99" 20.3 cm just cut
 $C.V = 20.24 \times 1300 = 26.38$ $C.M = 26.38 \times 5376 = 14,18$

Expr. 102 Time 1²⁰ AM PM Date 6-15-1955
 Purpose C.C. 3-8" R. in line, 3" edge to edge
Bare
 Personnel: L.W. Ct J.K.F.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 58
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by J.K.F. Time _____ PM Date _____ 1955

000
 3"

$C.V = 124.5 \times 975 = 121$

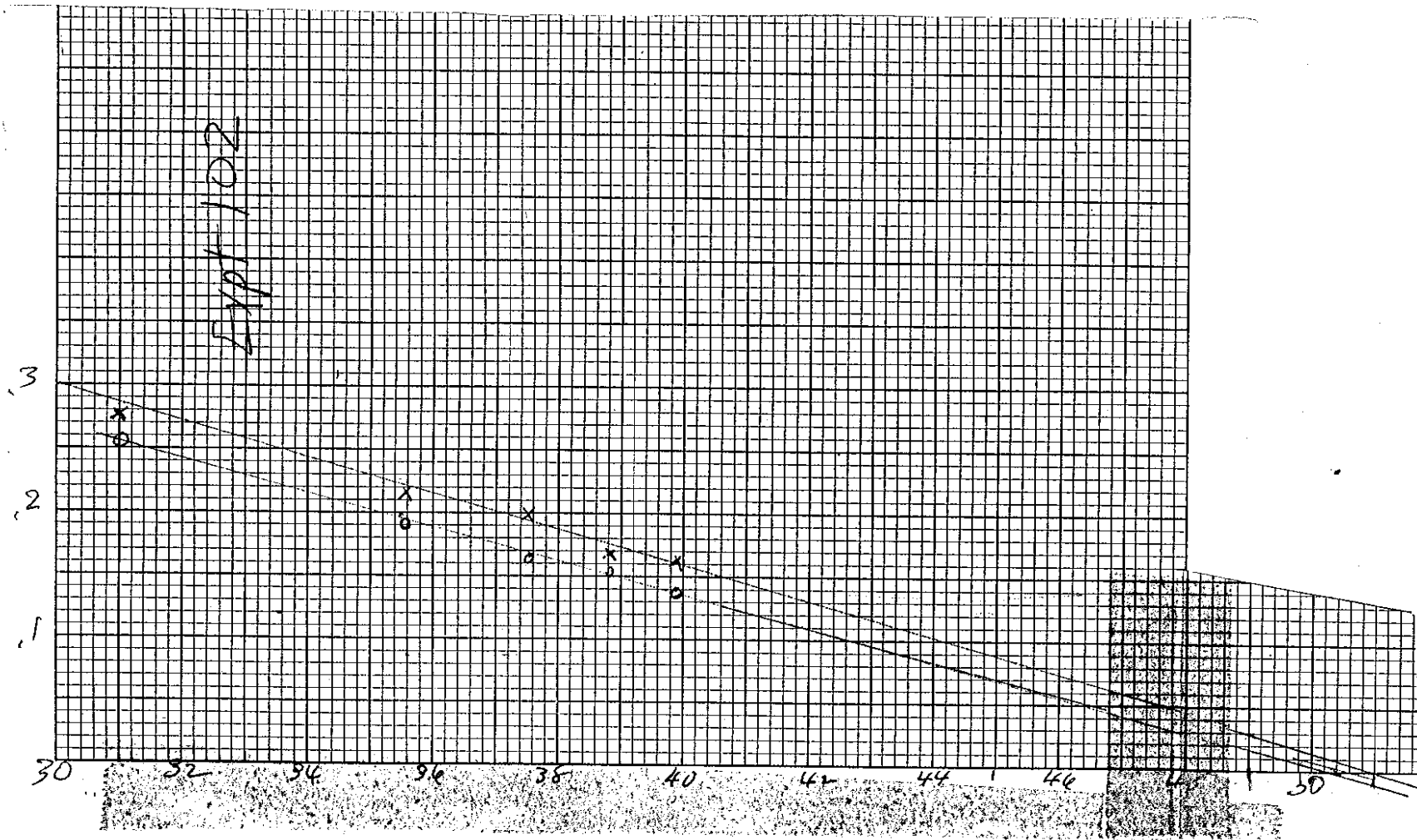
$C.M = 121 \times 5376 = 650$

Extrapolator to ~ 14" $= 2.65$ kg
 Soln ht. $C_9 \approx 124.5$ cm

39.90	135 ³	137, 139	49 ²	49	141
"	138 ¹²		47¹⁴		
38.84	124 ⁴	124, 152	47 ⁴	47.2	147
"	124 ¹⁰		47 ²		
37.56	115 ⁸	117, 142	39 ²	39.8	198
"	118 ⁹		40 ¹²		
35.55	101 ³⁷	100, 190	38 ²	37.0	213
"	99 ⁴³		35 ¹⁴		
31.02	75 ¹⁴	75, 254	29 ²	28.8	274
"	82⁵		26¹¹		
14	74 ⁵		28 ¹¹		
8.42	18 ¹⁰⁷	19	8 ²⁷	7.9	
	194 ⁵		7 ¹³		

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EXPT 102



Expr. 103	Time	AM	Date 6/15 1955
Purpose cc for 3-8" along in line			
with 3" edge to edge spacing			
referred except for top			
Personnel: Jay, Miller			

Fuel ht H₂O ht.

20.88 8.22" 20.8 cm just crit.

$C.V = 20.88 \times 975 = 20,366 \text{ l}$

$C.M = 20,366 \times 5376 = 10,95$

Expr. 104	Time 8:40 AM	Date 6/16/ 1955
Purpose cc for 2-8" R. in line, 3" edge to edge		
Base		
Personnel: LWG JRF		

0-3" 0

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. 48
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by LWG	Time PM Date 1955

Inst checked
OK.

Recorded av. count	Fuel ht	C _g	M-1	C _s	M-1
	48.91	av. 49.5		av. 18.8	
average of 3	47.98	" 50.0		" 19.7	Extrap.
	43.64	" 48.5		" 18.0	to ∞
	37.79	" 48.0		" 19.3	
	26.01	40.5		17.8	
	"	40.8	40.5	16.12	18.0
	"	41.2		13.13	
	19.45	35.6		13.10	
	"	37.1	36	14.2	13.8
	"	35.0		14.1	
8.67	19.4	20.3		7.8, 8.4	

Expt. <u>105</u>	Time <u>10⁵⁵ AM</u>	Date <u>6/16</u> 195 <u>3</u>
Purpose <u>L.C. for 2-8" II in line</u>		
<u>3" edge to edge, Refl. except for</u>		
Personnel <u>L.W.G. J.K.F.</u>		

00

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. <u>68</u>
Emergency Equipment in Control Room checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by <u>J.K.F.</u>	Time <u>10:55</u> Date <u>6/16</u> 195 <u>3</u>

Fuel ht H₂O ht.

2.14 cm 8.33" 2.11 cm just circ.

$$C, V = 2.14 \times 650 = 13.75 \text{ l}$$

$$C, M = 13.75 \times .5376 = 7.39 \text{ kg}$$

Expt. 106 Time 1:20 ^{AM} PM Date 6/16 1955
 Purpose cc for 5-8" cyls. in line
with 15" edge to edge spacing.
 Personnel: Jay, Hilley

START-UP CHECK LIST

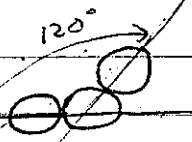
Equipment Checked by ✓ Person ✓ Check by ✓
 Instrument and Safeties Checked and Ready by ✓
 Source In ✓ Checked by ✓ Source No. ✓
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by JWA Time 1:20 ^{AM} PM Date 6/16 1955

Coln. Temp 79°F

Fuel ht.	C ₄	m ₄	C ₅	m ₅
24.01"	25 ⁵		9 ¹²	
"	21 ⁵	22 ⁵	11 ⁵	
"	21 ⁰		9 ⁵	
"	22 ⁴		10 ⁵	
22.46"	20 ¹¹		10 ⁷	
"	22 ⁸		9 ⁵	
"	23 ¹		10 ²	
20.48"	21 ⁰		9 ⁷	
"	20 ⁸		9 ¹²	
"	19 ¹⁰		9 ¹¹	
17.83"	20 ⁴		8 ³	
"	20 ⁶		10 ²	
"	19 ⁵		8 ⁶	
8.72"	11 ⁷		5 ⁶	
"	14 ¹²		6 ⁸	
"	16 ¹³		7 ²	
"	14 ²		5 ¹²	

Extrapolate to 20

Expr. 107 Time 8³⁰ AM Date 6/17 1955
 Purpose cc for 3-8" al cyl with 2x
alge to edge spacing - two in line, one at 120°
 Personnel: Jay Hilley



INSTRUMENT CHECK

Date 6/17 1955 Time 8³⁰ AM

Instrument TFP Serial No. _____

DC-1 _____

DC-2 trip

DC-3 trip

Log A trip

R-1 respond

R-2 _____

P. M. trip

START UP CHECK LIST

Equipment Checked by _____ Checked by _____

Instrument as indicated _____

"Source Is" checked _____

Emergency _____

Red Light On _____

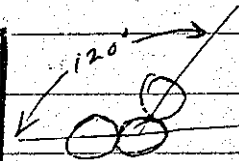
Start Up Order 3-W-2 Time 8³⁵ AM Date 6/17 1955

fuel hit source

42.49 cm 16.73" out just cut

$C.V = 42.49 \times 975 = 41,430$; $C.M = 41.43 \times 5376 = 22,27$

Expr. 108 Time 9⁰⁰ AM Date 6/17 1955
 Purpose C.C. 3-8" R. in Contact
at 120°. Refl. except for top
 Personnel: L.W.G. JRF



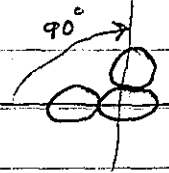
at start → source in H₂O

15.82 6.23" 15.8 cm just cut

$C.V = 15.82 \times 975 = 15,420$

$C.M = 15.42 \times 5376 = 8.29$

Expr. 109 Time 10⁰⁹ AM PM Date 6/17 1955
 Purpose cc for 3-8" diam at 90° with
~1/4" edge to edge spacing
 Personnel: Joe Killey



START-UP CHECK LIST

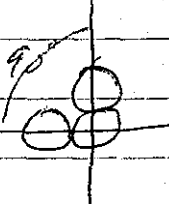
Equipment Checked by check-by
 Instrument and Supplies Checked and
 Source Is
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by L.W.A. Time PM Date 195

Fuel ht

36.126 - 14.22"

$C.V = 36.12 \times 975 = 35,222$; $C.M = 35,222 \times .5376 = 18,93$ *just cut*

Expr. 110 Time 10³⁷ AM PM Date 6/17 1955
 Purpose same as above but
Ref. except for top
 Personnel: L.W.A. J.R.F.



Source

Fuel ht Water ht.

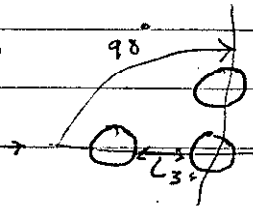
15.57

6.13"

15.5 cm

$C.N = 15.57 \times 975 = 15,182$
 $C.M = 15,182 \times .5376 = 8,161$ kg

Expt. <u>111</u>	<u>6/17</u>	<u>1955</u>
Purpose <u>cc for 3-8" al. cyl. with 90° angle</u> <u>at 3" edge to edge separation</u> <u>base</u>		
Personnel: <u>Fox, Hilley</u>		



Fuel ht.

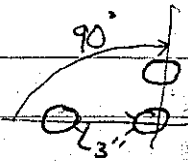
71.37 in 28.10"

just crit.

Solution Temp. = 80° F by thermocouple

$$C, V = 71.37 \times 975 = 69,591; \quad C, M = 69,591 \times 5376 = 37,41$$

Expt. <u>112</u>	<u>1/2</u>	<u>6/17</u>	<u>1955</u>
Purpose <u>cc for 3-8" al. cyl with 90° angle</u> <u>at 3" edge to edge separation</u> <u>reflected except for top</u>			
Personnel: <u>Fox, Hilley</u>			



Fuel ht. H₂O ht.

20.35 8.01

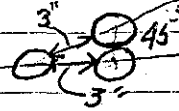
20.4 cm

just crit.

$$C, V = 20.35 \times 975 = 19,84$$

$$C, M = 19,84 \times 5376 = 10,67$$

Expr. 113	Time 2 ²⁵ AM	PM Date 6/17 1955
Purpose CC for 3-8" abt cyl with two in line and two in contact - 3" abt to abt spacing →		
Personnel: Fox, Kelley		



fuel ht. just cut.

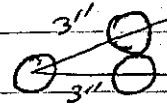
41.55 16.36"

$$C.V = 41.55 \times 975 = 40,518$$

$$C.M = 40.51 \times 5376 = 21,79$$

Expr. 114	Time 3 ⁰⁰ AM	PM Date 6/17 1955
Purpose C.I. Same as above except ref		
Personnel: L.W.G. JRF		

Source in



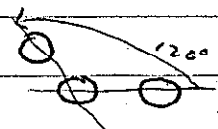
Water ht. just cut.

16.84 6.63" 16.85 cm

$$C.V = 16.84 \times 975 = 16,422$$

$$C.M = 16.42 \times 5376 = 8,83$$

Expt. 115 Time 8³⁰ AM Date 6/20 1955
 Purpose cc for 3-8" depth at 12 with
3" edge to edge spacing and at 120°
base
 Personnel: Joe Gilley



INSTRUMENT

Date 6/20 1955 Time _____
 Instrument _____ Trip _____
 DC-1 _____
 DC-2 trip ~ 1000 on 10x20
 DC-3 trip ~ 85 on 1x100
 Log N trip
 R-1 responses
 R-2 _____
 P. M. trip

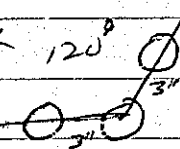
START-UP CHECK LIST

Equipment Checked by Check by
 Instrument and Settings
 "Source In" Check
 Emergency Equip.
 Red Light On by
 Start-Up OK'd by JWM Date _____ 1955

Fuel ht

$8740 \text{ cm} \times 34.41''$ just cut
 $C, V = 8740 \times 975 = 85,222 \text{ l.}$; $C, M = 85,222 \times .5376 = 45,81$

Expt. 116 Time 9³⁰ AM Date 6/20 1955
 Purpose C.C. same as Expt 113 except
refl.
 Personnel: LWC JKF



Fuel ht Water ht.

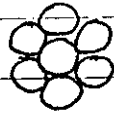
$20,40 \text{ cm} \times 8.03''$ 20.4 cm
 $C, V = 2040 \times 975 = 19,89 \text{ l}$
 $C, M = 19,89 \times .5376 = 10.69$

Cd wrapped Expts →

85

Expr. 117 Time 8⁰⁰ AM Date 6/21 1955
 Purpose "for 7-8" alcyd, wrapped with cadimium and spaced ~1/8" edge to edge - are otherwise
 Personnel: Fox, Hilkey

cd wrapped



INSTRUMENT CHECK

Date _____ 195_ Time _____ AM
 Trip _____ PM Source No. _____

Instrument	Volts	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>trip</u>	<u>~95.0m</u>	<u>10.720</u>	
DC-3	<u>trip</u>			
Log N	<u>trip</u>			
R-1	<u>trip</u>			
R-2				
P. M.	<u>trip</u>			

START-UP CHECK LIST

Equipment Checked by _____ Rechecked by _____
 Instrument and Source Checked by _____
 Source in _____
 Emergency _____
 Red Light On by _____
 Start-Up OK'd by AWA Time 8⁰⁰ AM Date 6/21 1955

fuel lit

19.58 7.71"

just exit.

$C_1V = 19.58 \times 2275 = 44.54 \mu$; $C_1M = 44.54 \times 5376 = 23.94$

Expr. 118 Time 8⁰⁰ AM Date 6/21 1955
 Purpose c.c. 7-8" R. in hex. ~1/8" edge to edge Cd wrapped, Rift bet. 8 side
 Personnel: LWGT JRF

source in

fuel lit H₂O height.

15.80 6.22"

15.8 cm

just exit.

$C_1V = 15.80 \times 2275 = 35.95 \mu$
 $C_1M = 35.95 \times 5376 = 19.33$

Expt. <u>119</u>	Time <u>10⁰⁵</u> AM	Date <u>6/21</u> 195 <u>5</u>
Purpose <u>ref for 3-8" d. cyl. in triangular array & columns w/ tapped base other w/ 1/8" d. to edge spacing</u>		
Personnel: <u>Joe Hillery</u>		

80

Fuel ht. 11.65" just cut.
 29.59
 $C.V = 29.59 \times 975 = 28,851$ $C.M = 28,851 \times 376 = 15,51$

Expt. <u>120</u>	Time <u>1¹⁰</u> AM	Date <u>6/21</u> 195 <u>5</u>
Purpose <u>Same as above except ref.</u>		
Personnel: _____		

80

START-UP CHECKLIST	
Equipment Checked by <u>✓</u>	Checked by <u>✓</u>
Instrument and Safeties Checked <u>✓</u>	
"Source In" Checked by <u>✓</u>	Source No. <u>58</u>
Emergency Equipment in Control Room Checked by <u>✓</u>	
Red Light On by <u>✓</u>	AM
Start-Up OK'd by <u>JKH</u>	Time _____ PM Date _____ 195 <u>5</u>

Fuel ht. 8.37" H₂O ht. 21.2 cm just cut.
21.26 cm
 Solar Temp. 81° F

$$C.V = 21.26 \times 975 = 20,73$$

$$C.M = 20,73 \times 5376 = 11,14$$

Slabs

Expr. 121 Time 9³⁰ AM PM Date 6/22 1955
 Purpose cc for 7-8" alief in box away with
1" edge to edge spacing and cadmium wrapped
~~below elements~~
 Personnel: Fox & Alley



INSTRUMENT CHECK

Date 6/22 1955 Time _____ AM _____ PM Source No. _____
 Trip _____
 Instrument _____ Value _____ Scale _____ Meter _____ Start Up Scale _____
 H₂O _____
 D₂O trip 2.85 on 10x20
 Log N trip
 R-1 responds
 R-2 _____
 P. M. trip

START UP CHECK LIST

Equipment Checked by [initials] Check by [initials]
 Instrument set up [initials]
 Source In [initials]
 Emergency Equip. [initials]
 Red Light On by [initials]
 Start-Up OK'd by BWA Time _____ AM _____ PM Date _____ 1955

fuel ht

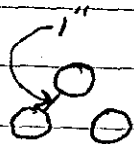
22.94 9.03" just crit.
 $C.V = 22.94 \times 2275 = 52,199$; $C.M = 52,19 \times 5376 = 28,076$

Expr. 122 Time 9⁵⁵ AM PM Date 6/22 1955
 Purpose cc for 7-8" alief in box away with
1" edge to edge spacing and cadmium wrapped
~~below elements~~
 Personnel: Fox & Alley

fuel ht. H₂O wt.

20.85 8.21" 2.0.9 cm just crit.
 $C.V = 20.85 \times 2275 = 47,439$
 $C.M = 47.43 \times 5376 = 25,550$

Expr. 123	Time 1:50	Date 6/22	1955
Purpose: cc for 3-8" al. cyl. in triangular array with ~ 1" edge to edge spacing			
cd wrapped - done old business			
Personnel: Fox, Hilley			



Equipment Checked by	<input checked="" type="checkbox"/>	Check by	<input checked="" type="checkbox"/>
Instrument and			
"Source In" (h)			
Emergency Eq.			
Red Light On by	<input checked="" type="checkbox"/>		
Start-Up OK'd by	LWA	1:50	Date 6/22 1955

Fuel ht.

37.00 cm / 14.57"

$$C, V = 37.00 \times 975 = 36,081$$

$$C, M = 36,081 \times 5376 = 19,400$$

just cut.

Expr. 124	Time 2:30	Date 6/22	1955
Purpose: Same as above except refl.			
Personnel: LWA JRF			

Fuel ht. H₂O ht.

2751

10.83"

27.5 cm

$$C, V = 2751 \times 975 = 26,821$$

$$C, M = 26,821 \times 5376 = 14,420$$

just cut.

Expr. 125	Time 3:30	Date 6/22	1955
Purpose: cc 1-8" cyl. cd wrapped refl. except top			
Personnel: LWA JRF			

Fuel ht. H₂O ht.

60.45

23.80"

60.5 cm

$$C, V = 60.45 \times 325 = 19,650$$

$$C, M = 19,650 \times 5376 = 10,560$$

just cut.

Slabs

Single 9.5 Dia. Reactor Bare

89

Expr. 126 Time 10³⁰ AM
 Purpose cc for 1-9.5" al. cyl. Date 6/23 1955

bare
 Personnel: Log Cross, Hilkey

INSTRUMENT CHECK

To 104 Time 10³⁰ AM Source No.

trip 245 on 10 x 20
trip 285 on 1 x 100

trip responds

M. trip

START-UP CHECK LIST

Equipment Checked by Personnel Check by

Instrument and Safety checked and tested by

Source in Control Room

Emergency Equipment in Control Room Checked by

Red Light On by AM

Start-Up OK'd by Time 10³⁰ PM Date 6/23 1955

fuel lit

$17.00'' = 43.18 + 1.05$ Bottom corrected
 just crit.

$C.V = 44.23 \times 458 = 20,261$

$C.M = 20,261 \times 5376 = 10.89 \text{ kg}$

B-cd
00
000
00
062"

Expr. 127 Time 8³⁰ Date 6/24 1955
 Purpose CC for 7-8" dia. cyl. with in hex array with 2" edge to edge spacing wrapped with Cd - bare otherwise
 Personnel: top Hilley

INSTRUMENT CHECK

Date 6/24 1955 Time _____ AM _____ Source No _____

Instrument _____ Amps _____ Scale _____

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

START-UP CHECK LIST

Equipment Checked by ✓ _____ Check by ✓ _____

Instrument and Safeties Checked and _____ ✓ _____

"Source In" Checked by ✓ _____ No _____ ✓ _____

Emergency Equipment in Control Room _____ ✓ _____

Red Light On by _____ AM _____

Start-Up OK'd by HWG Time _____ Date _____ 1955

fuel lit.

26.62g - 10.48" just cut.
 $C.V = 26.62 \times 2275 = 60.54$, $C.M = 60.54 \times 5374 = 32,56 \text{ kg}$

Expr. 128 Time 9⁰⁵ AM _____ PM _____ Date 6/24 / 1955
 Purpose C.C. 7-8" Dia. Cyl. hex array 2" edge to edge Cd. wrapped
RPT.
 Personnel: HWG J.K.F.

fuel lit H₂O lit.

28.37g - 11.17" 28.40 cm just cut.
 $C.V = 28.37 \times 2275 = 64.54$
 $C.M = 64.54 \times 5374 = 34.70 \text{ kg}$

Expr.	129	Time	10 ⁵² AM	PM	Date	6/24	1955
Purpose	cc. for 3-8" alc. cyl. in triangular array with 2" edge to edge spacing wrapped with cd - brass silver wire						
Personnel:	Jop, Kelley						

2"
○
○
○

fuel ht.

46.94 18.48"

just cut.

$$C.V = 46.94 \times 975 = 45772$$

$$C.M = 45.77 \times 5376 = 24.61$$

Expr.	130	Time	10 ⁰⁵ AM	PM	Date	6/24	1955
Purpose	Same as above except refl side & bot.						
Personnel:	L. W. C. J. K. E.						

0 0
0

fuel ht. H₂O ht.

36.12 14.22" 36.2 cm

just cut.

$$C.V = 36.12 \times 975 = 35222$$

$$C.M = 35.22 \times 5376 = 18.93$$

Expr. 131	Time 2 ⁰⁰ AM	PM Date 6/24	1955
Purpose: a for 7-8" al. cyl with 3" edge to edge spacing - her. array			
ch. wrapped on base other wires			
Personnel: J. H. Kelly			

Equipment Checked	<input checked="" type="checkbox"/>	beck by	<input checked="" type="checkbox"/>
Instrument and	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
"Source In" ()	<input checked="" type="checkbox"/>	No	<input checked="" type="checkbox"/>
Emergency Eq.	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/>		
Start-Up OK'd by J. H. Kelly	2 ⁰⁰	Date 6/25	1955

fuel ht.

30.43 cm - 11.98"

$$C.V = 30.43 \times 22.75 = 69.23 \text{ l, } C.M = 69.23 \times 5376 = 37.22$$

Expr. 132	Time 2 ³¹	PM Date 6/24	1955
Purpose: a for 7-8" al. cyl. in her. array with 3" edge to edge spacing			
ch wrapped - reflected in front for J. H. Kelly			
Personnel: J. H. Kelly			

fuel ht, H₂O ht

36.37 cm 14.32"

36.4 cm

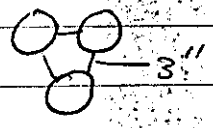
just cut.

$$C.V = 36.37 \times 22.75 = 82.74 \text{ l}$$

$$C.M = 82.74 \times 5376 = 44.48$$

Slabs

Expr. 133 Time 8⁵⁵ AM PM Date 6/27 1955
 Purpose CC for 3-8" al. cyl in triangular array with 3" edge to edge spacing
cd. wrapped - reflected except for top
 Personnel: Fox, Killey BARE



INSTRUMENT CHECK

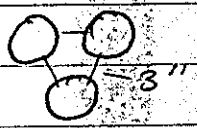
Date 6/27 1955 Time _____ AM PM Source No. _____
 Trip _____
 Instrument Volts _____ Source Distance _____ Start-Up Scale _____
 P. 1 trip ~40 on 10x20
 P. 2 trip ~100 on 100x1
 Log N trip
 R-1 trip responds
 R-2 _____
 P. M. trip

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safety checked and OK'd by ✓
 "Source In" Checked ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM PM
 Start-Up OK'd by G.W.A. Time 9⁵⁵ AM PM Date 6/27 1955

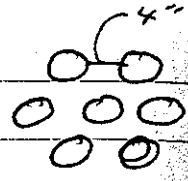
fuel ht. 58.12 cm 22.88" just cut
 $C.V = 58.12 \times 975 = 56.67 \text{ l}$, $C.M = 56.67 \times 5376 = 3047$

Expr. 134 Time 9¹⁵ AM PM Date 6/27 1955
 Purpose CC for 3-8" al. cyl in triangular array with 3" edge to edge spacing
cd. wrapped - reflected except for top
 Personnel: Fox, Killey



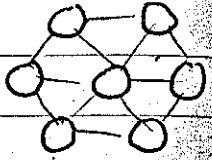
fuel ht. 43.48 cm 17.12" H₂O 43.4 cm just cut.
 $C.V = 43.48 \times 975 = 42.39 \text{ l}$
 $C.M = 42.39 \times 5376 = 22.79$

Expr. 135 - 11° - 4/27 1955
 Purpose cc for 7-8" al. cyl in hex. array
with 7" edge to edge spacing
ch. wrapped in barl. aluminum
 Personnel: Jay, Hilley



Fuel ht. 34.47 13.57" just cut.
 $C.V = 34.47 \times 2275 = 7842$ $C.M. = 78.42 \times 5376 = 42.16$

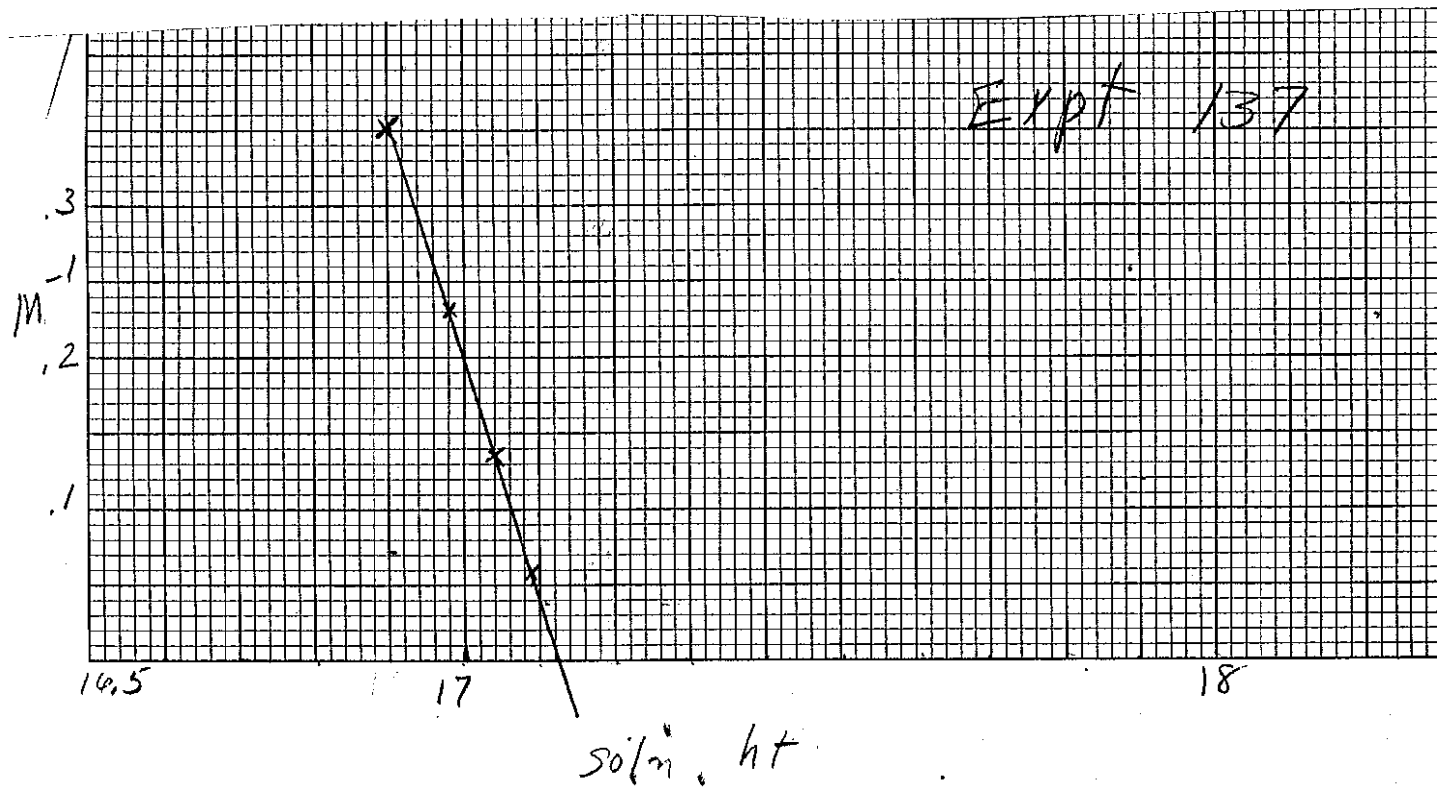
Expr. 136 - 135 - 6/27 1955
 Purpose cc for 7-8" AL. cyls. in hex.
array, 4" edge to edge. Refl.
 Personnel: L.W. Ct., J.K. F.



more in

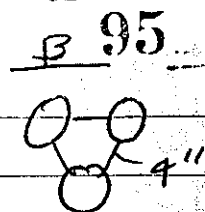
Fuel ht	H ₂ O ht	C ₉	M ₄	C ₅	M ₅
<u>17.10"</u>	<u>43.4 cm</u>	<u>48</u> ^{3x14}			
<u>17.09"</u>	<u>43.4 cm</u>		<u>C5-V64</u>		
"	"	<u>199</u>	<u>198</u>	<u>057</u>	
"	"	<u>197</u>			
<u>17.04"</u>	"	<u>87</u>	<u>84.6</u>	<u>.135</u>	
"	"	<u>85</u>			
<u>16.98"</u>	"	<u>48</u> ³⁴	<u>49.0</u>	<u>.23</u>	
"	"	<u>49</u> ³⁹			
<u>16.90</u>	"	<u>32</u> ⁴⁰	<u>32.2</u>	<u>.135</u>	
"	"	<u>32</u>			
<u>16.55</u>	<u>41.7</u>	<u>11</u> ³²	<u>11.37</u>		
		<u>11</u> ¹⁰			

43.48 cm - Cut ht. = 17.12
 $C.V = 43.48 \times 2275 = 98.92$
 $C.M. = 98.92 \times 5376 = 53.18$



3163
neut analysis

Expr. <u>137</u>	Time <u>9¹⁵</u> AM	PM Date <u>6/28/1955</u>
Purpose <u>C.C. for 3-8" D. Reactors</u> <u>in hex array 4" edge to edge</u> <u>cd. wrapped. Bare</u>		
Personnel: <u>LW G</u> <u>JRF</u>		

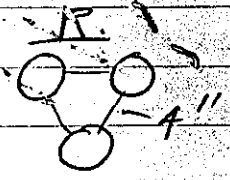


START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Assst by <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. <u>58</u>
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by <u>JRF</u>	Time _____ PM Date _____ 1955

Instrs checked
 ok.
 trip levels not.

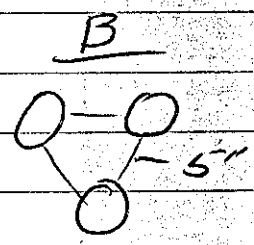
John ht
 71.736 — 28.24" just exit.
 $C.V = 71.73 \times 975 = 69.941$ $C.M = 69.94 \times 5376 = 37.00$

Expr. <u>138</u>	Time <u>10⁰⁵</u> AM	PM Date <u>6/28/1955</u>
Purpose <u>Same as above except</u> <u>(refl. - top)</u>		
Personnel: <u>LW G</u> <u>JRF</u>		



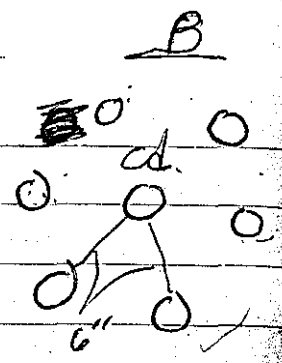
fuel ht H₂O ht.
 49.486 — 19.48" 49.5 cm.
 $C.V = 49.48 \times 975 = 48.241$ $C.M = 48.24 \times 5376 = 25.93$

Expr. <u>139</u>	Time <u>12⁴⁵</u> AM	PM Date <u>6/28/1955</u>
Purpose <u>C.C. 3-8" D. 19. Cyls. hex array</u> <u>5" edge to edge Bare</u>		
Personnel: <u>LW G</u> <u>JRF</u>		



fuel ht.
 89.31 — 35.16" just exit.
 $C.V = 89.31 \times 975 = 87.081$
 $C.M = 87.08 \times 5376 = 46.81$

Expt. <u>140</u>	Time <u>2³⁰</u>	PM Date <u>6/28/</u>	195 <u>5</u>
Purpose <u>C.C. 7-8" D. Cyls. in</u> <u>hex. array, 6" edge to edge</u> <u>Bar</u>			
Personnel: <u>LWC</u> <u>DFC</u> <u>JFE</u>			



START-UP CHECK LIST	
Equipment Checked by <u>✓</u>	Personnel Check by <u>✓</u>
Instrument and Safeties Checked and ready <u>✓</u>	
"Source In" Checked by <u>✓</u>	Source No. <u>✓</u>
Emergency Equipment in Control Room Checked by <u>✓</u>	
Red Light On by <u>✓</u>	AM <u> </u>
Start-Up OK'd by <u> </u>	Time <u> </u> PM Date <u> </u> 195 <u>5</u>

Fuelht
 43.00cm 16.93" just cut
 $C.V = 43.00 \times 2275 = 97,83$ $CM = 97,83 \times 5376 = 52.59$

Sample taken: 4/28/55
 Regn # 354714

net wt. 82.16 gm
 $gms U = 28.75 gm$

$$\frac{gms U}{gm} = 34988$$

$$\frac{gms X}{gm} = 32609$$

$$1,298 \times 34988 = \frac{4541}{5459} \times 10000$$

$$\frac{H}{X} = \frac{24.11 \times 5459}{32609} = 43.1$$

Value of sp. gr. from curve
 is 1.66

$$\frac{gms X}{gm} = 32609; \frac{gms X}{cm^3} = 5436$$

354714

BATCH NUMBER		REQUISITION NUMBER	
REPORT TO: <i>JK 7-14</i>			
BUILDING NO. <i>9213</i>			
DESCRIPTION OF MATERIAL: <i>V O₂ F₂ Soln</i>			
<i>Special</i>			
IF NOT TO BE COMPOSITED CHECK HERE..... <input checked="" type="checkbox"/>			
ASSAY REQUESTED		AT CODE NO.	
AT <input type="checkbox"/>	DT <input type="checkbox"/>		
ANALYSIS REQUESTED		REPORTED ANSWERS	
<input checked="" type="checkbox"/> GRAM/GRAM T		<i>379880</i>	
SIGNED:		DATE	
<i>[Signature]</i>		<i>JUL 9 1955</i>	

ANALYTICAL REPORT *01508*

Report to: *Chem Lab.*

Requisition Number *354714*

Material Type *1900 Soln.*

Batch Number

Run 2 mg. shots N.C.

Answers are in: (circle)

PPM

Percent

Other

Ag	Al	As	Au	B	Ba	Be	Bi	Ca	Cd	Co	Cr	Cs	Cu	Fe	Ga	Ge	Hg	In	K	Li	Mg
<i><1</i>	<i>156</i>			<i>22</i>	<i><10.6</i>			<i>55</i>			<i>166</i>		<i>5</i>	<i>1600</i>					<i><50</i>	<i><2</i>	<i>45</i>

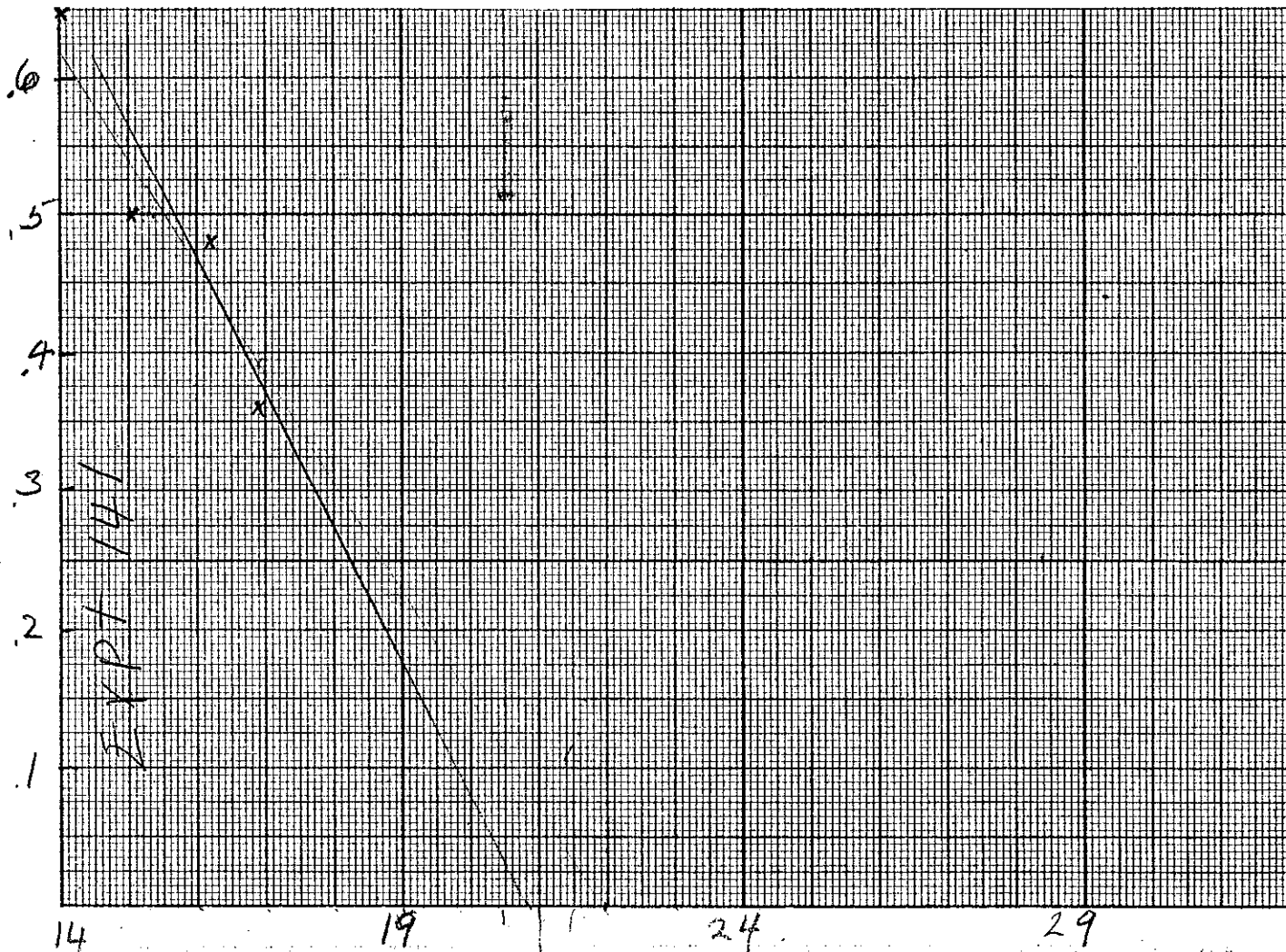
Mn	Mo	Na	Ni	P	Pb	Pd	Rb	Sb	Si	Sn	Sr	Ti	Tl	V	Zn						
<i>18</i>			<i><10</i>	<i>170</i>	<i>150</i>					<i><10</i>	<i>23</i>										

Remarks:

2410.

By *Al-Bd* Date *7-8-55*

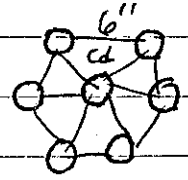
NO. 340. M DIETZGEN GRAPH PAF
MILLIMETER



5/1/55

97
R

Expt. 141 Time 8²⁵ AM Date 6/29 1955
 Purpose Cal for 7-8" diam cyl. in hex. assembly
with 6" edge to edge spacing - cd.
w rapped and reflected except for top
 Personnel: Joe Hilkey



INSTRUMENT CHECK

Date 6/29 195 Time _____ AM
 Instrument _____ FM Source No. _____
 Instrument _____
 D.C. _____
 D.C. trip @ 85 on 10 x 20
 D.C. trip @ 80 on 1 x 100
 Log N. alp
 R-1 responds
 R-2 _____
 P. M. trip

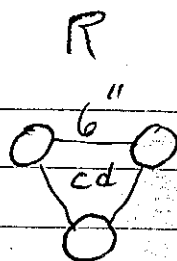
START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked on _____
 "Source In" Checked by ✓ Use No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by W. A Time 8⁴⁰ AM Date 6/29 1955

Fuel ht	H ₂ O ht	P ₅	M ₅
16.90"	43.0 cm	8 ⁸	1.36
"	"	8 ⁹	
"	"	8 ⁵	
"	"	7 ¹⁴	
16.18	41.1	6 ³ , 6 ³	6.2 4.8
15.03	38.2	6 ² , 5 ¹⁴ , 6 ⁴	6.0 5.0
14.01	35.2	5 ¹ , 4 ² , 4 ¹²	4.6 4.5
8.85	"	1 ⁴ , 1 ² , 1 ³	-
"	22.5	2 ⁴ , 3 ⁴ , 3 ²	3.0

Extrapolate to ~ 21.1" = 53.31 cm
 $C_V = 33.3 \times 22.75 = \sim 121 \text{ l}$
 $C_M = \sim 65 \text{ kg}$

Expr. 142 Time 11:55 AM Date 6/29 1955
 Purpose cc for 3-8" ob. cyl. in triangular array with 6" edge to edge spacing. Cd unheated - reflected except for top.
 Personnel: For Kelley



Fuel ht:

56.13 cm 22.10"

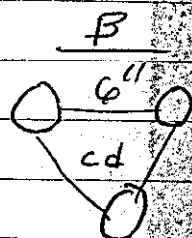
$C.V. = 56.13 \times 975 = 54.73$

$C.M. = 54.73 \times 5376 = 29,42$

just crit.

marks ok

Expr. 143 Time 10⁰⁰ AM Date 6/29 1955
 Purpose Same as above except Bare
 Personnel: LWG, JRF

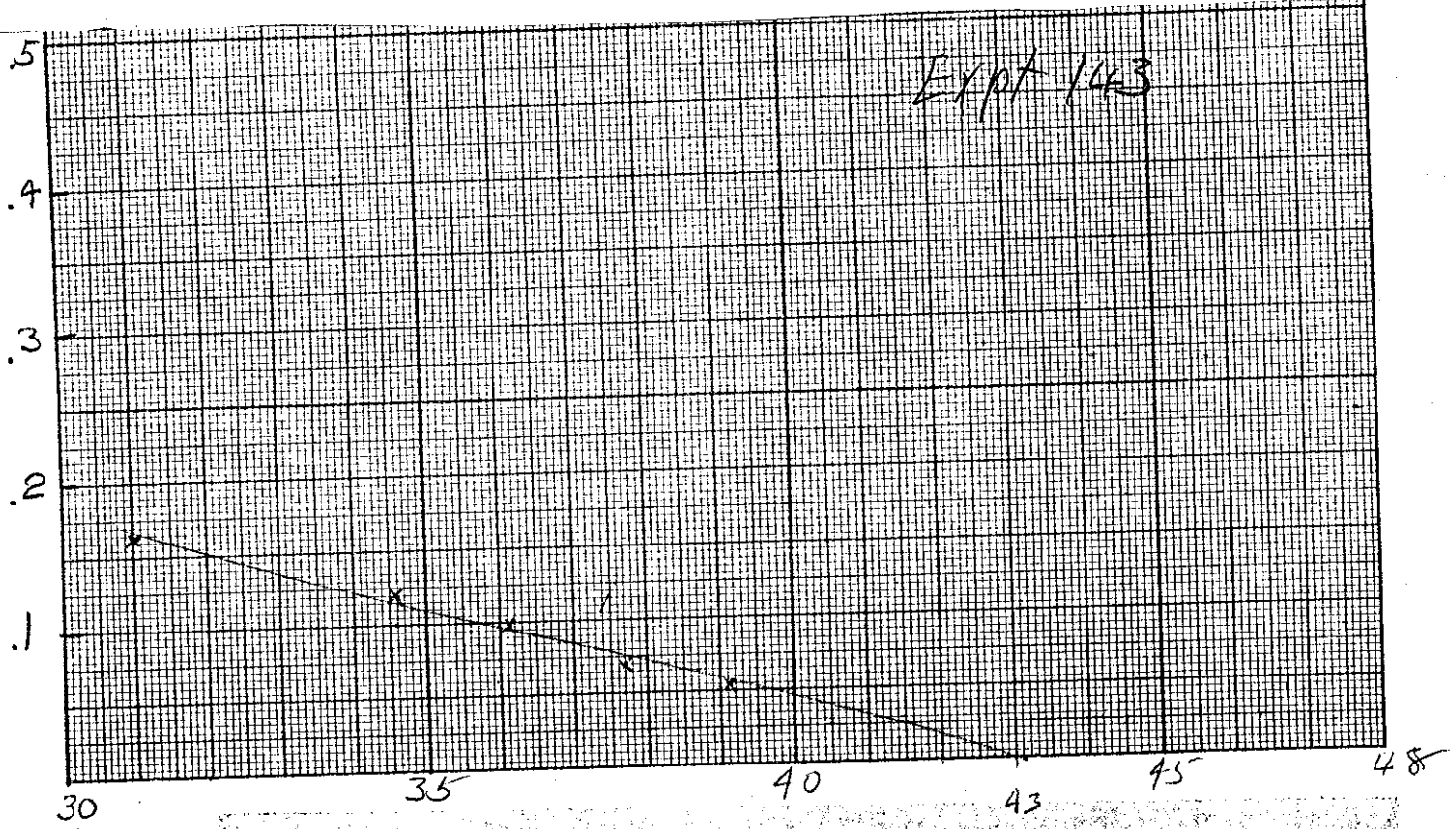


Fuel ht

Fuel ht	C_V	M_C	
39.07"	30.0		
"	32.3	30.5	.056
"	29.75		
37.47	24.0		
"	23.0	23.8	.071
"	24.51		
34.13	17.3		
"	14.4	17.4	.098
"	19.1		
"	16.75		
34.65	14.4		
"	13.6	14.2	.120
"	14.5		
31.01	9.75		
"	10.7	10.5	.162
"	10.75		
10.30	2.1		
" Extrapolated	1.4	1.7	$C.V. = 109.2 \times 975 = 107.5$
" Crit. ht. = 43"	1.7		$C.M. = 107 \times 5376 = \sim 57$

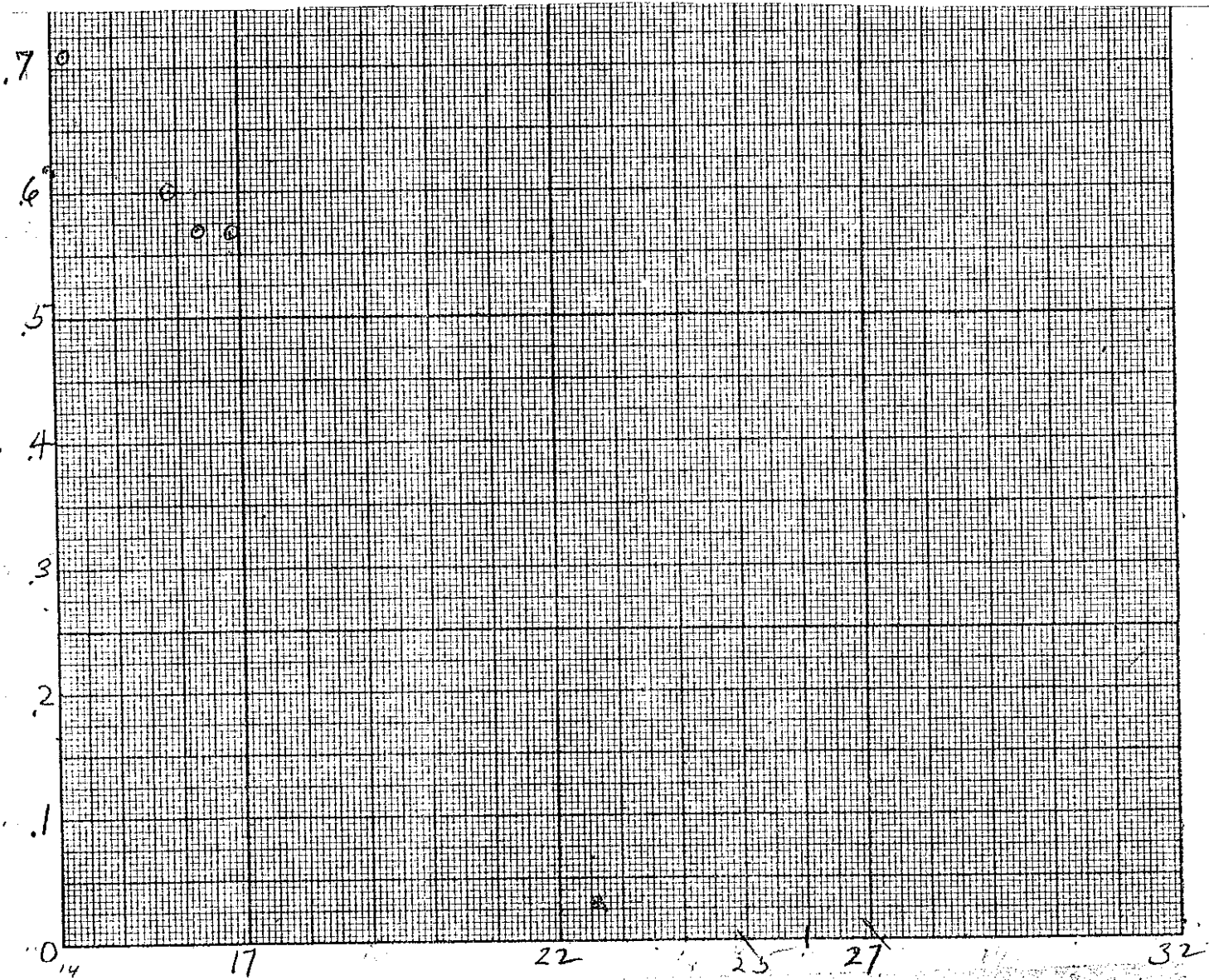
≈ 109.2

NO. 340. M DIETIG
MILLIME



EN GRAPH PAPER

EUGENE DIETZGEN CO.
PRINTED IN U. S. A.



51635

99
B
cd

00-9"
000
00

Expr. 144 Time 8¹⁵ AM Date 6/30 1955
 Purpose cf for 7-8" alc. cyl. in hex array
Ed. wrapped. - 9" edge to edge spacing
 above
 Personnel: Joe, Kelley

INSTRUMENT CHECK

Date 6/30 1955 Time _____ AM
 PM Source No. _____
 Trip _____

Instrument	Volts	Source	Distance	Start-Up Scale
D-1	trip ~ 85	on	10 R 20	
D-2	trip ~ 85	on	1 X 100	
L-5 N	trip			
R-1	respond			
R-2				
P. M.	trip			

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by SWA Time 8⁴⁸ AM Date 6/30 1955

fuel hf. <u>C2</u>	<u>C5</u>	<u>C3</u>
16.87	94 x 14	750
355	10 ⁴	745
11	98	7675, 770
16.28"	91	76
15.87	91.5	74.5
15.87	10 ⁴	71
15.87	10 ³	73
114.27	1510	72
Very poor Extrap = ~ 26"	counters just	60
C.V = ~ 66 x 2275 = ~ 1502		61.7
CM = ~ 81		61.2
		42.5
		44.25
		42.5

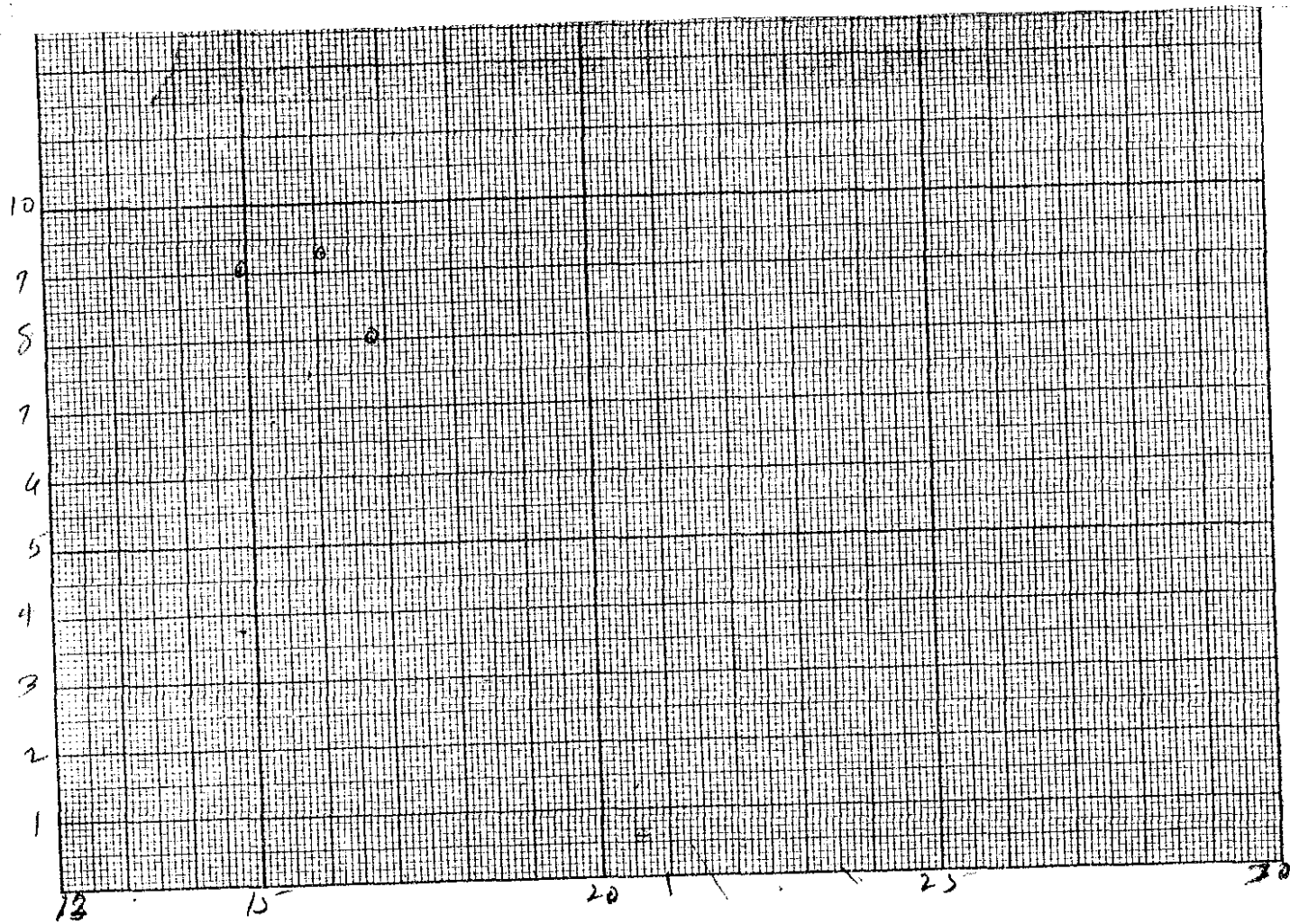
Expr. 145	Date 4/30 1955
Purpose cc for 7-8" reactor with 9" edge to edge spacing - d.w. rapped	
reflected except for top	
Personnel: Fox, Gillee	

fuel ht.	C3	C4
16.83"	.80	243, 259
"		251, 242
16:11	.93	205.5, 214, 213
14.89	.90	214, 227.5, 227
584		199, 198.5

indefinite

Expr. 146	Time 4:20 AM	Date 4/30 1955
Purpose cc for 3-8" ob. cyl. in triangle		
away with 9" edge to edge spacing		
d.w. rapped - reflected except for top		
Personnel: Fox, Gillee		

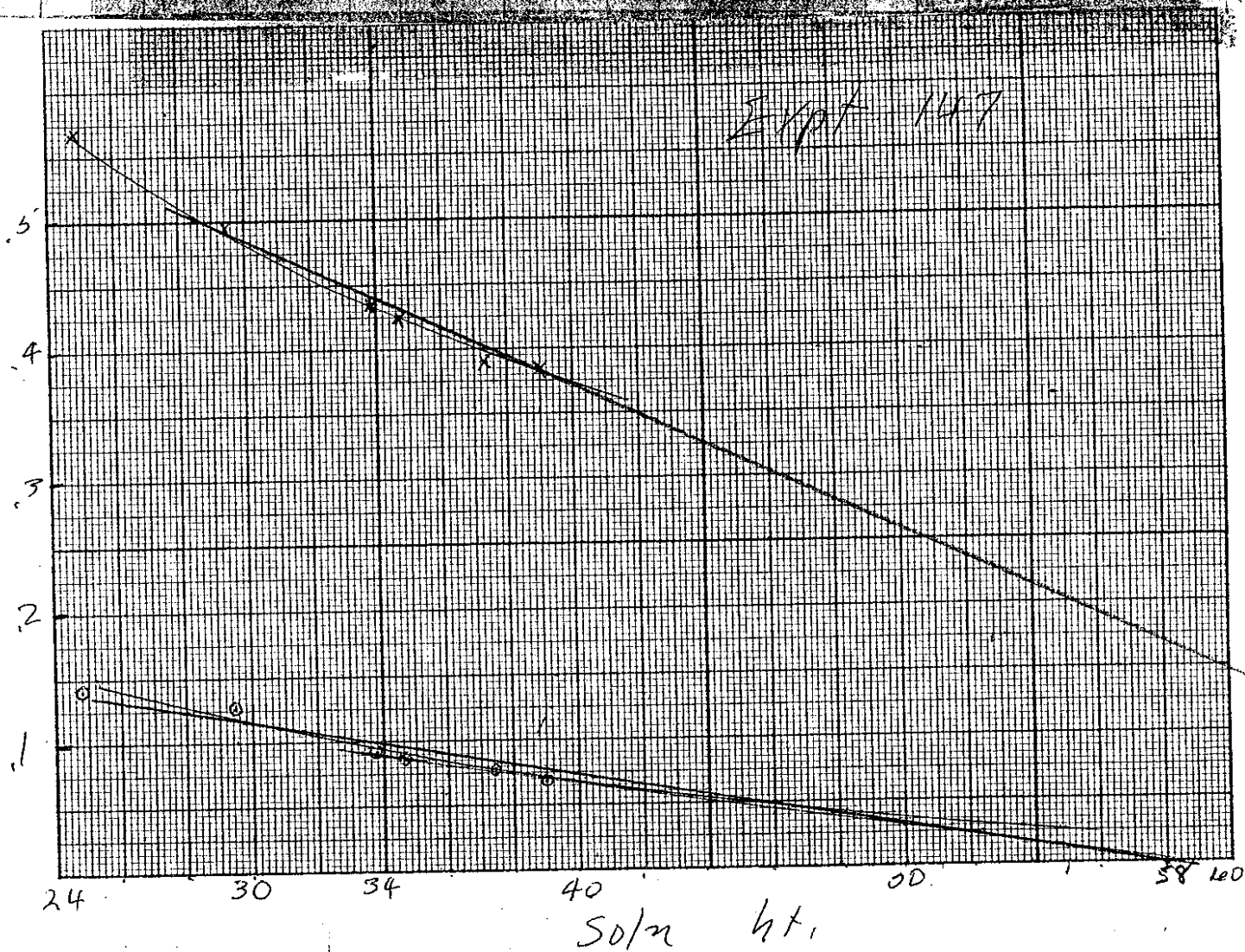
fuel ht	H ₂ O ht.	
59.69	23.50"	59.9 cm j not cut
$Q.V = 59.69 \times 975 = 58.20 \text{ l}$		
$Q.M = 58.20 \times 5376 = 311.29 \text{ kg}$		



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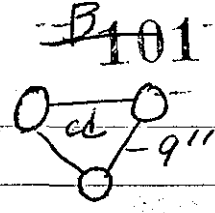
NO. 340.. M DIETZEN GRAPH PAPER
MILLIMETER

M^{-1}



5125

Expt. 147 Time 8:32 AM PM Date 7/11 1965
 Purpose C.C. For 3-8" Dia. Cyls. in
Tri. array, 9" edge to edge, Cd.
Wrapped Bare
 Personnel: L.W.C., J.K.F.



START-UP CHECK LIST

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

DC-2 Trips: 90 x 200
 PC-3 " 85 x 100
 Anals. OK

Fuel ht.	C ₂	C ₃
38.97"	14 ² 16 ² .067	58 59
" 15	16 ² 14 ² 58.7	59 .384
37.34"	11 ² , 12 ² .079	58
" 12.7	13 ² 57.8	57.25 .390
34.69	11 ² 11 ² .087	52.8 52.0
" 11.5	11 ² 53.75	53.75 .426
" 11.3	11 ² 52.25	52.25
33.82	10 ² 14	53.0
" 11	9 ² 13 .091	52.0 51.0 .433
" 11	12 ²	52.0
29.50"	7.9 8 ² .127	45.5 45 .495
" 7.9	7	46
24.82"	7.0 7 ²	40.5 39.5 39 .367
" 7.0	6 ² 8 ² .143	39.7
10.42"	1 ² 16	21.4
" 1	0 ² 15	22.5 23.1
" 1	1 ²	23.4

Indefinite but greater than 58" = 147 C
 C.V = > 143 L
 C.M = > 78

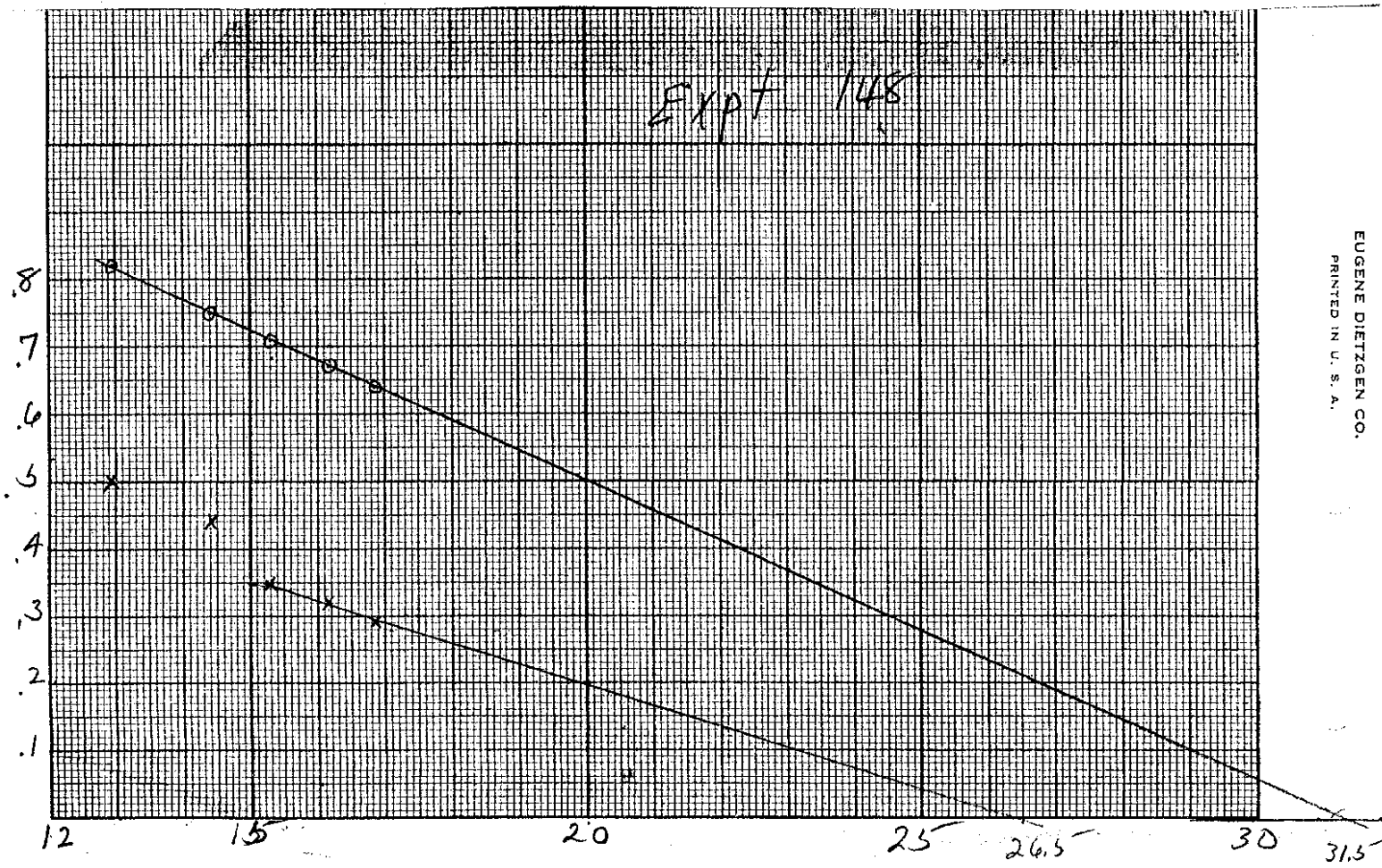
Expt. 148	Time 3 ⁰⁰ AM	Date 7/1 1953
Purpose: c for 7-8" al. cyl with 12" edge to edge spacing in bet away (no ed. wrapping)		
Personnel: J. Hiller		

fuel ht.		C ₃	C ₄
16.85"	.64	54 53	13 ¹ 29
"		54 52.3	11 ⁰ 11 ³
16.14"	.67	51.5 50.5	11 ⁴ 32
"		49.5	10 ¹³ 10 ⁴
15.28"	.71	48.0 47.5	9 ⁵ 35
"		47.0	10 ² 10 ⁰
14.40"	.75	46.25 45	6 ¹⁰ 44
		44.25	7 ²
		44.0	7 ⁰
12.95"		40.5	6 ²
"	.82	41.5 41.0	7 ² 50
"		41.0	6 ⁹
8.96"		33.5 33.7	3 ⁷
"		34.0	3 ¹⁴

Extrapolate → 26.5 - 31.5"
 AV = ~ 29" ≈ 73.66%

C.V = 73.66 x 2275 = ~ 168 l.
 G.M = 168 x .5376 = ~ 90 kg

EXPT 148

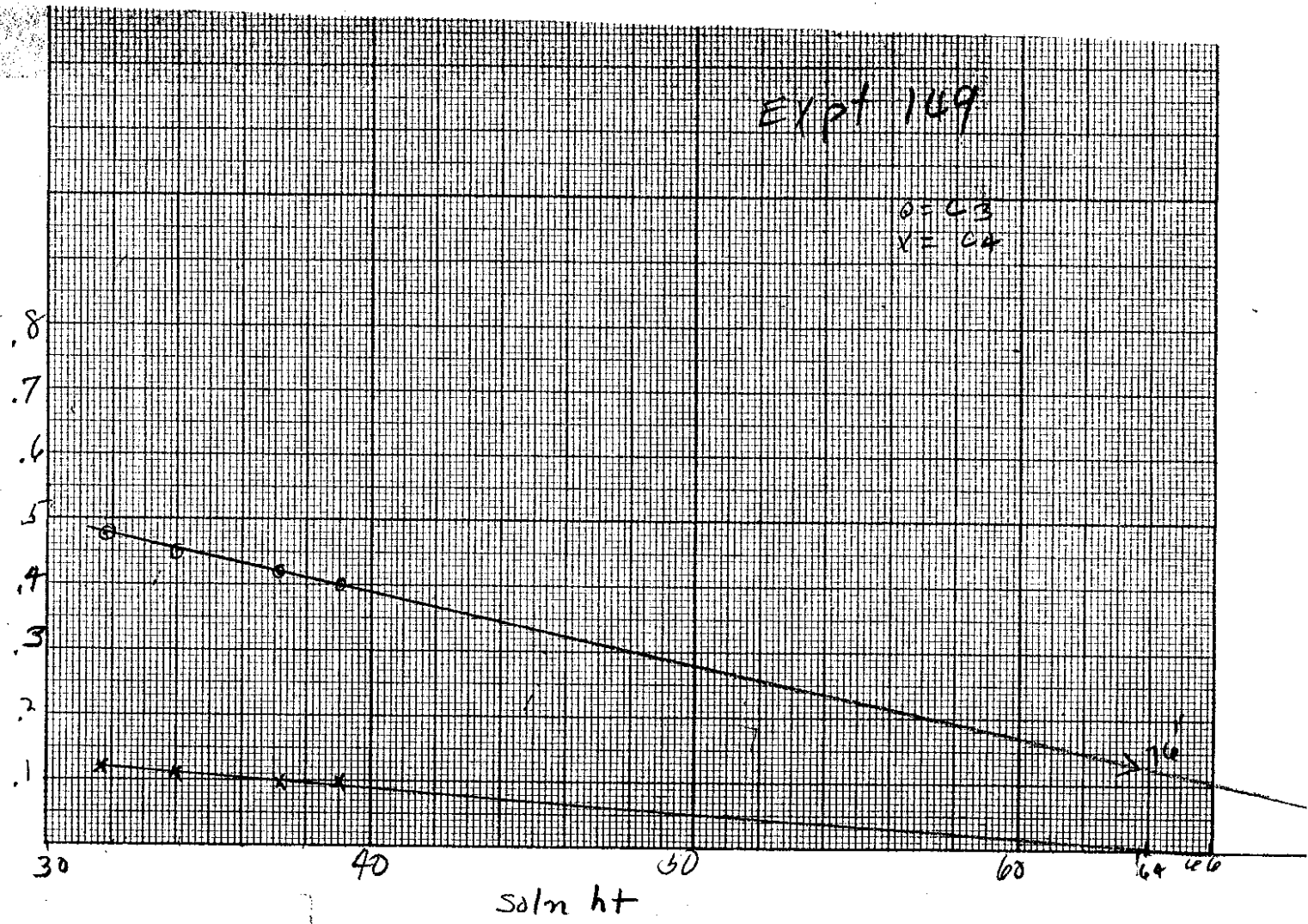


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NO. 340. M. DIETZGEN GRAPH PAPER
MILLIMETER

EXPT 149

O = C3
X = C4



Expr. 149 Time 9:05 AM Date 7/5 1955
 Purpose cf for 3-8" sl. cyl. in triangulation array with 9" edge to edge spacing bars
 Personnel: L.W.G., Cronin, Fox

INSTRUMENT CHECK

Date 7/5 1955 Time 9:05 AM Source No.
 Trip
 Instrument Value Serial Distance Start-Up Scale
 D-1
 D-2 trip
 D-3 trip
 Log trip
 R-1 repond
 R-2
 P. M. trip

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Supplies Checked and Reported by
 Source ID checked No.
 Emergency Equipment in Control Room Checked by
 Red Light On by Time 9:20 AM
 Start-Up OK'd by GWA Time 9:20 AM Date 7/5 1955

Fuel ht.	C ₃	C ₄		
38.97"	58.48	20 ⁷ / ₁₁	} 20.0 0.1	}
"	59.5	21 ¹¹ / ₁₁		
37.46"	56.25	21 ⁵ / ₃	} 21.25 0.094	}
"	55.5	21 ³ / ₃		
33.97"	54.0	17 ¹³ / ₁₃	} 18.50 0.108	}
"	53.25	18 ¹² / ₁₂		
"	51.25	19		
"	51.0	18 ¹⁴ / ₁₄		
31.76"	49.75	16 ¹⁴ / ₁₄	} 16.75 0.12	}
"	48.75	17 ¹ / ₁		
"	49.5	16 ⁵ / ₅		

cont.

Fuel Ht	C ₃	C ₄
9.99"	24.0	1.14
"	22.75	2.3
"	23.75	1.14

} 23.50 } 2.0

Indefinite but greater than 60"
 ≈ 152 cm

C.V = > 148 l
 C.M = > 80 kg

To Clean Manifold added the following:

Container no			
31-1991	15,394 gm. sal.	4898 gm	U. 314 gm U ₂ / gm
31-2004	1.58 gm	15,209	329 4649 3285
31-2028	15,484	4982	
31-2037	14,082	4051	
31-2054	14,141	4374	
31-2110	10,267	3203	
	<u>84,637</u>	<u>26,157</u>	

sample from manifold: P-149
 19259 gm 354795

added ~ 260 liter H₂O

128.95
 28.55

 100.40
 = 0.682 gmU / gm

Experiments with Interacting

3" Slabs

Calibration of flow rate: using center slab only.

Timing for one slab

	Height raised	Time	Notes
pump was pumping against \approx same head	1" (2.3 l)	10.5 sec.	regular pump by-pass was all the way open
	1"	9.2	
	1"	12.5	\leftarrow increased ^{2nd} by-pass
	2 ⁰⁴ P.M. 1"	22 sec.	" " \rightarrow 2 nd time here was by-pass was wide open
	1"	17.5	
	1"	17.5	regular valve open: 2 nd valve \approx 3/4 open
	1"	16.0	" " " " " \approx 1/2 "
$\left(\frac{2.3}{27} = 8.5 \text{ l/min} \right)$		16 \approx to .156 liter/sec.	

2nd Mixing: 3-23-56

Added cyl 31-1991 8 ~ 5.4 l. out of cyl L-3
 Then added 5.4 liter H₂O and mixed

Note: The slabs were apparently mounted in 516 (see p. 112), including the "unreflected" ones. 2 of 4/86

3-20-56

Experiments with Interacting 3" Slabs

105

Calibration of flow rate: using center slab only.

Timing for one slab

	Height raised	Time	
pump was pumping against same head	1" (2,3l)	10.5 sec.	regular pump by-pass was all the way open
	1"	9.2	
	1"	12.5	← increased ^{2nd} by-pass
2 $\frac{0.6}{1.1}$	1"	22 sec.	" " " " → 2 nd time
	1"	17.5	here the by-pass was wide open
	1"	17.5	regular valve open; 2 nd valve ~ 2/3 open
	1"	16.0	" " " " " " ~ 1/2 "
$\left(\frac{2.3}{2.7} = 8.5 \text{ l/min}\right)$		14 sec. to .156 liter/sec.	

2nd Mixing: 3-23-56

Added cyl 31-1991 8 ~ 5.4 l. out of cyl 2-3
Then added 5.4 liters H₂O and mixed

Note: The slabs were apparently mounted in 516 (sup. 112), including the "unreflected" ones. 4/8/6

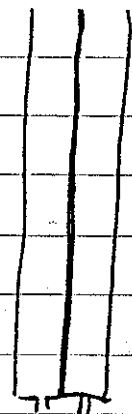
INTERACTING SLABS

$H/x \approx 400$

106
Slabs
clamped
together

Expr: <u>1</u>	Time <u>8:40</u> AM	Date <u>3-21-</u> 19 <u>54</u>
Purpose <u>Crit. Cond. for 2-3"</u>		
<u>All slabs in contact. Bare</u>		
Personnel: <u>L.W. Gilley, L. Cross, Fox</u>		

START-UP CHECK LIST	
Equipment Checked by <u>✓</u>	Personnel Check by <u>CROSS</u>
Instrument and Safeties Checked and Reset by <u>✓</u>	
"Source In" Checked by <u>✓</u>	Source No. _____
Emergency Equipment in Control Room Checked by <u>✓</u>	
Red Light On by <u>✓</u>	AM _____
Start-Up OK'd by <u>JKF</u>	PM Date _____ 19 <u>5</u>



Insts. checked. Trip Levels: D-c-3 - 65 x 200
others normal.

~~48.34~~ slab ht. 48.34 not crit.

	C4	C5
48.34	12+6	11+15
"	6+13	14+14

Preliminary data

Data above not to be reported

Expr. 2 Time 9⁴⁰ AM Date 3/22 1956
 Purpose Crit. conditions of 3-3" slabs
in contact - Base
 Personnel: Fox, C. Uey, Cross

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No.
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by JWS Time 9⁴⁰ AM Date 3/22 1956



INSTRUMENT CHECK

Date	Time	AM	PM	Source No.	Trip	Instrument	Scale	Source Distance	Start-Up Scale

trip
 trip
 trip

fuel ht. source
 10.34" out slightly sub
³⁵
 10 A.M. 10.35" " " super

3/22/56 Exp 2 repeated to check mixing of solution. 7 tanks only used from lower manifold.

fuel ht source
 10.34" out slightly sub.
³⁵
 11 A.M. 10.35" " " super

Preliminary Data
 Data above not to be repo

108

Put Paraffin
in front of
Counters

Expt. <u>Repeat</u>	Time <u>AM</u>	Date <u>3-22</u>	195 <u>6</u>
Purpose <u>Repeat of Expt #1</u>			
Personnel: <u>L.W. Gilley, R. Guzman, Fox</u>			

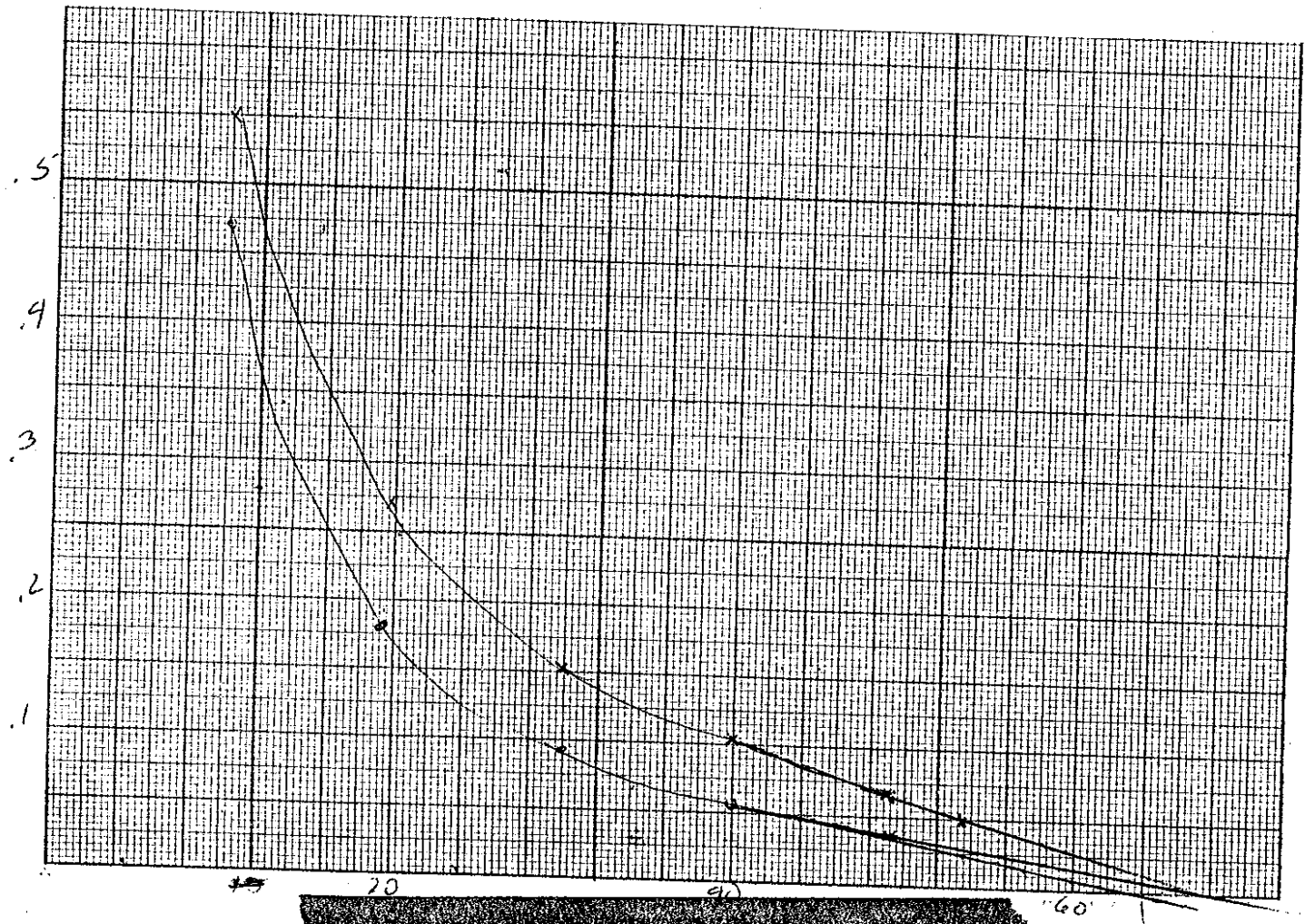
START-UP CHECK LIST	
Equipment Checked by <u>✓</u>	Personnel Check by <u>✓</u>
Instrument and Safeties Checked and Reset by <u>✓</u>	
"Source In" Checked by <u>✓</u>	Source No. <u> </u>
Emergency Equipment in Control Room Checked by <u>✓</u>	
Red Light On by <u>✓</u>	AM <u> </u>
Start-Up OK'd by <u>JK</u>	Time <u> </u> PM Date <u> </u> 195 <u> </u>

Soln ht.	C4	C5
3.26"	37.5 ³⁸	57.5 ⁵⁸
"	39.25	58.75
9.95	80.76 ⁴⁷	106.5 ⁵³
19.58	207.25 ¹⁸³	223. ²⁷
"	206.5	220.25
30.22	411.5 ⁶⁹³	378.5 ¹⁵³
"	408	379.5
40.07	658 ⁰⁵⁸	565 ¹⁰²
"	656	568
48.74	1019 ⁰³⁷	843 ⁰⁶⁸
	changed to 2365 → 1027	847
53.40	1456 ⁰²⁵	1172 ⁰⁴⁹
	"	1160

Extrapolate to critical at 64-68"

Preliminary data
not to be reported

11
Put
12
CO



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Conc. inc-
reased to
about

H₁ = 340
H₂ = 337

Expr. 3 Time 9:30 AM Date 3-24 1954
 Purpose Crit. Cond 2-3" slabs in
contact after increasing
conc. base
 Personnel: L.W. Gilley Fox

109

START-UP CHECK LIST

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

Insts. Trip OK. DCB - 60-10x20

5	41.12	slightly super crit.
7	41.07	" " "
	41.03	" " "
3	40.99	40.97 crit ht. " "
	40.95	" sub. crit

Lowered blade into soup - reactivity fell rapidly

3-24-54 PM Repeat to check on mixing:

41.05 slightly just. critical
check in fairly good since crit. ht is rather insensitive to fuel + uncertainty in equilibrium between reactor vessels.

Av. C.H = 41.0" ≈ 104.1 cm

C.V. = ~~191.5~~ 191.5-l

C.M. = ~~14.6~~ 14.61

110 337
 H/X = ~ 340

Expr: <u>4</u>	Time: <u>2:50</u> AM	PM Date: <u>3-26</u> 19 <u>54</u>
Purpose: <u>crit. cond for 3-3"</u>		
<u>Stabs in contact Bars</u>		
Personnel: <u>L.W. Gulley Fox</u>		
START-UP CHECK LIST		
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>	
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>	Source No: <u>PN 123</u>	
"Source In" Checked by <input checked="" type="checkbox"/>	Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	AM	19 <u>5</u>
Start-Up OK'd by <u>JK7</u>	Time	PM Date



Soln Temp 77° F

Soln Ht

10.12"	Slightly super critical
10.08	" " "
10.07	" " "
10.05	" " "
10.03	" sub. crit

C.H = 10.04 ≈ 25.5

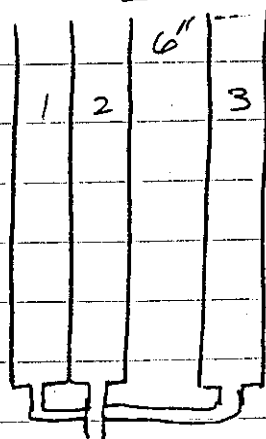
C.V. = 70.4

C.M = 537

C.V. = 70.4 l max (C.V.)
 C.M = 537 kg (C.V. = m/v)
 C.V. = 76.38/cm³

Expr: 5 Time 8:55 AM PM Date 3-27-1964
 Purpose Crit. Conditions 3-3" slab
Reactors - 2 in contact & 3rd spaced
16" Bare
 Personnel: L.W. Gilley, Cross, Fox

111



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. PN123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by gkf Time _____ PM Date _____ 195

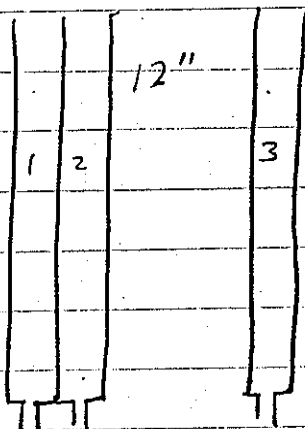
Inst. checked O.K.

80m ht.

17.71 slightly sub. critical
 17.73 " " "
 17.74 " super "

$\approx 45.1 \text{ cm}$; $C.V. = 12.45$ $C.M. = 9.620$

Expr: 6 Time 2:12 AM PM Date 3-27-1964
 Purpose C. Cond 3-3" Al slabs
2 in contact & 3rd spaced 12"
Bare
 Personnel: Gilley, Fox



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by gkf Time _____ PM Date _____ 195

slab Temp 76°F

20m ht

22.90 slightly sub.
 22.92 " super crit

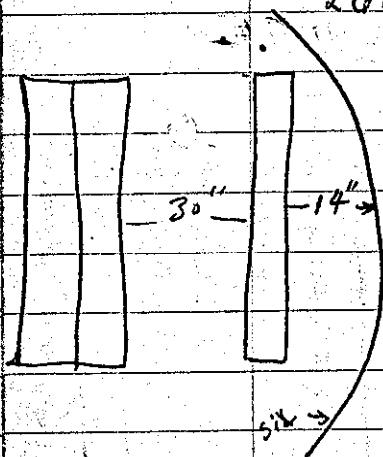
$C.H = 58.2 \text{ cm}$.

$C.V = 160.6$ $C.M = 12.25 \text{ kg}$.

Expr. 7 Time 8:30 AM Date 3/28 1956
 Purpose Critical Condition of 3-3" slabs (all with two in contact and 3rd 18" away)
 Personnel: _____

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by J.W.H. Time 9:30 AM Date _____ 1956

fuel ht source
 26.85" out sub critical
 9:18 A.M. 26.87" " " "
 26.89" " " " just crit.
 68.3 cm. C.V = 188.5 C.M = 14.38



Expr. 8 Time 10:50 AM Date 3/28 1956
 Purpose C.C. for 3-3" al. slabs with two in contact and the 3rd 30" away (edge to edge)
 Personnel: J.W.H., Hilley

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓
 Start-Up OK'd by J.W.H. Time 11:50 AM Date _____ 1956

→ Note: movable reactor is now 19 inches from steel tank at farthest point and 14" at nearest points (at edges).

fuel ht. source
 32.72" out just crit.
 C.H = 83.1 cm
 C.V = 229.4 f.
 C.M = 17.50

Expt.	9	Time	9:10 AM	Date	3/29	1956
Purpose	critical conditions for 3-3" alphas (ol)					
	Two outside alphas on each 6" away from central slab - base					
Personnel:	Jay, Kelley					
START-UP CHECK LIST						
Equipment Checked by	<input checked="" type="checkbox"/>	Personnel Check by	<input checked="" type="checkbox"/>			
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>					
"Source In" Checked by	<input checked="" type="checkbox"/>	Source No.				
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>					
Red Light On by	<input checked="" type="checkbox"/>	AM				
Start-Up OK'd by	<input checked="" type="checkbox"/>	Time		PM	Date	1956

fuel ht. source

47.35"	out	sub. crit.
47.37"		" "
47.45"		super "
47.42		" "
47.40 ± 120.4 cm.		just crit.

John Terry 77°F

$C_{H1} = 120.4 \text{ cm}$

$C_{UV} = 332.3$

$C_{IM} = 25.35$

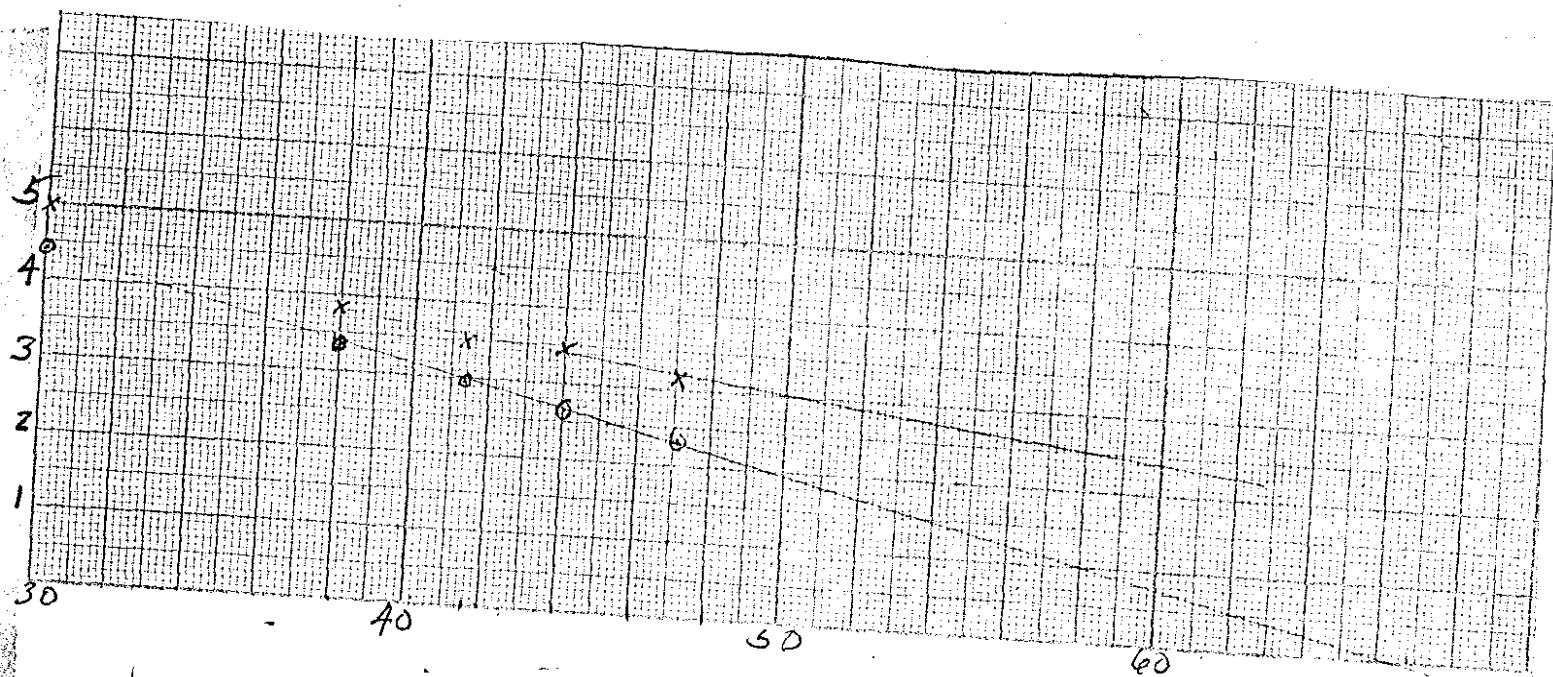
Expt. 10	Time 1:06 AM	PM Date 3/29 1956
Purpose Critical conditions for 3.3" of slabs 4" edge to edge reflected heat bar top		
Personnel: Roy Killey		

$1 \frac{50}{PM}$ { Soln temp. = $70^{\circ}F$ (Soln ht. $\approx 16"$)
 $1 \frac{42}{PM}$ { H₂O temp = $60.8^{\circ}F$
 $3 \frac{12}{PM}$ Soln temp = $63^{\circ}F$

Fuel ht.	H ₂ O ht.	C ₄	C ₅
47.07"	121.5 [*]	286 ^{+37 x 64}	313 147 ^{50 x 64}
"	"	281 ^{+5 x 64}	147 ^{5 x 64}
43.98"	"	267 255 ⁺¹³	344 134 ⁺²¹
41.50"	"	294 230 ⁺¹¹	35 131 ⁺⁴⁸
38.24"	"	328 208 ⁺⁴¹	88 121 ⁺²¹
29.24"	102.4, 143 [*]	155 ⁺⁹	50 92 ⁵⁰
17.77	87	68.5 ⁶⁸	70.5 ← ??
"	"	67 ⁶⁸	45 ⁴⁸ 46

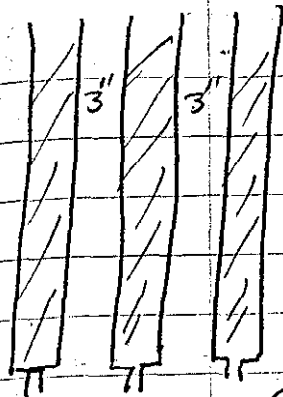
Extrapolated $\approx 66"$ - may be infinite
 C.V. ≈ 460 l
 C.M. ≈ 35 kg

* Zero on H₂O scale is zero on fuel scale.



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NO. 340-1M DIEZGEN GRAPH PAPER
 MILLIMETER



Expr. 11 Time 9:25 AM Date 4-2 1962
 Purpose Critical conditions 3-3"
At slabs spaced 3" apart
 Personnel: Bare LW Willey Cross Fox

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by JKF Time _____ PM Date _____ 195

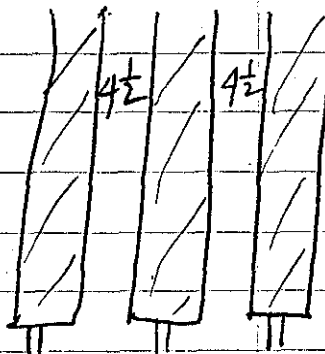
Just checked OK. Trip levels normal

Soln. ht. in:
 23.14 slightly just crit.
 $CH = 58.8 \text{ cm}$ $CV = 2760 \times 58.8 = 162.3 \text{ l}$; $CM = 162.3 \times 0.7628 = 12.38$

Expr. 12 Time 10:45 AM Date 4-2 1962
 Purpose Crit. Cond 3-3" slabs
spaced 3" apart Refl.
 Personnel: LW Willey Fox

Soln ht.	H ₂ O HT	Temp -
12.45"	41.4	just crit
12.98	32.6	slightly just.
12.96 12.96	33.0	just crit
C. H. = 32.9 cm		
C. V = 90.8		
C. M = 6.9 kg		

116



Expr. 13 Time 9²⁰ AM PM Date 4-3 1956
 Purpose CRIT. Cond. 3-3" Al Slabs
spaced 4 1/2 in. apart. Bare
 Personnel: L W Gilley, Fox

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by RK Time _____ PM Date _____ 1956

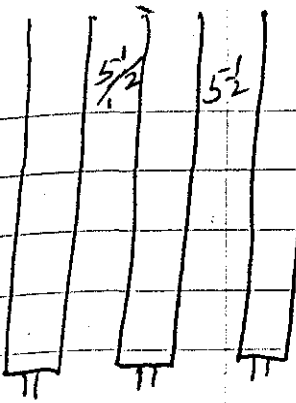
9²⁰ start check OK DC-3 trips 50X200

33.66 slightly sub.
 33.67 just critical
 Temp. 76°F
 C.H = 85.5 cm C.V = 236.0 l
 C.M = 18.0

Expr. 14 Time 1⁰³ AM PM Date 4-3 1956
 Purpose CRIT. Cond. same as
above except Refl.
 Personnel: Gilley Fox

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956

Fuel ht. water ht.
 24.02 ~~54.9~~ cm slightly super
 24.00 60.9 " just out.
 C.H = 61.0 cm
 C.V = 168.4 l
 C.M = 12.84



Expt.	15	Time	8:40 AM	Date	4-4	1956
Purpose	Crit. Cond. 3-3" Al. Slabs 5 1/2" apart BAVE					
Personnel:	Cross Culley Fox					

117

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/> Source No. 123
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/> AM
Start-Up OK'd by	JKF Time _____ PM Date _____ 1956

Primary & secondary steam give complete test. Trip levels normal PC3 - 50x200

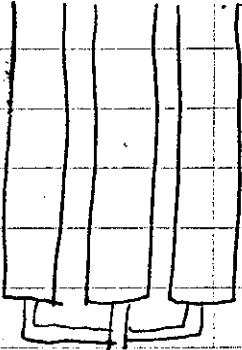
Fuel ht.
42.27" just critical
C.H = 107.4 cm
C.V = 296.4 l CM = 22.6 l

Expt.	16	Time	10:20 AM	Date	4-4	1956
Purpose	Steam as same except Re Fl.					
Personnel:	L.W. Culley Fox					

Fuel ht. #20 ht.
44.08" 110.9 cm just crit.
43.97" 112. 11 "

C.H = 111.7 cm
C.V. = 308.3 l
C.M. = 23.52 l

Expr. 17 Time 1:30 AM PM Date 4/4 1956
 Purpose Cal. conditions for 3-3" al. slabs
with 1" edge to edge separation
base
 Personnel: Fox, Hilley



START-UP CHECK LIST
 Equipment Checked by Personnel Check
 Instrument and Safeties Checked and Tested by
 "Source In" Checked by Source N.
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by HWA Time _____ PM Date _____ 1956

fuel ht. slightly sub.
 13.56" " super
 13.57"
 C.H 34.5 cm
 C.V = 95.2 l C.M = 7.26

Expr. 18 Time 2:20 AM PM Date 4/4 1956
 Purpose CC for 3-3" al slabs with
1" edge to edge separation
reflected
 Personnel: Fox, Hilley

refl. fuel ht. H₂O
 7.53" 19.1 cm just cut.
 C.H = 19.1 cm
 C.V = 52.7 l Temp 73.5° F
 C.M = 4.02 kg.

H/X = 337.

119

Expt.	19	Time	9:20 AM	Date	4/5/1956
Purpose	critical conditions 3 slabs in contact, reflected				
Personnel:	Gilley, Gwin				

START-UP CHECK LIST	
Equipment Checked by	Gilley Personnel Check by Gilley
Instrument and Safeties Checked and Reset by	Gilley
"Source In" Checked by	Gilley Source No.
Emergency Equipment in Control Room Checked by	Gilley
Red Light On by	Gilley AM
Start-Up OK'd by	Gilley Time 9:20 PM Date 4/5/1956

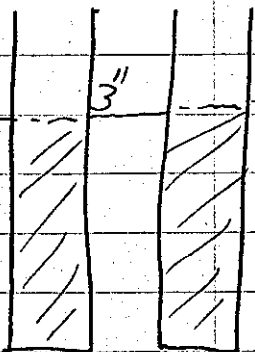
INSTRUMENT CHECK	
Date	4/5 AM
Time	
Trip	
Instrument	
DC-1	
DC-2	
DC-3	trip @ 4.5 on 10 x 20
Log N	alp
R-1	responds
R-2	
P.M.	trip

fuel ht. H₂O
 6.815" 17.3 cm just critical
 C.H = 17.3 cm.
 C.V = 47.7 f
 C.M = 3.64

Expt. 20 Time 2:35 AM Date 4/5 1956
 Purpose Critical cond. for 2-3" al. slabs
with 1" edge-to-edge separation
 Personnel: Fox, Kelley

START-UP CHECK LIST
 Equipment Checked by ✓ Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JW Time 2:35 PM Date 4/5 1956

Fuel ht. H_2O
 9.67" 24.6 cm just cut.
 $C, H = 24.6 \text{ cm}$ $C, V = 45.2$ $C, M = 3.45$



H₂O

Expt. 21 Time 8:42 AM Date 4-6 1956
 Purpose Crit. Cond. 2-3" slabs
with 3" between Repl.
 Personnel: LW, Gilleg, Fox, Cross

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JW Time 8:42 PM Date 4-6 1956

Fuel ht. H_2O
 16.58" 42.2 cm just cut.
 $C, H = 42.1 \text{ cm}$
 $C, V = 77.5$
 $C, M = 5.91$

Expt. 22 Time 10:50 AM Date 4/6 1956
 Purpose C.R. for 2-3" al. slabs with 4" edge to edge spacing reflected (H₂O)
 Personnel: Jay Kelley

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safety Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. ✓
 Emergency Equipment Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JWK Time 10:50 PM Date 4/6 1956

Fuel ht H₂O

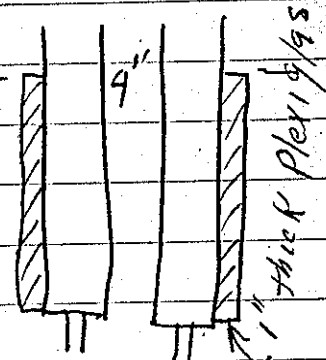
25.63 65.0

Temp = 75.5°F

C.H = 65.1 cm, C.V = 119.8 l C.M = 9.14

Expt. 23 Time 2:45 AM Date 4/6 1956
 Purpose Crit. Cond. 2-3" slabs spaced 4" with 1" Plexiglas plates on outer surfaces + water refl
 Personnel: L.W. Gilley, Cross, Fox

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safety Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. 123
 Emergency Equipment Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JWK Time 2:45 PM Date 4/6 1956



Fuel ht. H₂O ht.

21.43 55.0 cm just cut

all Expt. 24 - repeated
 spacing clamps slipped. Spacing at bottom after expt. appear to be ~ 3 15/16"

122

H/X = 337

Plexiglas disc
1" x 48" x 24"

Expt. 24	Time 9:00 AM	Date 4/9 1956
Purpose Critical conditions for: 2-3" of slabs spaced 4" apart with 1" plexiglas slabs on either surface. Slabs are spaced using 2" spacers. reflected		
Personnel: Fox, Gilley		

START-UP-CHECK LIST	
Equipment Checked by <u> </u>	Personnel Check by <u> </u>
Instrument and Safeties Checked and Reset by <u> </u>	
"Source In" Checked by <u> </u>	Source No. <u> </u>
Emergency Equipment in Control Room Checked by <u> </u>	
Red Light On by <u> </u>	AM
Start-Up OK'd by <u> </u>	Time <u> </u> PM Date <u> </u> 195 <u> </u>

Fuel ht. H₂O ht.
 21.99" 55.7 cm just cut.
 C.H. = 56.0 cm C.V. = 103.0 C.M. = 7.84

Removed 2"
from height of
Plexiglas

Expt. 25	Time <u> </u> AM	Date <u> </u> 195 <u> </u>
Purpose Same as above except ht. of plexiglas 22"		
Personnel: L.W. Gilley Fox		

Fuel ht. H₂O
 22.11" 54.15 cm just cut.
 C.H. = 56.2 cm, C.V. = 103.4, C.M. = 7.89 kg.

Fuel Feed Rate (into slabs (2))

fuel ht.	Time at feed
----------	-----------------

13.85" } 14.89" }	1 min.
----------------------	--------

14.89" } 19.91" }	1 min.
----------------------	--------

Fuel drain rate

16.20" } 8.77" }	5 min.
---------------------	--------

H₂O feed rate (big side)H₂O ht

1.0 cm } 12.8 cm }	2 min
-----------------------	-------

12.8 } 25.0 }	2 min.
------------------	--------

25.0 } 37.1 }	2 min
------------------	-------

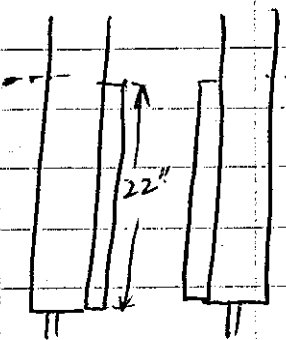
37.1 } 47.1 }	5 min
------------------	-------

H₂O drain rate

41.0 cm } 21.4 "	2 min
---------------------	-------

21.4 } 3.8 }	2 min.
-----------------	--------

Expr. 26 Time AM PM Date 4/9 1956
 Purpose Crit. Cond. 2-2" slabs 4" apart with 2" plexiglas between
Ref.
 Personnel: LW Gilley, Fox



START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by JKF Time _____ PM Date _____ 195_____

Fuel wt. H₂O wt.

22.47" 57.0 just crit.
 C.H = 57.1 cm ; C.V = 105.1, C.M. 8.02 kg.

Expr. 27 Time 9:00 AM PM Date 4/10 1956
 Purpose Crit. Cond. 2-3" slabs spaced 2" apart Refl.
 Personnel: Gilley, Fox

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by _____ Source No. ✓ 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by _____ AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 195_____

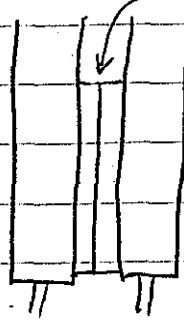
no plexiglas

Fuel wt. H₂O wt

12.55" 31.9 cm just crit.
 C.H = 31.9 cm C.V. = ~~98.7~~ 58.7
 C.M = 4.48 kg.

Expt. 28 Time 1:00 AM Date 4/10 1956
 Purpose Crit. Cond. 2-3" ALS slabs
spaced 2" apart refl. with
Plexiglas between replacing H₂O
 Personnel: Gilley, Fox

Plexiglas 125



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 125
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1956

Size of plexiglas: 2 PC - 1" x 12" x 48"

Fuel ht. H₂O

11.94" 30.3 cm

just crit.

C.H = 30.3 cm C.V = 55.8 l

C.M. = 4.26

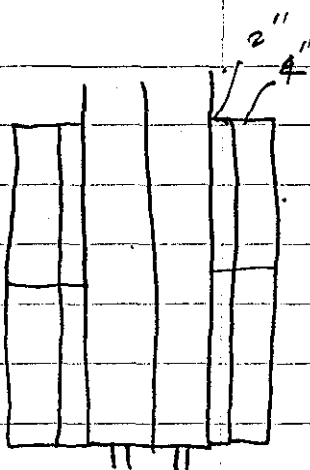
Expt. 27B Time 2:00 AM Date 4/10 1956
 Purpose Repeat of Expt 27
 Personnel: Gilley, Fox

Fuel ht. H₂O ht.

12.63" 32.0 cm

Note: reason for repeating experiment 27 was to check spacing. Expt. 27B was performed by sliding plexiglass from between slabs after exp. 28 was completed but without moving slabs. In exp. 28 slabs were separated after exp 27 and then brought back together with 2" plexiglass in between.

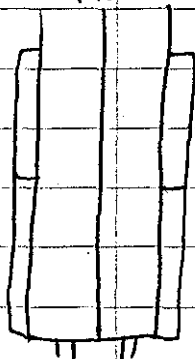
C.H = 32.1 C.V. = 59.1 l C.M. = 4.51



Expr. 29 Time 9:00 AM Date 4/11 1956
 Purpose Cut cond. for 2-3" slabs together (zero edge to edge)
with 6" magnesium soft insulation
reflector on lateral surfaces to height 8"
 Personnel: Jay, Hilley

START-UP CHECK LIST
 Equipment Checked by ✓ Disposed of back by ✓
 Instrument and Safeties Checked and ✓
 "Source In" Checked by ✓ Source No.
 Emergency Equipment in Control Room checked by
 Red Light On by AM
 Start-Up OK'd by JWH Time 9:00 AM Date 195

fuel ht*
 18.44 18.40"
 C.H = 46.8 cm, C.V. = 86.1 / 85.9 l / C.M. = ~~6.57~~ 6.57 just crit.



Expr. 30 Time 9:35 AM Date 4/11 1956
 Purpose Cut cond. for 2-3" slabs together (zero edge to edge)
with 6" magnesium insulation reflector
on sides to a ht. of 48"
 Personnel: Jay, McCoy, Hilley

fuel ht*
 22.18"
 22.20 22.16"
 10³⁰ Temp = 77 °F slightly super just crit.
 C.H = 56.4 cm C.V. = 103.0 l
 C.M. = 7407.92

* add 0.04" to above reading for probe zero

Expr. 31	Time 11 ⁰⁰ AM	Date 4/11 1956
Purpose cut. Comb. for 2-3" abs. slabs together with 4" of magnesium insulation on inside a wt. of 24"		
Personnel: Fox, Mee, Silley		

fuel ht. *

21.7² ~~21.18~~ 21.70" slightly super
21.67" slightly sub.

C.H = 55.2 cm C.V. = 101.69, C.M. = 7.75



Expr. 31 B	Time 1 ⁰⁰ AM	Date 4/11 1956
Purpose Repeat of above except now insulation is 48" slab high		
Personnel:		

fuel ht. *

21.58" sub
21.65 → 21.67" just crit.

C.H = ~~54.9~~ 55.0 cm ; C.V. = 101.2 ; C.M. = 7.72 kg.

Expr. 29 B	Time 1 ⁰⁰ AM	Date 4/11 1956
Purpose Repeat of 29 except the 2" thick abs. insulation on outside instead of adjacent to reactor - 6" thick		
Personnel: Fox, Mee, Silley		

fuel ht. *

19.58 → 19.57" slightly super
just crit.

C.H = 49.3 cm, C.V. = 91.1, C.M. = 6.9

Wts. of Magnesia slabs:

2" x 24" x 48" — 11.98 Kg

4" x 24" x 48" — 17.75 "

*

see note previous page

128

Expr. 32 Time 3³⁰ AM Date 4/11 1956
 Purpose Crit. Condition 2-3" slabs
in contact, Reflected except top
 Personnel: Griley Mee, Fox

Ref.

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and
 "Source In" Checked by Source No. 123
 Emergency Equipment
 Red Light On by
 Start-Up OK'd by Time _____ PM Date _____ 1956

Fuel ht* 9.09 9.05" Water ht 22.95 just out.
 C.H = 23.1 cm C.V. = 42.5 l C.M = 3.24 kg.

1" insulation cement + expanded metal lath

Expr. 33 Time 10²⁵ AM Date 4/12 1956
 Purpose Crit. cond 2-3" slabs in
contact + 1" insulation cement
outside
 Personnel: Griley Mee, Fox

START-UP CHECK LIST

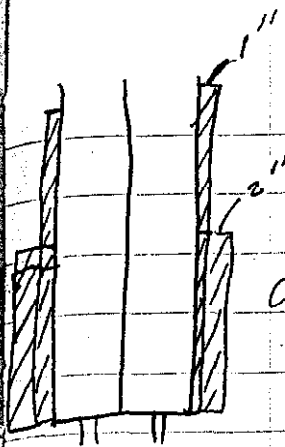
Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956

Instr. checked - OK.

Fuel ht 23.04" sub. crit.
23.12 23.08 just " "
 C.H = 58.7 cm, C.V. = 108.0 ~~l~~ C.M = 8.24

Weights of 2" insul. slabs:

- #1 - 11.66 kg
 - #2 - 12.64
 - #3 - 11.79
 - #4 - 11.98
- * see vol page 126



Expr. 34	Time 11 ⁰⁵ AM	Date 4/12 1956
Purpose Crit-Cond 2-3" slabs 121		
Contact + 1" & 2" slabs of Insul		
total of 3" Insul.		
Personnel: Gilley, Mee, Fox		

129
 2" Insul.
 only 2 9" high
 using slabs
 Nos. 354

check list-OK, Instr OK.

Fuel ht*

18.57 slightly Super crit.
 18.54 + 8.50 " " Sub. "

CH = 47.1 cm, CV = 86.7 l CM = 6.61



Expr. 35	Time 1 ³⁰ AM	Date 4/12 1956
Purpose Crit-Cond 2-3" slabs 121 Contact		
+ 1" Insul slab + 4" Insul slab		
Personnel: Gilley, Mee, Fox		

check list OK, Instr OK

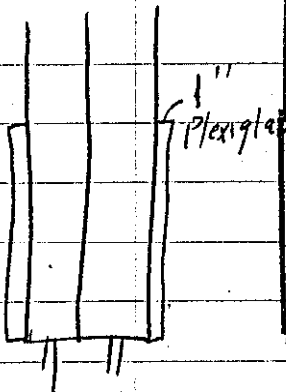
Fuel ht.*

18.18 slightly Super
 18.17 " "
 18.20 18.16 just crit.

CH = 46.2 cm, CV = 85.0 l, CM = 6.48

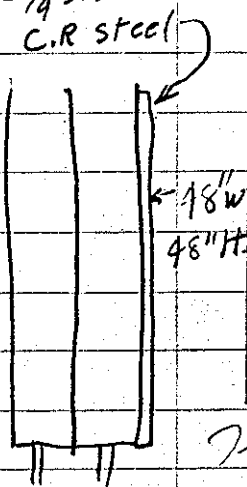
* see note page 126

130



Expt. 36	Time 2 ³⁰ AM	PM Date 4/12 1956
Purpose Crit. Cond. 2-3" slabs in contact with 1" Plexiglas on outside		
Personnel: Crilley, Mee, Fox		
START-UP CHECK LIST		
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>	
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>		
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. 123	
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>		
Red Light On by <input checked="" type="checkbox"/>	AM	
Start-Up OK'd by <input checked="" type="checkbox"/>	Time	PM Date 1956

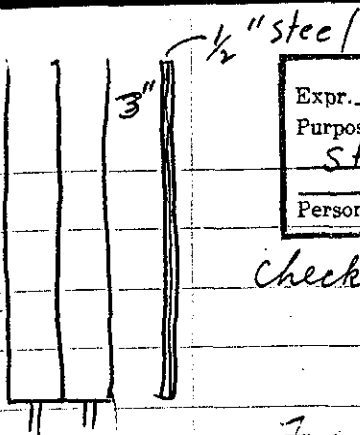
Fuel ht*
 12.10" slightly sub.
 12.15 12.11 " Super Crit.
 2-1/4 sheets of CH = 30.9 cm ; CV = 56.9, CM = 4.34 kg.



Expt. 37	Time 8 ⁴³ AM	PM Date 4/13 1956
Purpose Crit. Cond. 2-3" slabs in contact + 2-1/4" steel plates against one side		
Personnel: Crilley, Fox		
START-UP CHECK LIST		
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>	
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>		
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. 123	
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>		
Red Light On by <input checked="" type="checkbox"/>	AM	
Start-Up OK'd by <input checked="" type="checkbox"/>	Time	PM Date 1956

Inst. check OK.
 Fuel ht*
 21.72 Super
 21.75 21.71 just sub. Crit.
 C.H = 55.2 cm, C.V. = 101.6 l. CM = 7.53 kg

* See note page 126

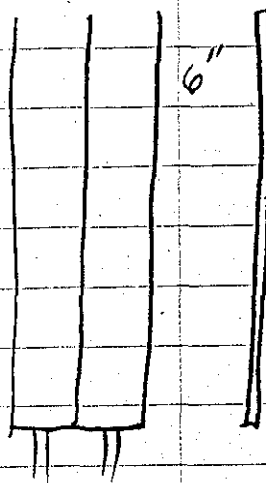


Expr. 37B	Time 10 ⁰⁰ AM	Date 4/12 1956
Purpose C.C. same as #36 except steel moved back 3"		
Personnel: Gilleys FOX		

check list & instrs OK.

Fuel ht*
 24.89 " super. critical
 24.88 s. " "
 24.89 24.85 just "

C.H = 63.2 cm ; CV = 116.3 l ; CM = 8.87



Expr. 38	Time 11 ⁰⁰ AM	Date 4/12 1956
Purpose Crit. cond same as above except steel moved back 6.6"		
Personnel: Gilleys, FOX		

check list & instrs

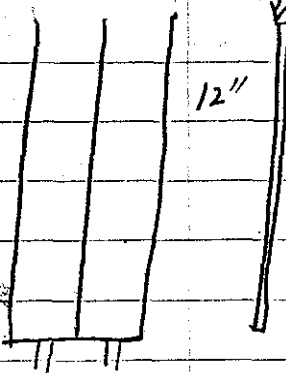
1/2" steel

Fuel ht* Remarks
 27.73 super crit.
 27.72 slightly " "
 27.75 27.71 just crit.

C.H. = 70.5 cm , CV = 129.7 l ; CM = 9.89

* see note page 120

132 $\frac{1}{2}$ " Steel



Expr. 39	Time 2:45 AM	Date 4/13 1962
Purpose crit. cond.	Same as	
Ext. 38	except $\frac{1}{2}$ " steel moved	
Back to 12"	Personnel: Griley Cross Fox	

check but & instr. OK.

Fuel ht *

31.99" slightly super
 31.97 " " "
 31.94 sub. crit

cut at 31.94 32.00

C.H. = 81.3 cm; C.V. = 149.6 l; C.M. = 11.41

Fuel Temp. 77.5 F

sample taken 4/16/56

P-170 ref 354807

74.55
 25.58

 48.97 gm net.

sp. gr. by hydrometer
 1.096 at 23.5°C

Hydro. calib. at 60°F = 15.55°C

gm U/gm = .07497

.06987 gm/gm

sp gr. 1.0917 @ 27°C

gm X - .07628 ✓
Cm³

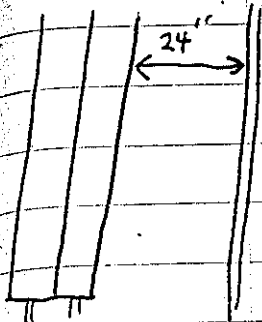
H_x = 337

4/17/57 sample from plastic bottle marked
 H_x - 337 sp. gr. Hydro. 1.098 @ ~ 25°F

* add accⁿ to fuel ht.

Expr. 40 Time 10²⁰ AM Date 4/16 1956
 Purpose list cond. for 2-3" slabs with
1/2" steel reflector 24" edge to edge
 Personnel: Fox, Milley

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956



Fuel ht. *

36.34 36.38"

just crit. super

Temp. = 75° F

C.H. = 92.3 cm ; CV = 169.8 l, CM = 12.95 kg.

Expr. 41 Time 12⁴² PM Date 4/16 1956
 Purpose Same as 40, above except 1/2"
Steel moved Back to 36"
 Personnel: Gilley, Fox

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956

Fuel ht.

38.31"

super

38.28"

slightly super

38.25"

" "

38.24 38.20"

just crit.

C.H. = 97.1 cm, CV = 178.7, CM = 13.63

* add 0.04" to fuel ht.

Expr. 42	Time 2:35 AM	Date 4/14 1956
Purpose Repeat of exp. #3 i.e. 2-3" al. slabs together with no reflector		
Personnel: Fox, Hilley		

40.07" super
 39.76" slightly sub.
 39.84" slightly super
 39.80 cut.

$$\sim CH = 101.1 \text{ cm}, C.V = 186.0 \text{ l}, CM = 14.19$$

Data on calibration of vol. of 6" slab.

H₂O ht. cm Vol. added l. 1-11-57 (see page 160)

5.5		10
10.9	5.4	20
15.2	5.3	30
20.6	5.4	40
25.9	5.3	50
31.3	5.3	60
36.7	5.4	70
42.0	5.3	80
47.4	5.4	90
52.6	5.2	100
57.9	5.3	110
63.2	5.3	120
68.55	5.35	130
73.9	5.35	140
79.2	5.3	150
84.55		160
89.95		170
95.25		180
98.5		186

Linear extrapolation of data

given $\frac{338}{340}$ l. at 180 cm ht.

Hence area = 1878 cm²/cm

Length = 120.7 cm

width = 15.56 cm

≈ 6.124"

The above result is in error for some reason!

Using a 6.00" stick gauge it was found that $\sim \frac{1}{2}$ of the slab is slightly above 6" & about $\frac{1}{2}$ slightly under 6"

Using a 6.09" stick it was found that no part in the slab was thin thick 1-15-57
 See page 160

Outside Expts. →

135

H/x = 337

Expt. 43 Time AM Date 4/25 1956
 Purpose CC. for 6" thick al. slab sitting on floor outside reflector tank
 Personnel: Jay, Hilkey

INSTRUMENT CHECK

Date 1956 Time AM 4/25 1956
 Instrument DC-1
DC-2
DC-3 trip @ 160 on 10x20
 Log N trip
 R-1 responds
 R-2 trip
 P. M. trip

START-UP CHECK LIST

Equipment Checked by JWA Personnel Check by JWA
 Instrument and Safety Checked and OK'd by JWA
 "Source In" Checked by JWA in room No. 100
 Emergency Equipment in Control Room Checked by JWA
 Red Light On by JWA Time 8:55 AM
 Start-Up OK'd by JWA Time 8:55 AM Date 4/25 1956

10⁵⁵ AM Safety ~ 5" inside of al. slab.
 Fuel up to 50" proven difficult - hitting side of case
 draining back - 84"

Fuel ht.

54.12" super

54.05" slightly super

53.99" " "

53.91 just crit.

53.83 slightly sub.

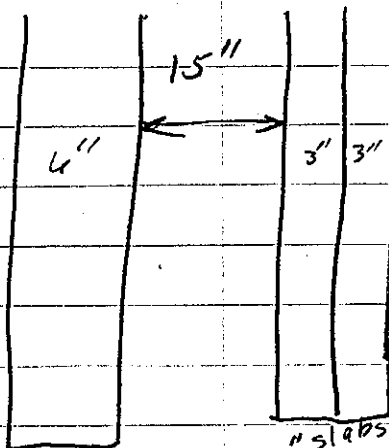
11³⁵ Safety block dropped - qualitatively it seemed effective

Fuel dumped ~ 1" in 2 sec. into dump well. 19:00

Corrected CH. $T_{emp} = 80^\circ F$
 $= \frac{137.3}{136.9} C.H. = 136.9 \text{ gm}$; $CV = \frac{248.4}{249.9} \text{ cal/g}$; $CM = \frac{19.0}{18.95}$

136

H/x = 337



Expr. 44 Time 9:10 AM Date 4/24 1956
 Purpose cc for 2-6" slabs as shown at left. Reactors on floor outside "big lab"
 Personnel: Joy, Hilley

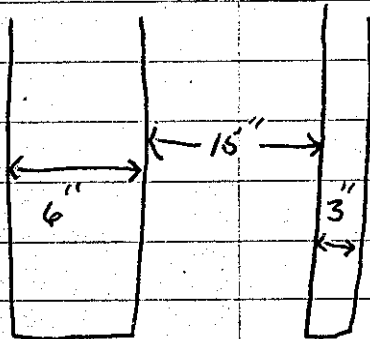
START-UP CHECK LIST
 Equipment Checked by Personnel checked by
 Instrument and Safeties Checked and
 "Source In" Checked by
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by JWH Time 10:15 Date 4/24 1956

Area = $\frac{1820}{3660} - \frac{900}{3660} = 2-3''$ " 6" slabs

Fuel ht.
 17.68"
 17.67"

slightly super
 " sub.

C.H = 44.9 cm. C.V = ~~87.7~~ ^{164.3} CM = ~~6.53~~ 12.53



Expr. 45 Time AM Date 4/24 1956
 Purpose cc for 6" slab and 3" slab as shown at left. (This is above exp. with second 3" slab removed.)
 Personnel: Joy, Hilley

Fuel ht.
 25.93"
 → 25.91"

super
 just cut.

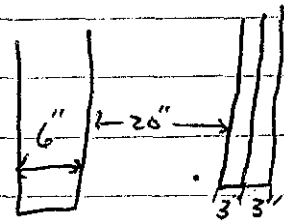
Area $\frac{1820}{2740} - \frac{920}{2740} = 2-3''$

Temp. = 79°F. 180.3 l
 C.H = 65.8 cm; C.V = ~~117.7~~ CM = 13.75

H/x = 337

137

Expr. 46	Time 2:15 AM	PM Date 4/26 1956
Purpose CC for 2-6" slabs as shown at right (20" edge to edge separation)		
Personnel: Fox, Kelley, Callahan		



fuel ht.

2:45 PM

19,80"

19,79"

C.H = 50,3 m

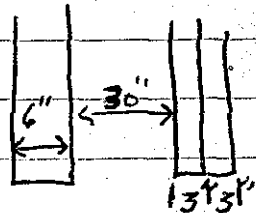
C.V. = 184,1 l.

super

just cut.

CM = 14,04 kg.

Expr. 47	Time 3:40 AM	PM Date 4/26 1956
Purpose CC for 2-6" slabs as shown at right with 30" edge to edge spacing		
Personnel: Fox, Kelley, Callahan		



fuel ht.

2:51

23,52"

23,50"

CH = 59.7

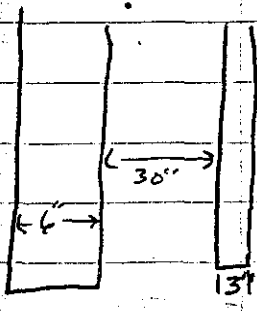
; CV = 218,5 l.

CM = 14,67

super

sub

Expr. 48 Time 8⁴⁵ AM Date 4/27 1956
 Purpose Crit cond. for 6" slab and one 3" slab 30 inches edge to edge
 Personnel: Tap Kilday



INSTRUMENT CHECK

Date 195 Time 8:45 AM Source in
 Instrument Value State Source Location Scale
 DC-1 _____
 DC-2 _____
 DC-3 trip @ -40 on 10 x 20
 Log N _____
 R-1 respond
 R-2 _____
 P. M. trip

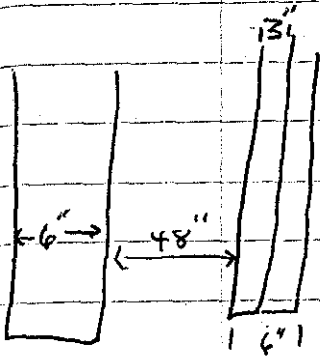
START-UP CHECK LIST

Equipment Checked by ✓ Re-check by _____
 Instrument and Safeties Checked and OK'd by ✓
 "Source In" Checked by ✓ Source in
 Emergency Equipment in Control Room checked by _____
 Red Light On by ✓ AM
 Start-Up OK'd by ✓ Time _____ PM Date _____ 195

fuel lit,
36, 41"
Temp. = 78° F. *just crit.*

$e, H = 92.5 \text{ cm} ; CV = 253.5 \text{ l} ; CM = 19.37$

Expt.	49	Time	11 ³⁵ AM	Date	4/27 1956
Purpose	C. Comb. for 2-6" slabs 48" edge to edge				
Personnel:	Fox, Malley, Callahan				

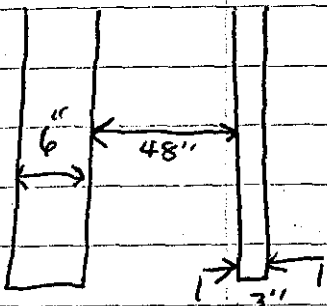


fuel ht.
 28.88"
 28.84"
 out 28.83 → 28.82"

super
 slightly super
 sub

$C.H = 73.2 \text{ cm.}; C.V = 267.9 \text{ l.}; C.M = 20.44 \text{ kg}$

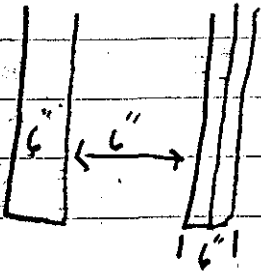
Expt.	50	Time	3 ³⁰ AM	Date	4/27 1956
Purpose	C. Comb. for 6" slab and 3" slab separated 48" edge to edge				
Personnel:	Fox, Malley				



fuel ht.,
 44.97"
 44.90"
 44.82"

slightly super
 " "
 just crit.

$C.H = 113.8 \text{ cm.}; C.V = 311.8 \text{ l.}; C.M = 23.78$



Expt. 51 Time 4⁰⁰ AM PM Date 5/1 1956
 Purpose Cal. Cont. for 21-6" slab and 2-3" slabs with 1/8" edge separation
 Personnel: Fay, Silley

INSTRUMENT CHECK

Date 1956 Time 4:00 AM Trip

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

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No.
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by Time 4⁰⁰ AM PM Date 5/1 1956

4:30 P.M. Fuel ht*

13.09" sub.
 13.10" super
 12.92 corrected ht.

* Probe zeroed after exp. Selsyn reads 0.18" when probe at zero.

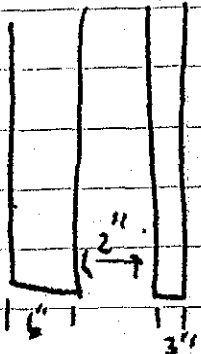
$C.H = 32.8 \text{ cm} ; C.V = 120.0 ; C.M = 9.15$

Expt. 52 Time 5:53 AM PM Date 5/1 1956
 Purpose Crit. Cond. for 1-6" slab and
1-3" slab with 6" edge to edge separation
 Personnel: Fox, Silley

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safety Checked and Reset by
 "Source In" Checked by
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by Time 5:53 AM PM Date 5/1 1956

fuel ht. *

corrected $\rightarrow 17.55$ $\rightarrow 17.74$ " super
~~17.73~~ "
 17.72 "
 $C.H = 44.6$ cm; $CV = 122.2$ l $C.M = 9.32$
~~45.0~~ $CV = 123.3$ l $C.M = 9.42$

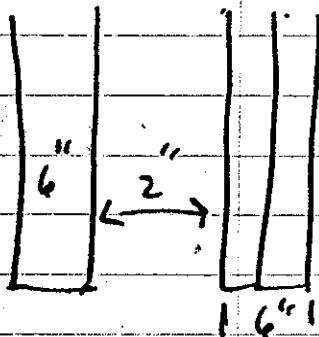


fuel ht. *

12.92 " sub.
 corrected 12.75 12.93 " just crit.
 $C.H = 32.4$ cm; $CV = 88.8$ l $C.M = 6.77$ kg

* See note on previous page. Zero is 0.18" too high.

Expr.	54	Time	9 ¹⁵	Date	5/1	1956
Purpose	cut. cond. for 1-6" slabs and 2-3" slab with 2" edge to edge separation					
Personnel:	Fox, Callahan, Killey					



fuel ht.*

10.20"

super

10.19"

sub.

Note: The above exp. (54) was run with instruments on "steps" in same position as in all exp. so far with slabs on outside, "sid." Now "steps" have been moved back from ~18 inches from reactors to ~3' from reactors, to see if steps etc. are reflecting neutrons

C.H = 10.02" corrected

C₁H = 255 am, C₁V = 933 l; CM = 7.12

Expr.	54 B	Time	AM	Date	5/1	1956
Purpose	Repeat of 54 except instruments moved back					
Personnel:	Fox, Killey, Callahan					

fuel ht.*

10.20"

same as above

super

10.19"

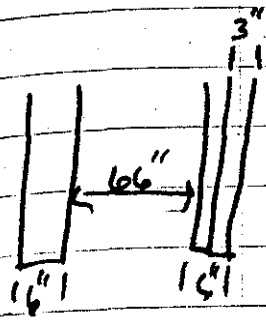
sub.

* Subtract 0.15" from reading

H_{1x} = 337

143

Expt. 55 Time 4:52 AM Date 5/2 1956
 Purpose cut. Cond. for 1-6" slab and 2-3" slabs with 60" edge to edge reparations.
 Personnel: Fox, Cross, Hilkey



INSTRUMENT CHECK

Date 1956 Time AM Source No. _____
 Instrument DC-1 Value _____ State _____ Source Distance _____ Start-Up _____
DC-2 _____
DC-3 trip @ 65 on 10x20
 Log N trip
 R-1 reparations
 R-2 _____
 P. M. trip

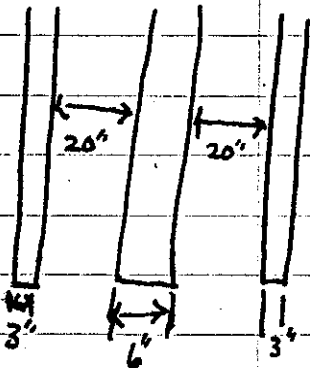
START-UP CHECK LIST

Equipment Checked by _____ Personnel Check by _____
 Instrument and Safety checked and Reset by _____
 "Source In" checked by _____ Source No. _____
 Emergency Equipment in Control Room Checked by _____
 Red Light On by _____ AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1956

fuel ht. *
 32.50" sub.
~~32.53" slightly sub.~~
 32.51" just cut.
 32.94" super - see chart for 2/100 sec period
 corrected ht = 32.33

$G.H = 82.1 \text{ m.}; CV = 300.5^{\text{302}}; CM = 22.92$

* Subtract 0.18" from reading



Expr. 56 Time 4:02 PM Date 4-3- 1956
 Purpose inst. check for 1-6" slab and
2-3" slabs spaced equal distance on
each side of 6" slab, 20" edge to edge spacing
 Personnel: Folk, Gillet, Gulia

INSTRUMENT CHECK

Date	195	Time	AM	PM	Source No.
Instrument	Trip	Value	Scale	Source Distance	Start-Up Scale
DC-1	<u>response</u>				
DC-2	<u>trip @ 58</u>		<u>on 10x20 scale</u>		
DC-3	<u>trip @ 60</u>	"	"	"	"
Log N	<u>trip trip</u>				
R-1	<u>response</u>				
R-2					
P. M.	<u>trip</u>				

Probe re-zeroed

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No.
 Emergency Equipment in Control Room Checked by
 Red Light On by ✓
 Start-Up OK'd by Time 4:15 PM Date 4/3 1956

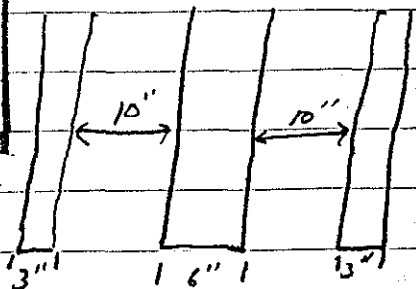
soln. height, inches

24.67 slightly super
 24.63 just critical
 Temp - 76° F

$C.H = 62.6 \text{ cm, ; } CV = 229.1 \text{ l ; } CM = 17.47$

Expr. 57 Time 5:50 ^{AM} PM Date 4-3- 1956
 Purpose crit. cond. for 1-6" slab and 1-3" slab spaced an equal distance on each side of the 1" slab. 10" edge to edge
 Personnel: Fox, Gwin

Source in



soln. height, inches

17.43

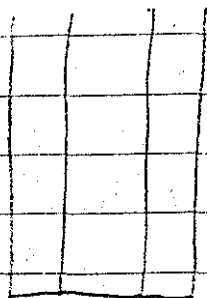
slightly super

→ 17.42

slightly sub

C.H. = 44.2 cm ; C.V. = 161.8 l ; CM = 12.34

Expr. 58 Time 7:43 ^{AM} PM Date 5-3- 1956
 Purpose crit. cond. for 1-1" slab with a 3" slab in contact with the 1" on each side
 Personnel: Fox, Gwin



Source in

soln. height, inches

→ 7.73

slightly sub

7.735

slightly super

Period attempt resulted in a

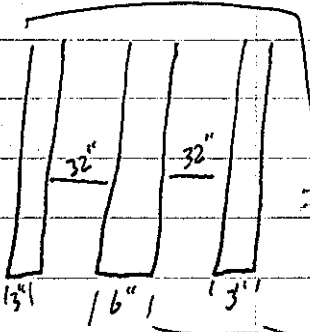
Normal screen on DC-3.

Source in , attempt period measurement

C.H. = 19.6 cm ; C.V. = 71.7 l ; CM = 5.47

soln. height, inches

7.75 slightly sub
 7.75+ just critical
 7.77+ Positive Period



Expt.	59	Time	9:50 ^{PM}	Date	5-3-1956
Purpose	crit. cond. for 1-6" slab with 2 3" slab 32" edge to edge from the 6" slab on each side of the 6" slab.				
Personnel:	FOX + Gwin				

source in

soln. height, inches

32.0 p slightly sub
 32.10 slightly sub
 → 32.11 just critical

$C.H = 81.6 \text{ cm.}; C.V = 298.7 \text{ l}; C.M = 22.78$

Expt.	60	Time	11:20 ^{AM}	Date	5-3-1956
Purpose	Period measure next in the 6" slab				
Personnel:	FOX, Gwin				

source in

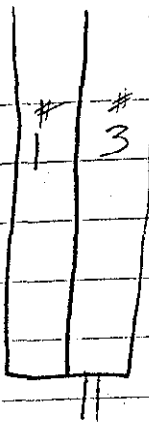
soln. ht., inches

52.13 slightly sub
 → 51.75 just critical
 53.66 (C.V = 239.9 l) ~ 100 sec Period
 corrected $T = 77.5^\circ \text{F}$
 $C.H = 31.8 \text{ cm.}; C.V.F = 238.4 \text{ l}; C.M = 18.30$

$\sim H/x = 333$
 estimate based on evaporation with time



4/x = 337
147



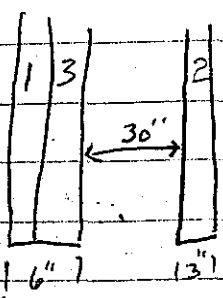
Expr. 61 Time 4⁰⁰ AM PM Date 5-8 1956
 Purpose Crit. Conditions for 2-3"
slabs in contact Bar
 Personnel: Fox, Hilley

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

The two 3" reactors (slabs) used were #'s 1 + 3
fuel ht.

45.84" super crit.
 45.58" sub. "
 45.61" slightly super crit.

C.H = 115.8 cm. ; CV = 213.1 ; CM = 16.26 kg.

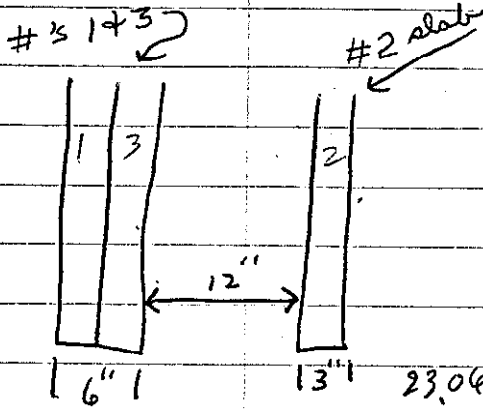


Expr. 62 Time 5³⁰ AM PM Date 5/8 1956
 Purpose Crit. cond. for 2-3" slabs together
with 1-3" slab 30" away
 Personnel: Fox, Hilley

Note: the two center slabs were #'s 1 + 3 and 3 + 2
 slab was #2.

fuel ht,
 34.21" slightly super
 34.13" just crit.

C.H = 86.7 cm. ; CV = 239.3 ; CM = 18.25



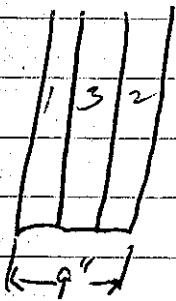
Expt. 63 Time 7³⁰ AM Date 5/8 1956
 Purpose crit. cond. for 2-3" slabs together
and one 3" slab spaced 12" away
outside of tank
 Personnel: Ray Kelley

fuel ht.

$23.06 \rightarrow 23.05''$ sub.
 $23.07''$ super

Temp = 76° F

C.H = 58.4 cm; CV = 161.7 l; CM = 12.33



Expt. 64 Time 8²⁷ AM Date 5/8 1956
 Purpose crit cond. for 3-3" slabs in
contact
outside tank
 Personnel: Ray Kelley

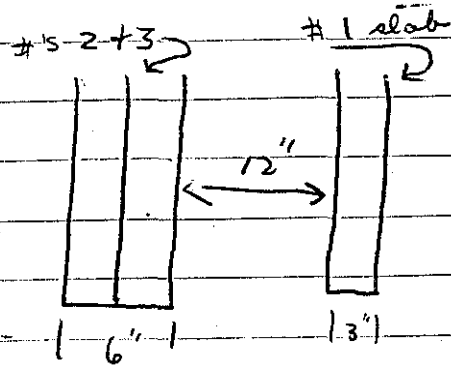
fuel ht.

$9.80''$ just crit.
 C.H = 24.9 cm; CV = 68.7 l; CM = 5.24

$H/x = 337$

149

Expt. 65 Time 9:12 AM Date 5/8 1956
 Purpose Cont Repeat of exp. # 43 except
#1 slab moved away instead of #2
 Personnel: Fox, Kelley



Fuel ht.

23.54"

super crit.

23.53"

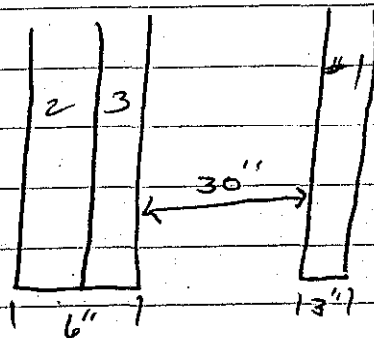
slightly super

23.51

" sub.

$CH = 59.7 \text{ cm}; CV = 164.8 \text{ l}; CM = 12.57$

Expt. 66 Time AM Date 5/8 1956
 Purpose Repeat of exp. # 62 except
#1 slab is moved 30" away from
2-3" instead of #2
 Personnel: Fox, Kelley



Fuel ht.

36.81"

sub-crit.

36.82 → 36.83"

slightly super.

$CH = 93.5 \text{ cm}; CV = 258.1 \text{ l}; CM = 19.69$

Seems to me these data comparisons get too complicated.

JKF.

150

H/x = 337

Outside Sid

#2	#3
----	----

Expr. 67	Time 3:40 AM	Date 5-10 1956
Purpose #s 283	-3" slab in	
Contact Outside		
Personnel: Gilley, Fox		

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	
Start-Up OK'd by <input checked="" type="checkbox"/>	Time 4:00 PM Date 5/10 1956

Temp of room. 75.5°F

Fuel hd.

50.26"

slightly super

50.14"

" "

50.14"

" "

50.08"

" "

~~50.00"~~

~~slightly sub.~~

49.95

just crit.

49.90"

sub. crit.

$C, H_1 = 126.9 \text{ cm.}; CV = 233.5 \text{ l}; CM = 17.81$

Start

H/x = 331

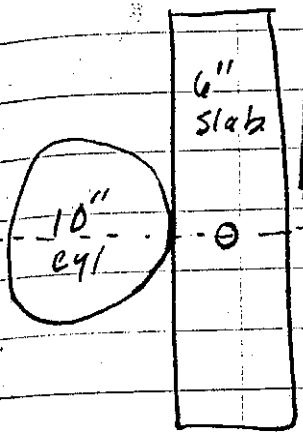
Expr. 68 A Time 2:30 AM PM Date 8-30 1956
 Purpose C.C. for 6" slab vs 10" A
Cyl. in contact outside
 Personnel: R.G., C.C., J.F.

151

DC-3-80x200
DC-2-70x200

AN-Trips
PM - "
R-1 Respond.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by J.F. Time _____ PM Date _____ 1956



Critical height

	12.1	CM
Tad adder	1.52	
	8.25	∞
	15.25	1413
	22.25	712
	27.42	517

Temp. 27°C

||
||

Expr. 68 B Time 11:00 AM PM Date 9-4 1956
 Purpose same as above for
Period meas.
 Personnel: L.W.G., G.C., J.F.

DC-3-80x200
DC-2-60x200
AN-Trips
PM - "

Area 1820 cm²
+ 501
2327

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by J.F. Time _____ PM Date _____ 1956

Final ht
12.05"

Tad adder
just crit 2.01

C.H = 30.6 cm.; CV = 7.231 CM = 5.55 kg

152

H/x = 331

Expr. 68C Time 9:45 AM Date 9-5 1956
 Purpose same as above for checking pos. period.
 Personnel: LWA C.C., JRF

START-UP-CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by JRF Time 9:45 PM Date 9-5 1956

Fuel Temp. 26°C

10:59 AM
11:03 AM
11:09 AM

cut ht 12.04"

total ddr T sec
 1.02" 0
 9.02" - 978
 17.02" - 446
 25.02" 270

Expr. 69A Time 2:30 AM Date 9-28 1956
 Purpose interaction between 4" slab & 10" dia. cyl. at 6" separation each & reflected on opposite sides & bottom
 Personnel: R.R., C.C., JRF

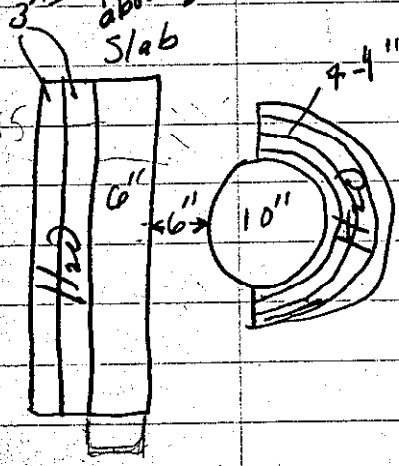
H/x = 328
331

Bot. Refl. 3-3 1/2" Plexiglas

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by JRF Time 2:30 PM Date 9-28 1956

instr checked
 D-C2 20110 = 45
 R-1 TRIPS
 P.M. "
 L.N. "

11:40
13 slabs above slab
3" above 20"



4-4" shells - full with H₂O - 35"

18.55" super crit
 10.54 sub. "

CH = 26.8 cm; CV = 62.4 CM = 4.86

H_x = 328

153

Expr. <u>69B</u>	Time	AM	Date <u>10-1-1956</u>
Purpose <u>Same as above except</u>			
<u>Separation 12"</u>			
Personnel: <u>C.C. T.F. & J.F.</u>			

2
DC-Trips 50x10
DC-3 Trip
PM "
LN "

START-UP CHECK LIST			
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>		
Instrument and Settings checked and Reset by _____			
Source In checked by _____	Source No. <u>123</u>		
Emergency Equipment checked by _____	Control Room checked by <input checked="" type="checkbox"/>		
Red Light On by _____	AM		
Start-Up Order by <u>QKF</u>	Time	PM	Date <u>1956</u>

Fuel ht.

11.22" slightly super.
11.21 " sub.

200m Temp 25°C
C.H. = 28.5 cm.; CV = 66.3; CM = 5.14

Expr. <u>69C</u>	Time	AM	Date <u>10-1-1956</u>
Purpose <u>Same as above except</u>			
<u>Added end veth. to slab</u>			
Personnel: <u>C.C. T.F. & J.F.</u>			

Fuel ht.

11.19 slightly sub.
11.20 " super

C.H. = 28.4; CV = 66.1; CM = 5.15

Expr. <u>69-D</u>	Time <u>11:00</u>	AM	Date <u>10-1-1956</u>
Purpose <u>Same as above except</u>			
<u>18" separation</u>			
Personnel: <u>C.C. T.F. & J.F.</u>			

Fuel ht.

11.56 slightly super
11.55 just crit

C.H. = 29.3 cm.; CV = 68.2 l; CM = 5.31

Expr. 69E Time 1:00 AM PM Date 10-1- 1956
 Purpose Same as above except
Separation is 30"
 Personnel: C.C., TF & J.F.

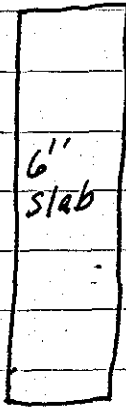
START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM _____
 Start-Up OK'd by JKF Time _____ PM Date _____ 1956

Fuel ht.
 11.81 slightly super
 11.805 just out

CH = 30.0 cm; CV = 69.8; CM = 5.44

Expr. 70A Time 8:30 AM PM Date 10-2- 1956
 Purpose Crit. cond. 6" slab & 10 AL cyl
Both Bare at 30" separation
 Personnel: C.C., TF, JP

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM _____
 Start-Up OK'd by JKF Time _____ PM Date _____ 1956



Bare 10"
cyl. Fuel ht.
 31.183" just crit

CH = 79.2 cm; CV = 184.3

CM = 14.36

Expr. <u>70B</u>	Time <u>9:45</u> AM	Date <u>10-2-1956</u>
Purpose <u>Same as above expt except separation now 42"</u>		
Personnel: <u>C.C., T.F. J.F.</u>		

155

 $H_f = 328$
 $\times 331$

Fuel ht.
 35.105" slightly super crit
 35.060 35.025 " sub crit.

CH = 89.1 cm CV = 207.3 l ; CM = 16.14

Expr. <u>70C</u>	Time <u>11:05</u> AM	Date <u>10-2-1956</u>
Purpose <u>Same as above except separation now 18"</u>		
Personnel: <u>C.C., T.F. & J.F.</u>		

Fuel ht.
 26.18" slightly super
 26.17 " just crit

CH = 66.5 cm ; CV = 154.7 l ; CM = 12.05 kg.

Expr. <u>70D</u>	Time <u>2:33</u> AM	Date <u>10-2-1956</u>
Purpose <u>Same as above except separation 12"</u>		
Personnel: <u>C.C., T.F., J.F.</u>		

Fuel ht.
 22.90" slightly super
 22.89 " sub.

CH = 58.2 cm ; CV = 135.4 l ; CM = 10.55

H/x = 331

Expr. 70E Time 3:30 AM PM Date 10-22 1956
 Purpose Same as above except sep. now 6"
 Personnel: CC, J.F., J.P.

Fuel ht.

18.83" slight supercritical

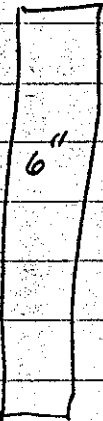
18.825" just critical

CH = 47.8 cm ; CV = 111.2 l- ; CM = 8.66

START-UP CHECK LIST
 Equipment Checked by J.F. Personnel Check by CC
 Instrument and Safeties Checked and Reset by J.F.
 "Source In" Checked by J.F. Source No. F
 Emergency Equipment in Control Room Checked by _____
 Red Light On by CC AM PM
 Start-Up OK'd by J.F.C. Time 10:50 AM PM Date 10-3 1956

H/x = 331

Expr. 71 Time 10:50 AM PM Date 10-3 1956
 Purpose Crit. Conditions of 6" slab alone Bare
 Personnel: J.F., J.P.



Fuel height see Soln. #2 book, page 20

46.78 slightly supercritical

46.75 slightly subcritical

(Corrected) CH = ~~47.8~~ cm CV = ~~245.8~~ l CM = ~~16.83~~ = 16.89

Req. No. 354521

10-30-56

83.7 gm
20.3
63.4 net

Sample from manifold

.07684 gm U/gm = .7167 gm U²³⁵/gm
10000
0997 gm Salt
9003

appr. 1.0963

F₂ = 190 ppm, Na = 130 ppm, Cr = 40 ppm, Al = 110 ppm
Ca < 50 ppm

$$H/x = 328$$

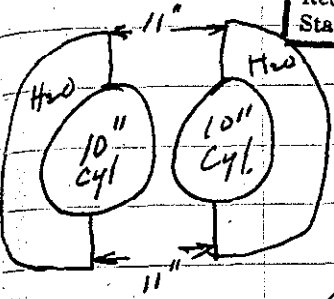
157

Both ~~ends~~ Cyls.
refl. on
bottom with
4" plexiglas

Expt. 72 A Time 2⁰⁰ AM PM Date 10-29 1956
 Purpose Crit. Cond. 2-10" Al cylinders
~~1~~ refl on back sides - separation 1"
 Personnel: C.C. L.W.G. J.F.

side refl. is
4 = 1" O.D. half
shells - total
of 3 1/2" H₂O.

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by ✓ Time PM Date 1956



Fuel ht. in.
 11.66 slightly sub. crit
 11.67 " super. "

$$C.H = 29.6 \text{ cm} \quad C.V = 30.0 \text{ l} \quad ; \quad C.M = 2.34 \text{ kg}$$

Expt. 72 B Time 8³⁰ AM PM Date 10-30 1956
 Purpose Same as above except
separation now 12"
 Personnel: C.C. L.W.G. J.F.

instr checked
 DC-2 - 70x200

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by ✓ AM
 Start-Up OK'd by ✓ Time PM Date 1956

Fuel ht in
 14.18 super crit
 14.16 just "

$$C.H = 36.0 \text{ cm} \quad C.V = 36.5 \text{ l} \quad C.M = 2.84$$

$$\frac{H}{x} = \frac{26.11 \times 9.003}{716} = 328$$

$$9 \text{ m}^{235} / \text{cm}^3 = .07161 \times 1.0963 = .0785$$

158328
H/X ~ 330

Expt. 72C Time 9:42 AM Date 10-31 1962
 Purpose same as above
except separation now 27
 Personnel: CC, LWG, JF

DC-3 responds
DC-2 - 265x200
R-1 responds
PM - trips

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195__

Room Temp
~ 75°F

Fuel ht. in

{ 14.95" slightly super.
 { 14.94 " sub.

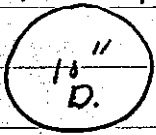
CH = 37.9 cm. CV = 38.4 l; CM = 3.01

Annuli Type



* 18"

FDS Type



~~Expt. 73A Time 12:40 AM Date 10-31 1962
 Purpose Crit Cond for 2-10" Dia
Al. cylinders bare separation
 Personnel: CC, LWG, JF~~

omit

~~**START-UP CHECK LIST**
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195__~~

First attempt slightly sub. crit at 353" & blade began to submerge -
 John - Drained

Expt. discontinued - blade in ~ 1/2"

Crit ht would be close to 36"

* cyl not tall enough for 27" separation

Expr. <u>73B</u>	Time	AM	PM	Date	195
Purpose <u>Same as above except</u>					
<u>separation now 16"</u>					
Personnel: <u>C.C. LWG J.F.</u>					

H/x = 328

Fuel hit in

35:51 sub. crit
 35:57 ~~super crit~~ just crit
 Blade in contact

Drained back partway & raised Blade 6"

35:63 ~~just crit~~ Barely sub
 without less than 1"

Results good to 3 digits

$E.H = 35.7''$
 $CH = 90.7 \text{ cm}$ $CV = 92.0 \text{ l}$ $CM = 7.22$

Expr. <u>73C</u>	Time <u>8⁴⁵</u>	AM	PM	Date <u>11-14</u>	195 <u>6</u>
Purpose <u>Same as above except</u>					
<u>spacing now 6"</u>					
Personnel: <u>C.C. LWG J.F.</u>					

START-UP CHECK LIST	
Equipment Checked by <u>✓</u>	Personnel Check by <u>✓</u>
Instrument and Safeties Checked and Reset by <u>✓</u>	
"Source In" Checked by _____	Source No. <u>123</u>
Emergency Equipment in Control Room Checked by <u>✓</u>	
Red Light On by <u>✓</u>	AM
Start-Up OK'd by <u>✓</u>	Time _____ PM Date _____ 195

24:68 super crit
 24:61 just "

$CH = 67.6 \text{ cm}$ $CV = 68.5 \text{ l}$ $CM = 5.38$

#1 x = 328

Expt. 73 D Time AM Date 11-14 1956
 Purpose same as above
for period meas.
 Personnel: C.C., L.W.G., J.F.

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

Result same
 as 73 C

Fuel ht.
 26.62 just cut
 26.84 - corresponds to period

Calibration of 6" Al. slab by weighing water
 Drained out into drum

1-18-57
 Calibrated scale:
 at 100# reads $\frac{3}{8}$ " high
 at 500 " " $\frac{2}{5}$ " "
 Drum gross 511.5 lb.
 Drum tare 135.5
 376.0 lb net
 $\times .4536 = 170.550$
 .870
 171.420

Sum of Displacement
 due to rods & plastic

53.23 cm³
 = .870 l

Height meas. 57.125" final from top
 20.187" initial
 36.938" = 93.8 cm

$$\frac{171.42}{93.8} = 1827.5 \text{ cm}^2 = 15.14 \text{ cm thick}$$

$$\frac{120.7}{20.187} = 5.96$$

(using calibration corr. 15.10 cm = 5.95")

This result is more in line with expt. results &
 direct thickness meas. by "probe stick".

1 Boral sheet

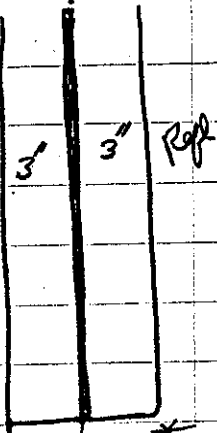
Hx = 328

Savannah River
Exp # 61

Expr. 74 Time AM Date 11-19 1956
 Purpose Crit. Cond for 2-3" Al
slabs with 3/8" sheets of Boral
between in contact. Refl
 Personnel: G.E. LUG JKF

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by ✓ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM PM
 Start-Up OK'd by ✓ Time PM Date 1956

Insts
checked
D.C. 2-68X100



*Water ht. soln ht. Blade at ~49" up.

1/4" Boral sheets
canned in
stainless S

61.4 cm	22.88"	super crit
60.2	22.90	just crit
59.1	22.95	
58.4	23.04	sub.
58.4	"	just crit

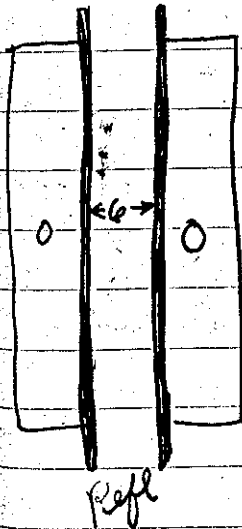
Water Temp 78 °F

CH = 58.5 cm, CV = 107.6 l, CM = 8.45"

Expr. 75 Time AM Date 11-19 1956
 Purpose Crit. Cond. for 2-3" Al
slabs with Boral sheets against
inside edges as shown - 6" spacing Refl
 Personnel: _____

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties checked and Reset by ✓
 "Source In" Checked by ✓ Source No. _____
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM PM
 Start-Up OK'd by ✓ Time PM Date 1956

6" Between
Boral sheets.
Insts. checked
OK

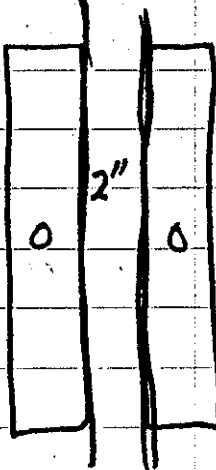


Water ht a. soln ht. in
+ 118 cm 46" no appreciable
multiplication

+ - even with top of poison plate
* Back scale set to reactor zero

162

4/x = 328



Expr. 76 Time 2:50 PM Date 11-20 1956
 Purpose C.C. for 2-3" Al slabs
Separated 2" with Boral sheets
on inside edges
 Personnel: L.W.G. J.F.

D-C - resp.
 PM - Trips
 DC-2 - 50x200
 LN Trips
 R-2 - resp.

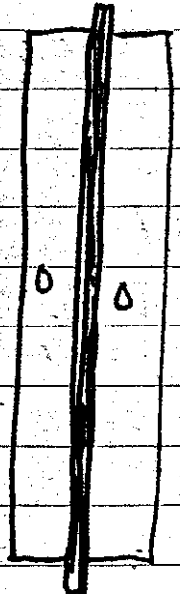
START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by J.F. Time 2:50 PM Date 11-20 1956

Water ht in
 117 cm

Fuel ht in
 46" NO appreciable
 multiplication

2 Layers
 Boral



Expr. 77 Time 10:22 AM Date 11-21 1956
 Purpose C.C. for 2-3" Al slabs
separated by 2-layers of Boral
only, Ref 1
 Personnel: L.W.G. J.F.

Trips OK
 checked
 DC-3 - resp.
 R-2 " "
 PM Trips
 LN " "
 DC-2 - 40x200

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by J.F. Time 10:22 AM Date 11-21 1956

H₂O ht
 93.8 cm

Fuel ht
 36.92" just out

Fuel Temp 25°C

C_H = 93.8 cm ; C_V = 172.6 l , C_M = 13.55

Two 10" Dia. Al. Cylinders Interacting with
 $H/x = \sim 52$ in one & $H/x = 328$
 Outside Sid

Expr. 78 Time 2:40 PM Date 11-29 1966
 Purpose C.C. Two 10" Al Cyls in Contact
Barc $H/x = 52$ in one & $H/x = 328$ in other
 Personnel: C.C. L.W.G. J.F.

Cyl #1 at 50.1
 Cyl #2 at 328

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by J.F. Time 2:40 AM
 PM Date 11-29 1966

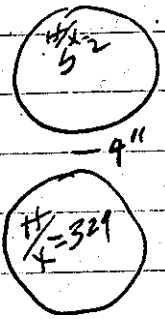
DC-2 - 65x200
 DC-3 RESP.
 LN TRIP-
 PM "
 R-2 RESP
 R-1 "

$CV_1 = 14.40$
 $CV_2 = 14.40$
 $CV = 28.80$ Total vol.

Fuel ht
 Cyl. #1 Cyl. #2 use av. crit ht = 11.20"
 11.19 - 28.4cm 11.22 - 28.5cm just crit

cylinder #1 - FOS type - cyl. #2 - annular type
 $CM_1 = 6.91$ $CM_2 = 1.13$; Total CM = 8.04

Expr. 79 Time 1:40 PM Date 11-29 1966
 Purpose C.C. Same as above
except 9" edge to edge
 Personnel: _____



Cyl #1 Cyl #2
~~12.73~~ 12.73 ~~12.72~~ 12.72 slightly super
~~12.72~~ 12.72 slightly sub.

CH = 32.3 cm ; $CV_1 = CV_2 = 14.40$ 16.28
 $CM_1 = 7.84$ kg. $CM_2 = 1.29$ Total CM = 9.15

$H/x = 50.1$ in Mampold for Analysis see
 Sahn Book #2 page 39 ; $9m^{2.35}/cm^3 = 4798$

Expr.	80	Time	3:15 AM	PM	Date	11-29	1966
Purpose	Same as above except spacing now 12"						
Personnel	L.W. G. J. F.						

Rounded off to
 13.15 13.175
 Cyl #1 13.18 13.165
 Cyl #2 13.23 13.215
 slightly super
 " " sub.

Since system is comparatively insensitive to cyl #2
 soln ht., will calc. on basis of #1 cyl.

C.H. = 33.5 cm CV₁ = CV₂ = 16.98 Total Vol = 34.0 l
 CM₁ = 8.75 CM₂ = 1.33 Total CM = 9.48

Expr.	81	Time	8:45 AM	PM	Date	11-30	1966
Purpose	Same as above except spacing now 18"						
Personnel	R.G. J. FOX						

DE-2 - 65x200
 PC 3 Rump
 R1 " "
 R2 " "
 PM Trip 3
 LM "

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>
"Source In" Checked by	Source No. 123
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/> AM
Start-Up OK'd by	<input checked="" type="checkbox"/> Time _____ PM Date _____ 1966

#32

18"

Cyl #1 13.21 13.20
 Cyl #2 13.29 13.275
 slightly super
 " " sub.

#329

13.20

{ 13.21 13.19 }
 13.19 13.175
 slightly super
 " " sub.

C.H. = 33.5 cm CV₁ = CV₂ = 16.98
 CM₁ = 8.15 CM₂ = 1.33 Total CM = 9.48

H/x = 50.1

Expr.	82	Time	10:25 AM	Date	11-30 1952
Purpose	Single 10" dia. Al. cyl. - 3" Bottom Pipe				
	Bare at H/x = ~ 50				
Personnel:	LWG J.F.				

Fuel ht

13.24"

very slightly super

13.23 - 33.6 cm

Pipe Bottom correction - .9 cm; Plate cor. #0

Sub.	33.6
	1.3
	34.9

Cor. Cut ht. = 34.9 cm ≈ 13.74"

corrected CV = $\frac{17.69}{17.24} \rightarrow C.M. = \frac{8.49}{8.27}$

Expr.	83	Time	AM	Date	195
Purpose	S.C. for 2-10" Al. cyl. both at H/x = 50.1 Bare - contact				
Personnel:	C.C. LWG J.F.				
START-UP CHECK LIST					
Equipment Checked by	<input checked="" type="checkbox"/>	Personnel Check by	<input checked="" type="checkbox"/>		
Instrument and Settings Checked and Reset by	<input checked="" type="checkbox"/>				
Source Interlocked by	<input checked="" type="checkbox"/>	Source No.	123		
Emergency Alert in Control Room checked by	<input checked="" type="checkbox"/>				
Red Light	<input checked="" type="checkbox"/>				
Start Up O.K.	<input checked="" type="checkbox"/>	Time	AM	Date	195

1-cyl. Ann. type
1-cyl - F05 "

Fuel ht

10.03"

super cut

10.02 10.01

2nd cut

C.H. = 255 CV = 25.86

CM = 12.41

Expr. 84 Time 2:30 AM PM Date 11-30 1956
 Purpose C.C. - 2-10" Al cpls Bare
H/X = 50, separated 12"
 Personnel: LWG JF

Fuel ht
 12.83 { 12.84 slightly super
 12.82 " " sub.
 CH = 32.4 CV = 33.04 CM = 15.86

Block stacks

H/X = 50.1
 in manifold

Expr. 85A Time 8:45 AM PM Date 12-17 1956
 Purpose C.C. for 9x40"x48" cube stack
against 3" Al. slab at H/X = 52
 Personnel: LWG, C.C., J.F.

START-UP CHECK LIST
 Equipment Checked by Date 12-17 check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by C.C. Case No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start Up OK'd by Date 1956

9x12x48 cube stack 17¹⁵ 14³¹ 14⁴⁰ Before adding
 9x40x48 " * 7¹² 7¹⁶ 9⁴⁰ John.
 1440 - 2x2x3 - blocks
 1440 x .2312 = 332.9
 22.8
 353.7 ~ 20.35" = 51.7cm
 CV = 47.41 CM = 22.8

12x
 Total
 1530

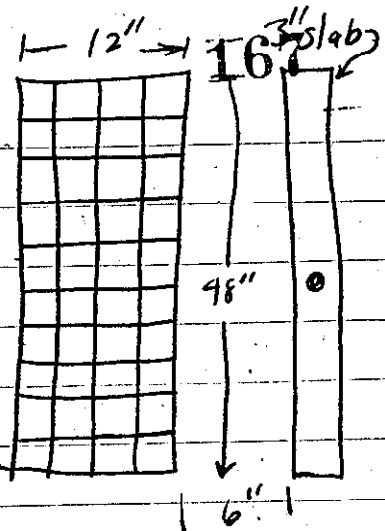
Expr. 85-B Time 10:11 AM PM Date 12-17 1956
 Purpose Same as above except
3" slab moved back 6"
 Personnel: LWG C.C., J.F.

~~Fuel~~ Fuel ht is
 33.23 ~~32.23~~ out of John - very
 32.23 little multiphase
 * - Apparently cube more reactive or distributed
 into hood

C
 C

Expr. 85E Time 12³⁰ PM Date 12-17 1966
 Purpose Re-stacked Blocks - 12x32x48
Slab 6" from blocks
 Personnel: L.W. Co J.F.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and
 Source in Checked by Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1966



very little m^t at 32"

Expr. 85D Time 12 PM Date 12-17 1966
 Purpose Same as above except
slab moved in rd 3"
separation
 Personnel: L.W. Co J.F.

Fuel ht
 33.18" sub-cut - but considerable
 reactivity

Expr. 85E Time 12¹⁵ PM Date 12-17 1966
 Purpose Same as above except
slab now 2 1/2" in separation
 Personnel: L.W. Co J.F.

12x32x48
 Total 1536-2x2x3
 1536x.2312

$$\begin{array}{r}
 = 355.1 \\
 \underline{34.3} \\
 389.4
 \end{array}$$

Fuel ht Leveling
 29.91 "
 30.20 "
 30.34 ~ level at ~ .002 on L.N

source out at ~ 29.6

" Put source in
 " Removed source power cont. to drop qtr
 C.H = 30.6 30.55 Leveling - but much less
 = 77.7 ~ 30.63 - L.N exp. rise

C.V = 71.5 C.M = 71.5 x .48 = 34.3

Approx. 1/2 crit size Block stack

Total 1248 - 2x2x3
 1248 x 123 1/2 = 28875
 23.6
 312.7

Expr. 85 F Time 12-18 1956
 Purpose C.C. with cube stack 12x24x48 "W.
8 3" slab 1" separation
 Personnel: C.C., L.W.G., J.F.

START-UP CHECK LIST
 Equipment Checked by Department Check by
 Instrument and Safeties Checked and
 "Source In" Checked by _____ Station No. 123
 Emergency Equipments in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956

Fuel ht
 20.99" Leveling source out
 21.01 " slightly
 21.03
 21.05 L.N. - Exponential Rise
 CV = 49.1
 CM = 23.6

12x22x48

Expr. 85 G Time 12-18 1956
 Purpose Same as above except
Block stack reduced to 22" high
1" separation
 Personnel: C.C., L.W.G., J.F.

Not nearly critical at 22" fuel ht
 Drained back.

12x23x48

1056 - 2x2x3
 1056 x 123 1/2 = 244.1
 + 1325 cu in x 1947
 = 25.8
 244.1
 269.9
 28.0
 297.9

Expr. 85 H Time 12-18 1956
 Purpose Same as above except
added 1" height to stack
 Personnel: C.C., L.W.G., J.F.

Fuel ht. 24.97" Exp. rise
 crit ht = ~ 24.95" = 63.4
 CV = 63.4 x 92 = 58.31
 CM = 58.3 x 48 = 28.0

Expr. 85 J I Time 1:40 AM Date 12-18 1960
 Purpose Added 1 m. to height of side
Block - 1" separation
 Personnel: C.C. LWG J.F

12x24x48

1152 x .2312 = 266.3

24.9
24.2 fuel ht.

22.03 Leveling
 27.16 slightly leveling
 22.22
 22.21 Exp. rate

22.2"
5.6, 4 cm

C.U. = 54.4 x 9.2 = 519

C.M. = 24.9

Expr. 85 J J Time 2:40 AM Date 12-18 1960
 Purpose Reduced Block Stack to 9" thick
1" separation
 Personnel: C.C. LWG J.F

9x24x48

fuel ht ~ 27.1 very little reactivity
 Drained. Apparently could not be made crit.
 Omit

Expr. 85 K Time 2:55 AM Date 12-18 1960
 Purpose Added 2" to height of blocks
 Personnel: C.C. LWG, J.F

9x26ohx48w

Very little m-1 at ~ 27"
 Drained back.

Omit

170

Expr. 85~~AL~~L Time 332 AM PM Date 12-18-1956
 Purpose Same as above except added 2" to B.S. height.
 Personnel: C.C. LWG J.F.

9x28h x48"W

not crit at 320" fuel ht. Drained

Expr. 85~~AM~~M 904 12-19-1956
 Purpose Added 9" to stack height
 Personnel: C.C. LWG J.F.

DC-3 - Resp.
 DC-2 - 60X200
 LN TRIPS
 PM " "
 R-2 Resp.

"32"
 9x~~28~~h x48"W
 1152 - 2x2x3 Blocks
 1152x.2312 = 266.3
 30.5
 296.8

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by _____
 Instrument and Safeties Checked and Reset by _____
 "Source In" Checked by _____
 Emergency Equipment in Control Room Checked by _____
 Red Light On by _____ AM
 Start-Up OK'd by _____ Time _____ PM Date _____ 1956

Fuel ht seen

CH = 27.15
 69.0 w
 CU = 63.5
 27.09" Leveling
 27.20 Exp. rise
 CM = 63.5 x .480 = 30.5

Expr. 85~~AM~~N 920 AM PM Date 12-19-1956
 Purpose Removed 2" of Blocks
 Personnel: C.C. LWG J.K.

249.7
 31.2
 280.9

9x30x48

1080 - 2x2x3 Blocks

Fuel ht

1080x.2312 = 249.7

27.73

slightly leveling

27.76

27.79

Exp. rise

CH = 27.85
= 70.7 w

CU = 65.0 l

CM = 31.2 kg

12x28x48
 = 1344 Blocks
 - 1344 x .2312
 = 310.7
 18.2

Expr. 86A Time 2:15 AM Date 12-19-1960
 Purpose C.C. 12x28x48 B.S. with
3" lead in contact
 Personnel: LWG C.G. J.F.

Fuel ht 16.23 Leveling 50. out.
 C.H. = 16.26" / 16.24" Exp. rise
 = 41.3 cm / 4.27

$C.V. = 41.3 \times .92 = 38.0$ $CM = 38.0 \times .48 = 18.2$

Expr. 86B Time 3:15 AM Date 12-19-1960
 Purpose Same as above except 2"
separation
 Personnel: C.C. LWG J.F.

12x28x48

310.7
 33.5
 344.2

Fuel ht
 29.17 Leveling
 29.27 "
 29.40 "
 29.69 "
 29.99 Exp. rise

C.H. = 29.40"
 = 75.9

$C.V. = 75.9 \times .92 = 69.8$ $CM = 69.8 \times .48 = 33.5$

Block data:

37 1/2 Enriched: 2" x 2" x 3" Blocks contain 1,2312 kg U235-
 2 x 2 x 1 " " " 1,0779 " "

Depleted: 2 x 2 x 3 Blocks contain 1,295 gm U235-

Blocks per Layer = $120 - 2 \times 2 \times 3 + 24 - 2 \times 2 \times 1$

172

$1800 \times .2314 = 414.1$

$336 \times .0779 = 26.2$

442.3
 21.4

463.7

Expr. 87A Time 9:40 AM Date 12-20-1956
 Purpose C.C. cube stack 16" Th x 30" h x 48" W
VS 3" slab at 2" separation
 Personnel: LWG J.F.

48" W

DC-2 - 70x200

DC-3 resp.

R-1

2 - resp.

LN TRIPS

PM 11

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by _____
 Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by _____
 Red Light On Start-Up OK'd by _____ AM _____ PM Date _____ 1956

7.1 mel ht 19.04" slightly leveling
 " " 19.07 " " "
 " " 19.09 Exp. rise

C.H. = 19.08
 = 48.5

$CV = 48.5 \times 92 = 44.61$ $CM = 21.4$

Expr. 87B Time 12:20 AM Date 12-20-1956
 Purpose Same as above except slab in contact with stack
 Personnel: LWG J.F.

16" Th x 30" h x 48" W

442.3
 14.8

457.1

7.1 mel ht 13.15" leveling
 " " 13.18 " " "
 " " 13.20 " " "
 " " 13.22 Exp. rise

C.H. = 13.20
 = 33.5

$CV = 33.5 \times 92 = 30.81$ $CM = 30.8 \times 48 = 14.8$

Expr. 87C Time 2:20 AM Date 12-20-1956
 Purpose Same as above except separation now 3"
 Personnel: LWG J.F.

442.3
 28.1

467.4

22.25 leveling
 22.29 " "
 22.33 " "
 22.40 " "
 22.44 Exp. rise

C.H. = 22.40
 = 56.9

$CV = 56.9 \times 92 = 52.31$ $CM = 25.1$

Expr. 87D Time 2³⁰ ^{PM} Date 12-20 1956
 Purpose Same as above except opening now 4"
 Personnel: LWG J.F.

442.3
 32.2
 474.5

Fuel ht 28.22 Leveling
 28.34 "
 28.44 "
 28.55 "
 28.65 "
 28.76 Exp. rise

C.H = $28.17 = 72.9a$

CV = $72.9 \times 92 = 67.0$, CM = 32.2

Expr. 87A Repeat 830 Date 12-21 1956
 Purpose To check cont ht.
 Personnel: CC. LWG J.F.

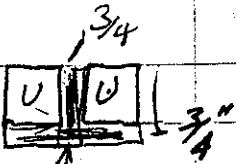
DC-2 - 60
 DC-3 resp.
 R-1 Trips
 PM " "
 LN " "

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Sa^{fe}ties checked and correct
 "Source In" Checked by _____ Source No. 123
 Emergency _____
 Red Light:
 Start Up OK'd by _____ 1956

Fuel ht 19.08 Leveling
 19.15 "
 C.H 19.17 19.18 Exp. rise

Check on reproducibility
 omit

Each Layer: 17 - 2x2x3 = Total 136 = 31.44
 36 2x2x2 = " 292 - 22.7
 174 = 54.1



Plastic

in two dimensions

Dim: of stack

5" Th x 48" L. x 22" H
 8-Layers

Expr. 88A Time 3:02 AM PM Date 12-29-1956
 Purpose C.C. 5" Block slab RT - HX =
Test vs 3" slab made in contact
 Personnel: C.C. DFC, J.F.

DC-2 - 60 X 20
 DC-3 - 70 X 100
 LN TRIPS
 PM "
 R-1 TI
 R-2 Resp.

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956

Fuel ht

Blocks 54.1 kg

15.31" Leveling
 15.32 Exp. run
 15.28 Level on LN

$\frac{17.2}{71.3}$

CH = 15.31" = 38.9 cm

CV = .358 CM = 17.2

Expr. 88B Time 3:50 AM PM Date 12-29-1956
 Purpose Same as above except
separation 3"
 Personnel: C.C. DFC, J.F.

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1956

very small m⁻¹ at 32" fuel ht.

omit

Expr. 88C Time 8:45 AM Date 1-2-1957
 Purpose Same as above except separation now 2"
 Personnel: C.C. DFC, J.F.

START-UP CHECK LIST
 Equipment Checked by Present Check by
 Instrument and Safety checked and
 "Source In" Checked by No. 123
 Emergency and Room checked by
 Red Light: AM
 Start-Up OK'd by time PM Date 195

DC-2 - 70x200
 DC-3 resp.
 R-1 - trips
 R-2 resp.
 LN Trips
 PM "

very little m⁻¹ at 30"

Expr. 88D Time 9:15 AM Date 1-2-1957
 Purpose Same as above except separation now 1 1/2"
 Personnel: C.C. DFC, J.F.

54.1
 28.5
 82.6

Fuel ht 25.49 exp. rise level
 C.H = 25.45" = 64.6 cm
 25.52
 25.42
 CV = 59.4 CM = 28.5
 Separation for equal Heights ≈ 0.80

2x2x3 - 34x8 = 272
 2x2x1 - 38x8 = 304
 272x.2312 = 62.9
 304x.0779 = 23.7
 9.4
 96.0

Expr. 89A Time 1-3 1957
 Purpose C.C. 3/4" plastic mod. Block stack 8" thick x 4 1/2" w x 2 1/2" h. vs 3" Al slab in contact
 Personnel: C.C. DFC, J.F.

DC-2 - Trips
 80x200

START-UP CHECK LIST
 Equipment Checked by Present Check by
 Instrument and Safety checked and
 "Source In" Checked by No. 123
 Emergency and Room checked by
 Red Light: AM
 Start-Up OK'd by time PM Date 195

DC-3 resp.
 LN Trips
 PM "
 R1 - resp.
 R2 "

Fuel ht: 8.43" exp. rise
 8.405" level

C.H = 8.40" = 21.3 cm
 CV = 19.6
 CM = 9.4

176^{62.9}

Blocks

23.7
86.6
14.0
100.6

Expr.	89B	Time	3:22 AM	Date	1-3-1957
Purpose	Same as above except separation 2"				
Personnel:	C.C. DFC J.F.				

Fuel ht.: 12.54" exp. rise
12.51 level

CH = 12.52" = 31.8 cm

CV = 31.8 x .92 = 29.3; CM = 14.0

86.6
16.3
102.9

Expr.	89C	Time	8:30 AM	Date	1-4-1957
Purpose	Same as above except sep. now 3"				
Personnel:	L.W.G. C.C. J.F.				

DC-2 - 70x200
DC-3 Resp.
R-1 - "
R-2 - "
LN TRIPS
PM "

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset	<input checked="" type="checkbox"/>
"Source In" Checked by	Source No. 123
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>
Red Light On by	AM
Start-Up OK'd by	Time PM Date 1957

Fuel ht. 14.56 exp. rise
14.51 level

CH = 14.53" = 36.9 cm

CV = 33.9
CM = 16.3

Expr.	89D	Time	10:05	Date	1-4-1957
Purpose	Same as above except separation 6"				
Personnel:	C.C. L.W.G. J.F.				

Fuel ht 31.0" appreciable M⁻¹
Not crit.

Expt. 89E Time 10³² AM Date 1-4 1957
 Purpose Same as above except separation 5"
 Personnel: G.C. L.W.G. J.F.

86.4
 25.9
 112.5

Fuel ht. 23.20" Exp. Rise
22.88 level

$C.H. = 23.1 = 58.7 \text{ cm}$
 $C.V. = 58.7 \times .92 = 54.0$ $CM = 25.9$

See page 226 End of Block vs 3" slab interaction

Expt. 90 Time 9³⁰ AM Date 1-7 1957
 Purpose Crit Cond. 3" Al slab. Refl. except top. H₂O = 50
 Personnel: R.G. J.F.

DC-2 - 70x100
 DC-3 - Resp.
 PM - Trips
 LN "
 R-1 Resp.
 R-2 "

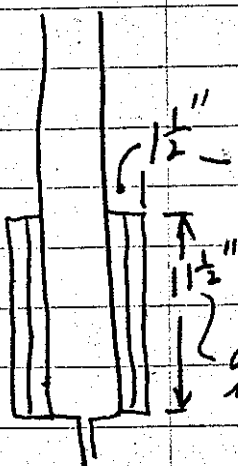
START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date 195

Fuel ht. 11.91" Water ht. 30.3

$C.H. = 30.3 \text{ cm}$ $C.V. = 27.88$ $CM = 13.38 \text{ kg.}$
 just out
 See page 183 for repeat with
 other water zero

3" slab.

Expt. 91 Time 2²² AM Date 1-7 1957
 Purpose Same as above except 1 1/2" thick Plexiglas against 3" slab replacing H₂O
 Personnel: R.G. J.F.



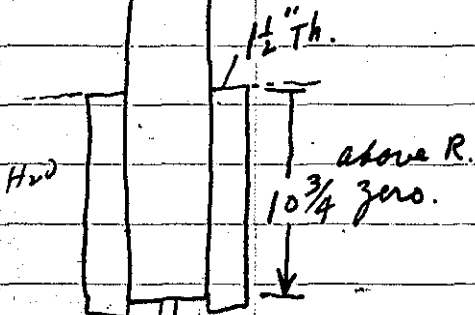
1 1/2" - Plexiglas 48" long
 Fuel ht.

10.57 27.2 cm just out

$C.H. = 26.8 \text{ cm}$ Omit
 See 91A P178

178

Expr. 91A Time AM Date 1-7 1957
 Purpose Same as above except lowered plexiglas 3/4"
 Personnel: R.G. DL. JF



Fuel ht
10.67"

H₂O ht. #

* ~~28.3~~ = plexiglas
10.75
same
Critical

10 3/4 0.21 R = 28.3 cm

on right glass CH = 27.1 cm

CV = ~~24.93~~ ~~24.79~~ 24.93

* corrected $\frac{17}{24.4}$

CM = ~~11.96~~ ~~11.65~~ 11.96

Expr. 92 Time 8:30 AM Date 1-8 1957
 Purpose Crit. Cond. for 3" slab refl. s. with 3/4" Th. Plexiglas against the other
 Personnel: _____

DC-2 - Tr. 70x200

DC-3 resp.

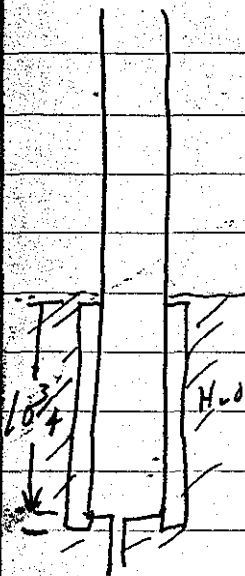
PM Trips

LN "

R-1 "

R-2 resp.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by Time _____ AM
 Start-Up OK'd by Time _____ PM Date _____ 1957



Fuel ht
11.23"

water ht.

28.8 cm Crit

CH = 28.5 cm CV = 26.22

CM = 12.58

* lowered right glass 1 cm
** omit correction

178

Expt. <u>91A</u>	Time <u>AM</u>	Date <u>1-7</u> 195 <u>7</u>
Purpose <u>Same as above except lowered plex angle 3/4"</u>		
Personnel: <u>R.G. DL. JF</u>		

H₂O Th.


Not in 7029


2- 3" slabs

Rough


5 (cm) H (cm)

10.16 56 ← P. 123

10.14 57.1  12" high P. 124

5.1 30.3  12" high P. 125

Bar

10 30.9  1"

outside sid

S H

H₂O ht. ~~3~~

✓ 28.3 - plex angle

*

Expr. 93	Time 10 ¹⁰ AM	Date 1-8-1957
Purpose C.C. 2-3" slabs in contact		
Bare in sid		
Personnel: L.W.G. C.C. J.F.		



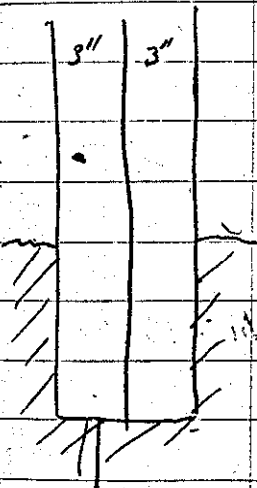
Fuel ht.

12.54" = cut

(Compare to value to 2 1/2" slab)
Outside - 12.89" ±

CH = 31.9 cm, CV = 58.70, CM = 28.14

Expr. 94	Time 1:32 PM	Date 1-8-1957
Purpose C.C. two 3" slab in contact reph. except top		
Personnel: L.W.G. J.F.		



Fuel ht.

Water ht.

5.88"

5.94"

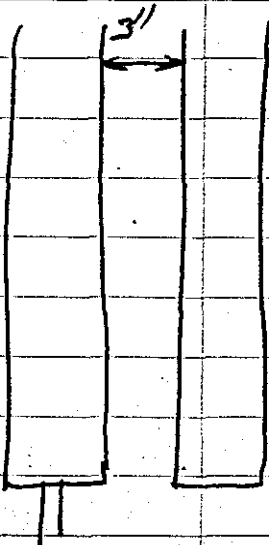
cut

CH 14.9 cm

CV = 27.42

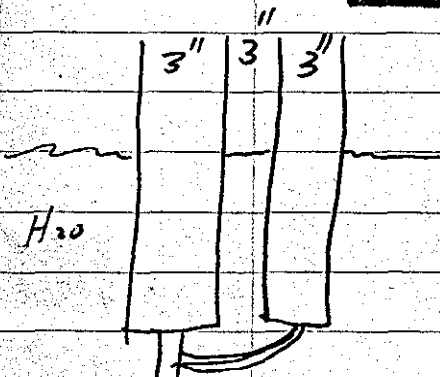
CM = 13.16

Expr.	95	Time	3 ⁰⁰ AM	Date	1-8-1957
Purpose	C.C. 2-3" slabs separated				
	3" Bare				
Personnel:	LWG C.C., J.F.				



Not cut at 16" small
 M⁻¹, Practically out of col
 Drained to 5.90"
 & added H₂O refl.

Expr.	96	Time	3 ⁴⁰ AM	Date	1-8-1957
Purpose	C.C. same as above				
	except refl. - top				
Personnel:	LWG J.F.				



Fuel ht water ht
 7.49" 7.51" crit

$C.H = 19.0$; $C.V = 34.96$ $C.M = 16.77$

H/X = 50

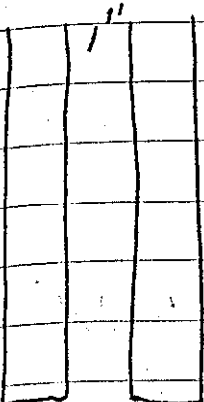
in sid.

181

Expr. 97 Time 8:45 AM PM Date 1-9 1957
 Purpose C.C. 2-3" slabs Bare
at 1" separation
 Personnel: C.C. LWG J.F

DC-2 - 70 x 200
 DC-3 resp.
 R-1 "
 R-2 "
 PM Trips
 LN "

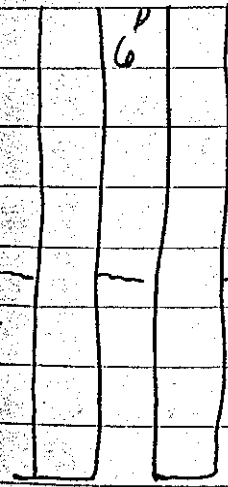
START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by time _____ PM Date _____ 1957



Fuel ht 14.72 out of coln - only
 very slightly ^{sub.} - probably within
 1" of crit.

crit ht. approx 14.8 ~~14.8~~"
 CH = ~ 42.7 cm CV = ~ 78.6 CM = 37.7 kg

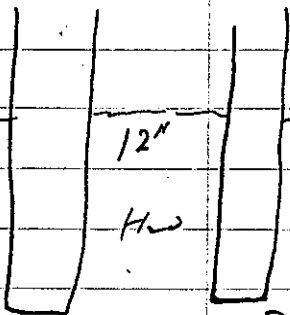
Expr. 98 Time 10:25 AM PM Date 1-9 1957
 Purpose C.C. 2-3" slabs refl. except top
separation 6"
 Personnel: C.C. LWG J.F



Fuel ht. 10.43
 Water ht " 10.47" Crit.

CH = 26.5 CV = 48.74 CM = 23.40

Expr. 99 Time 2⁴⁵ AM PM Date 1-9 1957
 Purpose C.C. 2-3" slabs ref
12" separation
 Personnel: C.C. LWG J.F.



Fuel ht Water ht
 11.69 11.84 slightly

DC-2 tripped accidentally Super crit
 when level became too high
 System would have been just about crit
 if water had been 11.7"

CH = 11.70 ≈ 297cm CV = 54.65, CM 26.22

Expr. 100 Time 8³⁰ AM PM Date 1-10 1957
 Purpose C.C. Same as above
except separation 1.5"
 Personnel: LWG C.C. J.F.

P-C2 - TOK200
 PC3 - resp.
 PM TRIPS
 LN "
 R-1 "
 R-2 resp.

START-UP CHECK LIST

Equipment Checked by Person (Check by
 Instrument and Safeties Checked and
 "Source In" Checked by
 Emergency Stop buttons in Control Room checked by
 Red Lag:
 Start-Up OK'd by Time _____ AM
 PM Date _____ 1957

Fuel ht Water ht. crit
 10.75 10.75

Comparing Fuel and water hts
 at near crit - 10.85" H₂O was
 crit at ~ 11.69-11.70. Hence the results
 of expts 99 & 100 are very nearly identical

CH = 29.8cm CV = 54.83, CM = 26.31

Expr. 90 repeat Time 10³⁰ AM Date 1/10 1957
 Purpose C.C. for single 3" slab
reflected
 Personnel: Joe Gilley

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safety Checked and Reset by ✓
 "Source In" Checked by ✓
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK'd by ✓ Time PM Date 195

Fuel ht. H₂O ht.

$CH = 29.9$ $11.76''$ $11.73''$ just crit.
 (see page 177) $CV = \frac{27.57}{26.86}$
 $CM = 14.00$ 72.89

* corrected 29.2

Expr. 101 Time 12³⁰ PM Date 1-10 1957
 Purpose C.C. 2-3" slabs refl
10" separation
 Personnel: KWA JF

$CV = 27.57$
 $CM = 14.00$

Fuel H₂O
 11.63 $11.65''$ critical

$CH = 29.5cm$ $CV = 54.28$
 $CM = 26.04 kg$

1-18-57, W.T.M. has been here
 * Omit cor. because not top refl.

184

Calibration of 7-5" cylinder
 34 l in equiv. to 42 cm height.
 or area of 7 is $810 \text{ cm}^2 \approx 116 \text{ ft}^2$

 $r = 4.08 \text{ cm}$

Expr. 102	Time 8 ⁴⁵ AM	Date 2/6 1957
Purpose Critical Conditions for 7-5" cyl in intersecting hexagonal array - Bare		
Personnel: Fox, Riley		
INSTRUMENT CHECK		
Date 1 195	Time	AM PM Source No.
Trip		
Instrument	Value	Status
DC-1		
DC-2	trip $\approx 90 \text{ cm}$	10 x 20
DC-3	responds	
Log N	trip	
R-1	respond	
R-2	respond	
P. M.	trip	

aluminum cylinders are spaced $\approx 1/4"$ apart (closest approach)
 fuel ht.

11.23"

super crit.

 $9/2$ 11.21"

sub. crit.

CH 11.22" $\approx 28.5 \text{ cm}$

CV = 23.09

CM = 11.08

Expt. 103 Time AM Date 2/6 1959
 Purpose Critical Count for 7-5" al. cyl. in
hex array Reflected
Separation ~ 14"
 Personnel: Fox, Riley

fuel ht. H_2O ht.

9:55 AM

5.71" 14.5 cm just crit.

$CH = 14.5 \text{ cm}$ $CV = 11.75\%$; $CM = 5.64$

Expt. 104 Time AM Date 2/6/1957
 Purpose C.C. 7-5" cyls. Bare
Separation 1" Hex Pattern
 Personnel: LWG, WT Mee, J.K.F.

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Rec.
 "Source In" Checked by Rec No. 123
 Emergency Equipment by Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time PM Date 1957

Fuel ht
 26.17" super crit.
 26.12" just crit

$CH = 66.3 \text{ cm}$ $CV = 53.70$ $CM = 25.77$

Expr. 105 Time _____ Date 2/6/1957
 Purpose C.C. 7-5" cyl. in Hex array; sep. 1" refl. except top
 Personnel: L.W.G., W.T., M.C.C., J.F.

Fuel ht. H₂O ht.
 6.19" 15.7 Crit.
 C.H = 15.7 CV = 12.72; CM = 6.10

Expr. 106 Time 9⁰⁰ AM Date 2/7/1957
 Purpose C.C. 7-5" cyl. in Hex array separate 2" Bare
 Personnel: L.W.G. C.C. J.F.

START-UP CHECK LIST

Equipment Checked by	<input checked="" type="checkbox"/>	Checked by	<input checked="" type="checkbox"/>
Instrument and Samples	<input checked="" type="checkbox"/>		
"Source In" Check	<input checked="" type="checkbox"/>		123
Emergency Equipment	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Red Light	<input checked="" type="checkbox"/>		
Start Up OK'd by	<input checked="" type="checkbox"/>		195

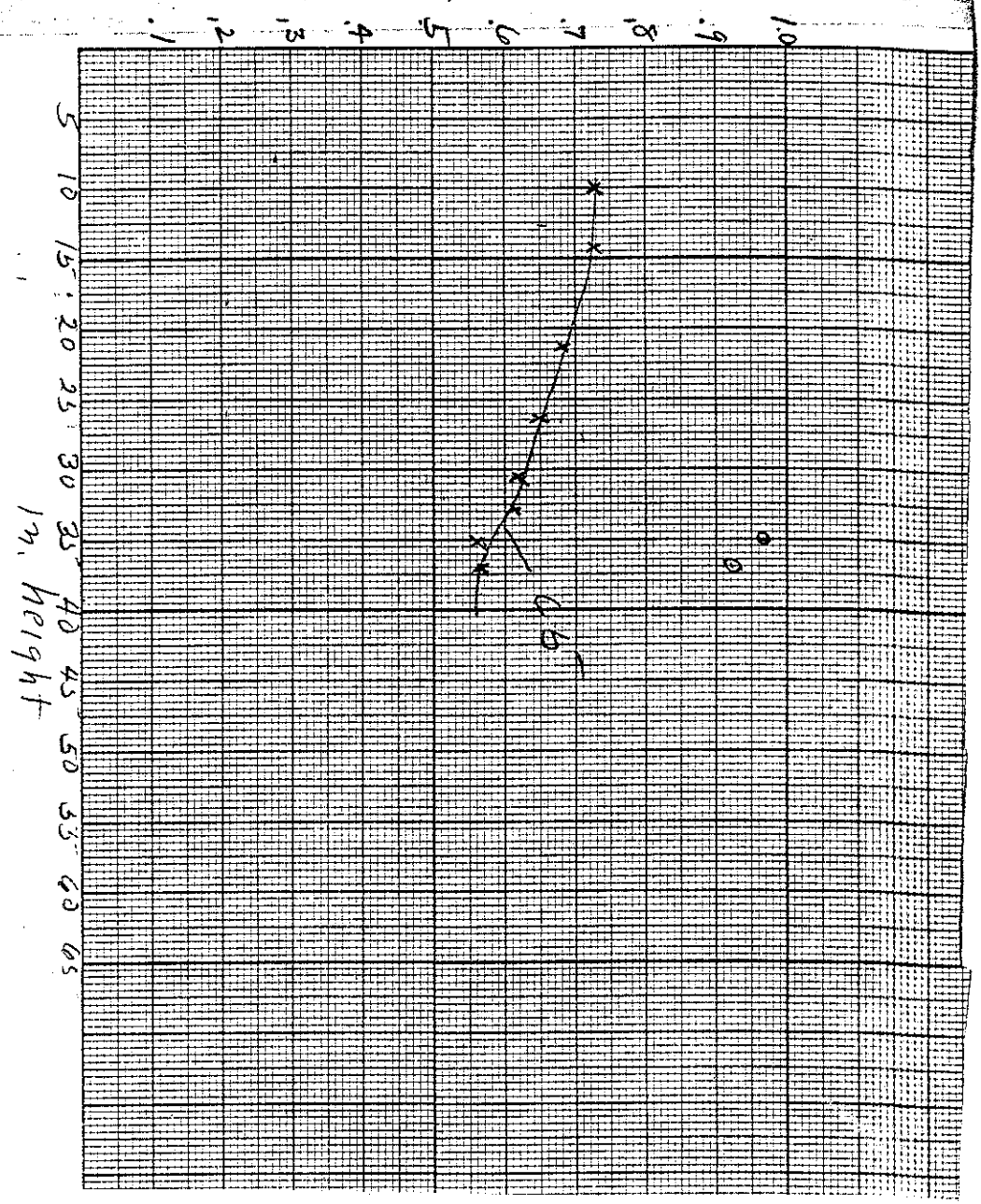
Fuel ht. 35.08" very little M' out of solution

Expr. 107 Time 10⁰⁰ AM Date 2/7/1957
 Purpose C.C. 7-5" cyl. in hex array; sep. 2" refl. except top
 Personnel: L.W.G. J.F.

Fuel ht. Water ht.
 8.38" 21.3 cm.

C.H = 21.3 cm CV = 17.25; CM = 8.28 kg.

M-1



m. height

0.65

Expt. 108 Time 1:00 ^{AM} PM Date 2/7/1957
 Purpose C.C. 7-5" Al. Cylinder 3.
in hex. array, separation 4"
refl. except top
 Personnel: LWC, C.C., J.F.

START-UP CHECK LIST

Equipment Checked by ✓ _____ Check by ✓ _____
 Instrument and Safety checked and OK ✓
 "Source In" Checked by _____ 123
 Emergency Equipment checked and OK ✓
 Red Light On by ✓ _____
 Start Up OK'd by _____ Date _____ 1957

Fuel ht 25.47" Water ht 25.5"
 $CH = 64.7m$ $CV = 52.4$ $CM = 25.15$

START-UP CHECK LIST

Equipment Checked by _____ Check by _____
 Instrument and Safety checked and OK _____
 "Source In" Checked by _____
 Emergency Equipment checked and OK _____
 Red Light On by _____
 Start Up OK'd by _____ Date _____ 1957

Expt. 108A Time _____ ^{AM} PM Date 2/8/57 1957
 Purpose C.C. for 7-5" al. cyl. in hex.
array. Separation 4.5"
Reflected except top
 Personnel: Jay, Cross, Hillley

H ₂ O	Fuel ht	C ₃	C ₄	C ₅
102.8 cm	37.27"	20.25	.92 44.4 ^{x16}	33 ^{x6} .570 (5min.)
	35.18	25.5	.97 42	33.5 .562
	33.10	20.13	- 39	30.8 .613
	30.48	21.0	.99 41.2	30.5 .618
	26.70	18.8	- 39.2	28.4 .652
	21.80	18.8	.99 41.2	27.5 .684
	14.52	17.5	1.0 40.8	26 .724
	10.09	23.5	.97 41.8	26 .724
	4.88	19.8	40.7	18.8

Expr. 109 Time 3:30 AM Date 2/13 1957
 Purpose Chk. for 7-5" al cyl. in line with 1/4" spacing
Reflected
 Personnel: Fox, Durin, Hilkey

7-5" in line
 0000000
 in contact

INSTRUMENT CHECK

Date 2/13 1957 Time _____ AM

Inst. No. _____

DC-1 trip @ 100 on 10x20

DC-2 respond

DC-3 trip

R-1 trip

R-2 responds

P.M. trip

START-UP CHECK LIST

Equipment Checked by Personnel Check by

Instrument and Safeties Checked and Reset by

Source In" Checked by Source No. _____

Emergency Equipment in Control Room Checked by

Red Light On by AM

Start-Up OK'd by Time _____ PM Date _____ 1957

Fuel ht. H₂O AT
9.26" crit. 23.6 cm

CH = 23.5 cm, CU = 1904, CM = 9.14

check list
 OK

Expr. 110 Time 1:00 AM Date 2/14 1957
 Purpose C.C. 7-5" cyls in line
separation 1" refl.
 Personnel: LWG SJ

met
 DC-2-80x20
 LN Trips
 DC 3 resp
 R1 "
 R2 "

Fuel ht. Water ht
11.01" 27.9 critical

CH = 28.0 cm, CU = 22.68, CM = 10.88

Expr. 111 Time 1:14 AM PM Date 2/14 1957
 Purpose C.C. 7-5" cycle 17 Time 17
separation 13" refl except top
 Personnel: LWG C.C. J.F.

3" 189
0000000

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM _____
 Start-Up OK'd by ✓ Time _____ PM Date _____ 1957

Fuel ht
35.98"

H₂O ht.
91.5 cm Crit

CH = 91.4 cm CV = 74.0 l CM = 35.5 kg

Expr. 112 Time 3:45 AM PM Date 2/14/ 1957
 Purpose C.C. 7-5" cycle 17 Time 17
refl except top 2" separation
 Personnel: LWG J.F.

2"
0000000

Fuel ht
16.12

H₂O ht.
90.9 cm Critical

CH = 40.9 cm CV = 33.1 CM = 15.9

Expr. 113 900 AM Date 2/15/1957
 Purpose C.C. 6-5" cyls in line separated 7" Refl. except
 Personnel: LWG J.P.

DC-2 - 100X200
 LN TRIPS
 PM "
 DC3 resp
 R1 "
 R2 "

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties checked and
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room checked by
 Red Light On by AM
 Start-Up OK'd by line _____ PM Date _____ 1957

Fuel ht. 16.54" H₂O ht. 42.0

CH = 42.0 cm CV = 34.0; CM = 16.3

↓
 H/X = ~50 49.2 Expts outside

1 cyl. Annular loop
 1.5 FOS "

Expr. 114 1230 AM Date 3-5-1957
 Purpose TWO -10" cyls separated
 Personnel: LWG J.P.

DC2 - 30X200
 DC-3 60X1000
 LN - Trips
 PM "
 R-2 resp.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties checked and
 "Source In" Checked by _____ Source No. 123
 Emergency Equipment in Control Room checked by
 Red Light On by AM
 Start-Up OK'd by line _____ PM Date _____ 1957

11.78" slightly super
11.78" " sub.

CH = 29.9 cm CV = 30.32; CM = 14.55⁸²

10" cyl at 50%
annuli type

10" cyl at 90%
FOS type

1/2-90 fed from
3" slab by rack
Lift

Expr. 115 Time 1:00 ^{PM} Date 3-7-1957
 Purpose 1-10" cyl. at 50% vs 1-10" cyl at 90% separation 2"
 Personnel: LW G J.F.

191

DC2-50X2000

DC3-60X1000

LN Trips
PM "
R1 "
R2 resp

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 124
 Emergency Equipment in Control Room checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195

#1 Fuel ht $\frac{1}{2}=50$
11.08"

#2 Fuel ht $\frac{1}{2}=90$
11.08" Crit.

CH = 28.1 cm $CV_1 = CV_2 = 14.25$
 $CM_1 = 6.9$

$CM_2 = 4.28$

Total CM = 11.24

Expr. 116 Time 2:40 ^{AM} Date 3-7-1957
 Purpose Same as above except separation 6"
 Personnel: LW G J.F.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and
 "Source In" Checked by Source No. 124
 Emergency
 Red Light On by
 Start Up OK'd by Time _____ PM Date _____ 195

#1 Fuel ht
12.05"

#2 Fuel ht
12.05" Crit

CH = 30.4 cm $CV_1 = CV_2 = 15.51$

$CM_1 = 7.58$

$CM_2 = 4.65$

Total CM = 12.23

1923-8-57
 Ref 35485-5
 84185

Sample from Mansfield

19.916
 64.269 net.

gms salt = 3274x1

$\frac{gms V}{gm} = 3274$

$\frac{gms X}{gm} = 3051$

$\frac{H}{X} =$

sp gr = 1.602

$\frac{gms X}{cm^3} = 4887$

BATCH NUMBER		REQUISITION NUMBER	
REPORT TO: L.W. Gilley			
BUILDING NO. 9213			
DESCRIPTION OF MATERIAL: UO ₂ F ₂ solution			
IF NOT TO BE COMPOSITED CHECK HERE.....			
ASSAY REQUESTED AT <input type="checkbox"/> DT <input type="checkbox"/>	AT CODE NO.		
ANALYSIS REQUESTED	REPORTED ANSWERS		
GRAM/GRAM T	3.273.6		
	sp. gr. = 1.6018 @ 25.0°C		
SIGNED: <i>md</i>		DATE: MAR 18 1957	

Expt. 117	Time 1:00 AM	Date
Purpose same as above separation 12"		
Personnel: LWC C.C. J		

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel
Instrument and Safeties Checked and React B	
Source In Checked by	So
Emergency Equipment in Control Room Check	
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by <input checked="" type="checkbox"/>	Time PM

#1 cyl #12 = 49.2
 " " 12.61

#2 cyl #14 = 83.1
 " " 12.59 ~ 15.7 ON RACK

av. CH = 12.60 ~ 32.0 am; CV₁ = CV₂ = 16.22

CM₁ = 7.93

CM₂ = 4.87

Total CM = 12.80

#2-
15
Bar
Lif

#

192 3-8-57 Sample 9
 Ref 83485-5
 84185

19.916
 64.269 net.

gms salt = $3274 \times 1.298 = 4250$
 1.000
 .575

$\frac{gms V}{gms} = 3274$

$\frac{gms X}{gms} = 3051$

$\frac{H}{X} = \frac{26.11 \times .575}{.3052} = 49.2$

spgr = 1.602

$\frac{gms X}{cm^3} = 4887$

Expt. 117	Time 1:00	Date 3/1957
Purpose same as above except separation 12"		
Personnel: LWC C.C. JF		
START-UP CHECK LIST		
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>	
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>		
Source In Checked by <input checked="" type="checkbox"/>	Source No. 124	
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>		
Red Light On by <input checked="" type="checkbox"/>	AM	
Start-Up OK'd by <input checked="" type="checkbox"/>	Time	PM Date 195

DC2 55x200
 DC3 60x100
 LN TRIPs
 PM "
 R1 "
 R2 responds

#1 cyl #1 = 49.2
 " " " " " "
 12.61

#2 cyl #1 = 83.1
 " " " " " "
 12.59 - 19.7 on YACK

av. CH = 12.60 \approx 32.0 am; $CV_1 = CV_2 = 16.22$

$CM_1 = 7.93$

$CM_2 = 4.87$

Total CM = 12.80

H/x = 83.1

Expr. 118 Time 3:25 AM PM Date 3-8-1957
 Purpose C.C. for 1-10" Al. Cyl. at ~~1/2" AD~~ using 3" slab - rack lift for feed
 Personnel: L.W.G. C.C. J.F.

START-UP CHECK LIST
 Equipment Checked by Person 1 Check by
 Instrument and Safeties Checked and Ready by
 "Source In" Checked by Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

FOS Type Cyl.

33.05 cm C.H.
 + 0.93 Pipe Cor.
 .4 Bot. "
 34.38 → 34.4

(Cor. 13.54") 13.01" critical

COR. C.H. = 34.4 cm CV = 17.44 CM = 5.23

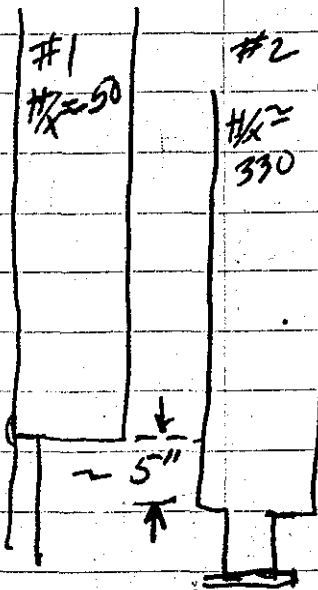
#2-10" cap. reservoir
 is 3" Al. Slab
 Bare-on-rack
 Lift.

Expr. 119 Time 2:30 AM PM Date 3-11-1957
 Purpose C.C. 1-10" Al. Cyl. at ~~1/2" AD~~ ~~330~~ ~~HK=328~~
 2-1-10" Al. Cyl. at ~~1/2" AD~~ ~~504~~ sep. 2.0"
 Personnel: L.W.G. J.F.

START-UP CHECK LIST
 Equipment Checked by Person 1 Check by
 Instrument and Safeties Checked and Ready by
 "Source In" Checked by Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

DC-2-~~200~~ 200
 " 3-~~1000~~ 1000
 55

PM - TRIPS
 LN "
 R-1 resp.
 R-2 resp.



#1 Fuel ht

#2 Fuel ht.

1/2 86" ≈ 30.1 cm

21.48 Crit.
 L ≈ 54.6 cm

CV₁ = 15.26 l
 CM₁ = 7.44

CV₂ = 27.68 l
 CM₂ = ~~21.17~~
 2.17

Total CV = 42.94
 " CM = 9.63

194

Did ~~not~~
change zero
of #2 reactor
~ 7" Below #1
$$\begin{array}{r} 26.4 \\ 12.2 \\ \hline 14.2 \end{array}$$

Time down

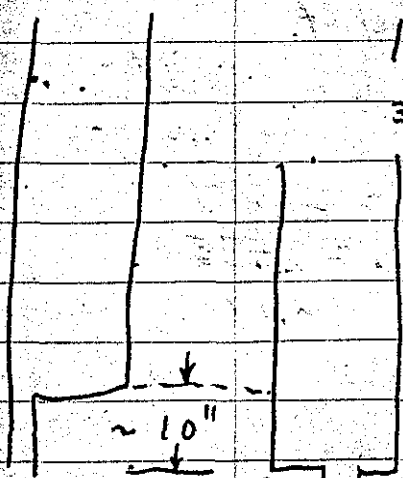
Expr. 120	Time 3:45 AM	Date 3-11-1957
Purpose Same as #119 except separation 11.0"		
Personnel: LWGT J.F.		

#1 Fuel ht 12.89" - 32.7 cm	#2 Fuel ht * 24.85" critical
$CV_1 = 16.58$	1.68
$CM_1 = 8.10$	26.53 corrected
	$= 67.4$ cm
	$CV_2 = 34.2$
	$CM_2 = 2.68$

Expr. 121	Time 10:12 AM	Date 3-12-1957
Purpose Same as Above except separation 12"		
Personnel: LWGT J.F.		

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Re...	
"Source In" Checked	
Emergency Control	
Red Light	
Start-Up OK'd by	

#1 Fuel ht 13.29" 33.8 cm	#2 Fuel ht + 29.00 cor. → 4.00 33.00 83.8 cm
$CV_1 = 17.14$	$CV_2 = 42.5$
$CM_1 = 8.37$	$CM_2 = 3.34$



* zero must be checked + check zero

Sample of soln in 3" slab fed at $H/x \approx 90$
 Gross 56.831g Reg. # 354856 taken 3/11/56
 Tare 20.1860
 36.6456

$\frac{gms U}{gms} = .2346 \checkmark$
 $\frac{gms U_{235}}{gms} = .2186 \checkmark$

$\frac{10000}{3040} \frac{gms UO_2 F_2}{gms}$
 $\frac{H}{x} = \frac{26.11 \times .696}{.2186} = 83.1$

SPGR = 1.373 $\frac{gms U_{235}}{cm^3} = 3001$

Hydro. sp. gr. = 1.372 at $73^\circ F$
 " " = 1.373 at $76^\circ F$

Expr. 122 Time 9:20 AM Date 3-13-1957
 Purpose: C. Cond. 2-10" Al cylinders - ~~both~~ #1
~~at $H/x = 330$~~ Separation 2"
 Personnel: C.L. LWG JIF

#1 cyl - Fast T.
 #2 " Ann. T.
 #2 fed from 3" slab. by rack lift.

START-UP CHECK LIST
 Equipment Checked by Personnel check by
 Instrument and Safety checked and
 "Source In" checked by
 Emergency Equipment 124
 Red Light
 Start Up OK'd by Date 1957

DC-2-10X1000
 " 3 TRIPB
 LM " "
 PM " "
 P1 - resp
 P2 - resp.

Soln in manifold	#1 cyl	#2 cyl
$H/x = 250$	19.45	19.45 (Soln in 3" slab is $H/x = 330$)
$\frac{1.011 gms}{cm^3}$	$CV_1 = 2505$	$CV_2 = 2505$
	$CM_1 = 2.63$	$CM_2 = 1.97$

→ Drained $H/x = 50$ from manifold, lowered $H/x = 330$ from overhead manifold into main manifold + addition of $H/x = 330$ from 4-5 plastic bottles

Expt. 123 Time 7:12 AM PM Date 3-13 1957
 Purpose C.C. 2-10" AL Cyls
separation ~ 1/8"
 Personnel: LWG, J.F

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

#1 Fuel ht

#2 Fuel ht.

$H/\bar{x} = \frac{250}{2.54} \rightarrow 13.65''$
 34.7 cm
 $CV_1 = 17.59$
 $CM_1 = 1.78$

$13.66''$ $H/\bar{x} = \frac{320}{328}$
 $CV_2 = 17.59$
 $CM_2 = 1.38$

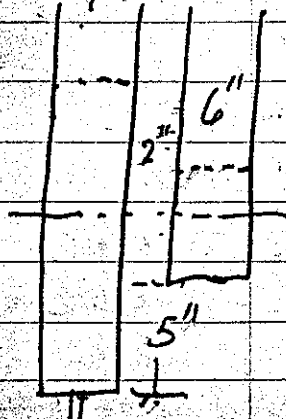
zero cyl
 ~ 5" below
 slab.

Expt. 124 Time 8:45 AM PM Date 3-14 1957
 Purpose C.C. 1-6" slab 1/8 1-10
AL cyl sep 2"
 Personnel: LWG, J.F see below

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

DC-2 - 75x200
 DC-3 - 60x1000
 PN Trip
 LN " "
 RI " "
 R2 resp.

$H/\bar{x} = 250$
 \bar{x} in slab
 10" cyl slab



5" slab ht
 $11.29 \left\{ \begin{array}{l} 11.28'' \text{ sub} \\ 11.30'' \text{ sup} \end{array} \right.$
 $CH 28.7 \text{ cm}$
 $CV_1 = 5.22$
 $CM_1 = 5.28 \text{ kgx}$

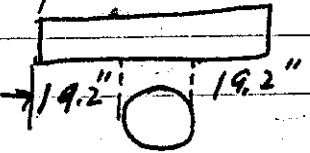
10" cyl ht
 $19.51''$ crit.
 49.4 cm
 $CV_2 = 2.515$
 $CM_2 = 1.97 \text{ kg}$

cyl
 6.45
 6" s
 10
 30
 Be
 5
 6" s

Cyl. zero
6.5" below
6.45 slab.

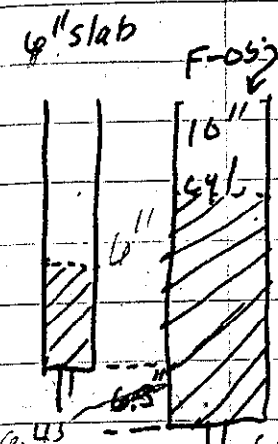
Expr. 125 Time 10:20 AM Date 3-14 1957
 Purpose C.C. same as above
except separation 10"
 Personnel: L.W.G. G.L. J.F.

Cyl. centered!



START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date 195

266
13.2
213.4
6.7



slab fuel ht
13.20" sub.
13.22" crit

10" cyl. fuel ht.

26.61" crit

CH = 33.6 cm
 $\frac{H}{x} = 254$
 $CV_1 = 61.2$
 $CM_1 = 6.19$ kg

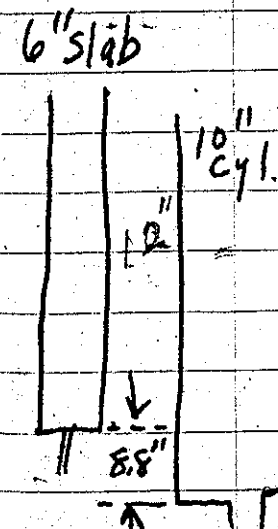
CH = 67.4 cm
 $\frac{H}{x} = 328$
 $CV_2 = 34.3$
 $CM_2 = 2.69$ kg

10" cyl
zero 8.8"
Below
slab.

Expr. 126 Time 2:15 PM Date 3-14 1957
 Purpose same as above
except separation 12"
 Personnel: L.W.G., J.F.

Centered as
above

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date 195



slab fuel ht
15.48" ✓

10" cyl fuel ht

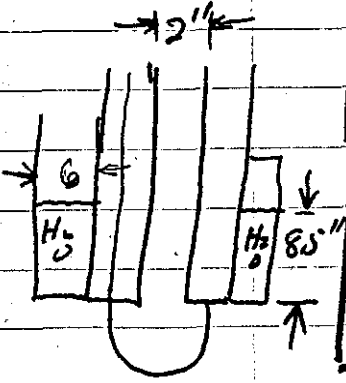
32.69" crit

39.3 cm
 $\frac{H}{x} = 254$
 $CV_1 = 71.5$
 $CM_1 = 7.73$

CH = 83.8 cm
 $\frac{H}{x} = 328$
 $CV_2 = 42.5$
 $CM_2 = 3.34$

1- 6" mock-up with 2-3" slabs
 Total A = $1820 + 2 \times 920 = 3640$

$H/\lambda \approx 254$



Expt. <u>127</u>	Time <u>9:12</u> AM	Date <u>3-25-1957</u>
Purpose <u>C.C. 2-6" slabs ref.</u>		
<u>on back side sep. 2"</u>		
Personnel: <u>L.W.G. - C.C. - J.F.</u>		

DC-2-70X200
 DC-3 Trips
 R-1 resp.
 R-2 "
 LN Trips
 PM Trips

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	124
Red Light <input checked="" type="checkbox"/>	
Start Up OK'd by <input checked="" type="checkbox"/>	AM Date _____ 1957

Fuel ht 7.97" water ht ~ 8.5"

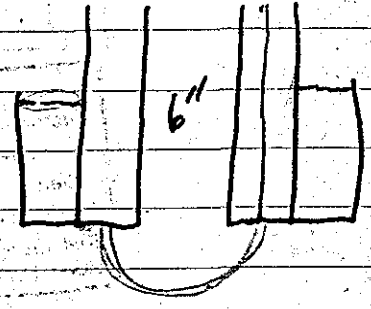
inst in

Lowered H₂O " 7.94" water ht. 8.1 crit

No apparent reason for 2nd reading not being higher.

com. C.H. = 20.2 cm. CV = ~~55.8~~ 73.9 l CM = ~~5.64~~ 7.47 kg

Expt. <u>128</u>	Time <u>2:50</u>	Date <u>3-25-1957</u>
Purpose <u>same as above except</u>		
<u>sep. now 6"</u>		
Personnel: <u>L.W.G. J.F.</u>		



START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	124
Emergency Equipment in Control Room Checked by <input checked="" type="checkbox"/>	
Red Light <input checked="" type="checkbox"/>	AM
Start Up OK'd by <input checked="" type="checkbox"/>	PM Date _____ 1957

Fuel ht ~~9.15~~ " Heo Ht. ~ 9.5" crit
 9.15"
 9.19 ~ 9.2

C.C.H. = 23.3 cm CM = ~~6.50~~ 8.61
 CV = ~~64.3~~ 85.2

Expr. 129 Time 8:40 AM Date 3-26-1957
 Purpose Same as above except
Sep. 12"
 Personnel: LWG C.C. JF

DC-2 - 75x200
 DC-3 - 58x1000
 LN - Trips
 PM - "
 R-1 "
 R-2 resp.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

probably air
 in line →

Fuel ht. H₂O ht
 10.26" ~ 10.5"
 10.05 ?? ~ 10.25" crit
 Repeat -
 10.08 ~ 10.1" crit

CH = 25.6 am CV = 93.7 CM = 9.47

Expr. 130 Time 11:45 AM Date 3/26-1957
 Purpose Same as above except
Sep. now 24"
 Personnel: Fox, Gilley

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by Source No. _____
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

Fuel ht. H₂O ht
 10.81 ~ 11.1" crit
 ~ 10.8~~80~~ for H₂O at 10.8
 86

CH = 27.4 CV = 101.0 P CM = 10.21

Expr. 131 Time 2:40 ^{AM} PM Date 3-26 1957
 Purpose same as above except separation 40"
 Personnel: LWG, C.C., JF

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start Up OK'd by _____ PM Date _____ 1957

Fuel ht 11.18" H₂O ht 11.65" crit
11.23 " "

CH = 28.5 cm CV = 104.3 CM = 10.54

Expr. 132 Time 9:00 ^{AM} PM Date 3-27 1957
 Purpose C.C. for 1-6" stab left on one side
 Personnel: RG, LWG, JF

DC-2 - 75x200
 DC-3 - 38x100
 LN Trips
 PM "
 R-1 "
 R-2 resp

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start Up OK'd by _____ PM Date _____ 1957

Fuel ht 11.38" H₂O ht 12.25" crit
11.44 " "

CH = 29.1 CV = 53.0 CM = 5.36

note from manifold: 3-27-57

201

Reg. 354859

Hydrogen sp. gr. from manifold:

67.30
19.80

1.129 at 73°F

47.50 g/m net.

4.58 gm

||

SP. gr. at H/x = 328:

1.101 at ~73°F

0.09646 gm U/gm ✓

50.91, 1.124 ✓

0.08990 gm X/gm

gm X / cm³ = 0.1011 ✓

1.000

1.125 gm UO₂F₂/g

1.875

$$H/x = \frac{26.11 \times 875}{0.899} = 254$$

Expr. 133	Time 9:00	Date 3-28-1957
Purpose C.C. Single	6" slab	
Bare		
Personnel: R.G., J.F., C.C.		
START-UP CHECK LIST		
Equipment Checked by ✓	Personal Check by ✓	
Instrument and Safety checked and Rec'd by ✓		
"Source In" Checked by ✓	Source No. 12F	
Emergency Equipment in Control Room Checked by ✓		
Red Light On by ✓	AM	
Start-Up OK'd by ✓	Time	PM Date 1957

DC-2- 75X200

DC-3- 55X1000

PM Trips

IN "

R-1 resp.

R-2 "

Fuel ht.

$$H/x = 254$$

23.11"
23.09
~~23.09~~
23.108

super crit
just crit
mo.

CH = 58.6 cm
Correction $\frac{.4}{58.6} = 0.0068$
59.0

$$CV = \frac{106.7}{105.9} = 1.007, \quad CM = \frac{10.8}{10.79} = 1.009$$

Water added to system to Adjust H/x to ~ 328

Provision
4-14-75

H/X
C. H
337 53.8"
333 51.75"
328 46.75"

Expr. 133A	Time	AM	Date 3-29	1957
Purpose 6" slide bore to check on conc. & mixing				
Personnel: LWG R G				

DC2 - 70x200
DC3 - 55x100
LN TRIPS
PM "
R-1 "
R-2 resp.

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by <input checked="" type="checkbox"/>	
Source In Checked by <input checked="" type="checkbox"/>	124
Emergency Equipment Checked by <input checked="" type="checkbox"/>	
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by <input checked="" type="checkbox"/>	Date 1957

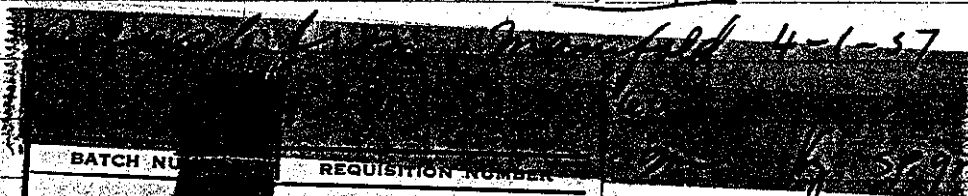
(Probably not used)
mixed
H/X indicator C.H. lower

7 mel ht

47.86

just crit

omit



BATCH NO.	REQUISITION NUMBER
REPORT TO: 70X	
BUILDING NO. 213	
DESCRIPTION: 70X	MATERIAL: pure UO2F2
08.7m/cm³	
IF NO. 209	COMPOSITED
ASSAY RE...	AT CODE NO.
ANAL...	REPORTED ANSWERS
GRAM/G...	0.077920
	1.0985
SIGNED:	DATE

4-1-57
1.100 - 73°F
gm net
9m → 0.0723 gm x 9m
10000
1007
8993
18995
895 = *325*
234

* Applying approx. imp. correction based on 13000 P.P.M.

H/X = 326

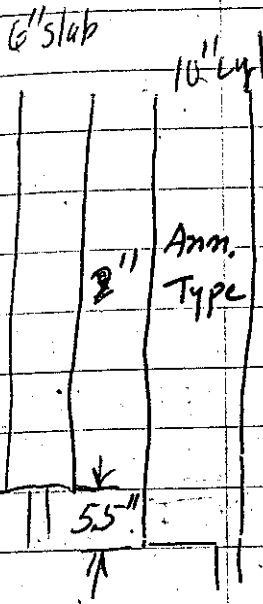
-203

Expr. 124A 10³⁰ 4-1- 1957
 Purpose Same as Expt 124 except
Sol'n in manifold 930 325 Bare out
 Personnel: LWG J.F.

DC-2 - 70X200
 DC-3 TRIPS
 LN "
 PM "
 R-1 resp
 R-2 "
 29.84
 4.92

START-UP CHECK LIST

Equipment Checked by _____ Check by ✓
 Instrument and Safety Checked and Reset by ✓
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM _____ PM _____
 Start-Up OK'd by ✓ Time _____ PM Date _____ 1957

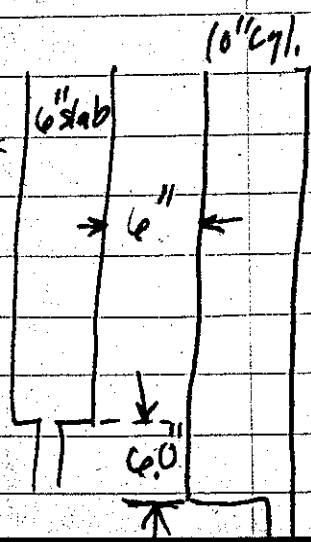


Fuel ht in slab 11.13" Fuel ht in 10" cyl 20.97 crit
28.3 cm 53.3 cm
 CV₁ = 51.5 CV₂ = 27.0 Total Vol. = 78.5
~~CM = 6.22~~ CM = 6.22

Expr. 125A Time 140 AM PM Date 4-1- 1957
 Purpose Same as Expt 125 except
6" slab now at 26.5
 Personnel: LWG J.F.

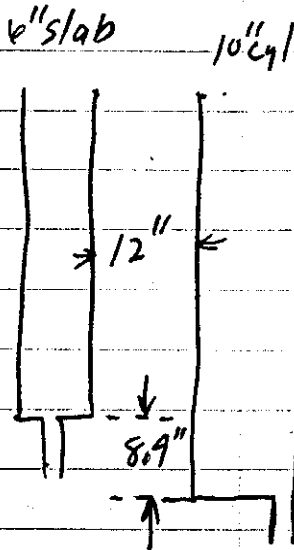
START-UP CHECK LIST

Equipment Checked by _____ Personnel Check by ✓
 Instrument and Safety Checked and Reset by ✓
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ AM _____ PM _____
 Start-Up OK'd by _____ Time _____ PM Date _____ 1957



Fuel ht in slab 13.45" Fuel ht in 10" cyl 26.63" crit
34.2 cm 67.6
 CV₁ = 62.2 CV₂ = 34.3 Total CV = 96.5
 CM = 7.64

Expt. 126A Time 3:50 PM Date 4-1-1957
 Purpose same as Expt. 124, except slab soln at ~ 350 324
 Personnel: LWG J.F.



START-UP CHECK LIST

Equipment Checked by Done by
 Instrument and SOURCE Checked and
 "Source In" Checked by
 Emergency Equipment 124
 Red Light On by
 Start-Up OK'd by 195

.94 1.73

.24 = 1.93

Fuel ht = 6" slab Fuel ht = 10" cyl.
 zero off: { 15.51 15.40 33.45 crit
 Readings { 14.45 14.34 31.78 80%
 0.11" too high
 Report 15.40" & 33.45" - finally reported both
 39.1 cm & 85.0 cm - valid
 From above reports: Not safe to use interpolated
 39.8 cm = 15.74 to equiv to 33.0 = 85.8 cm in cyl.
 with only 2-pts.
 $CV_1 = 72.4$ $CM = 9.10$ $CV_2 = 42.5$ Total CV = ~~114.9~~

For checking hydrometer:

Reg 354861

92.67
 20.25
 72.42

Reg 354862

82.55
 20.34
 62.21

$CV_1 = 71.2$
 $CV_2 = \frac{93.1}{114.3}$
 $CM = 9.05$

Hydro. sp. gr. 1.282 at ~ 73°F

1.895 gm/gm ✓

1.264 ✓

13.7 gm

1.181 H. sp. gr.

1.314 gm/gm ✓

1.164 ✓

8.19 gm

Expr. 134 Time 4-3 AM Date 1957
 Purpose C.C. 2-10" cyls at 1/4" separation 9"
 Personnel: C.C., L.W.G., J.F.

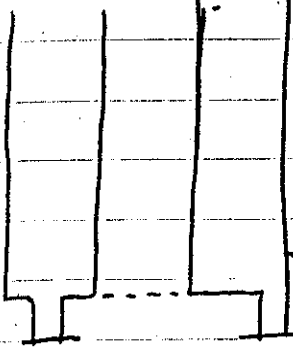
Insts checked
 DC-2 - 85 x 100
 DC-3 - 50 x 100

START-UP CHECK LIST
 Equipment Checked by Checked by
 Instrument and Safety
 "Source Int'l" checked No. 124
 Emergency Equipment checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

← fed from 3" slab at ~ 330

Fo 5

Ann. Type



Fuel ht (Fos) Fuel ht (An.T.)
 29.98" 29.98" crit
 CH = 76.1 cm CV = 77.2 l
 CM = 6.11 kg

Expr. 135 Time _____ AM Date 4-3 1957
 Purpose Same as above except separation 3"
 Personnel: C.C., L.W.G., J.F.

Fuel ht #1 Fuel ht #2
 23.05" 23.00" crit
 CH = 58.4 cm CV = 59.2 l
 CM = 4.69

back d.v.

l

Expr. 136 Time 8:30 AM Date 4-5-1957
 Purpose C.C. 2-10" Cyls 1 in
Contact (~1/4") at ~330
 Personnel: LWG JF

DC-2 - 80X200
 DC-3 - 58X1000

LN TRIPS

PM "

R-1 resp

R-2 "

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safety checked and Ready by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195

Fuel ht (Fos)

16.80"

Fuel ht (Am. Type)

16.80" crit

CH = 42.7 am CV = 43.3 CM = 343

used outside manifold, H/x

H/x = 85.7

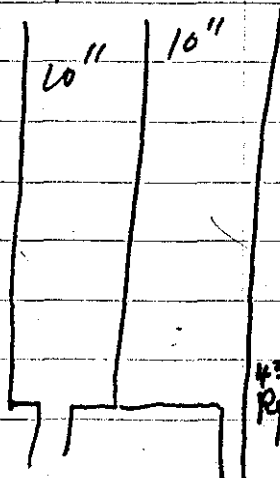
Expr. 137 Time 3:20 AM Date 4-5-1957
 Purpose C.C. 2-10" Cyls at ~ H/x
in Contact (~1/4")
 Personnel: C.C. LWG J.F.

H/x = 85.7
 2905

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safety checked and Ready by
 "Source In" Checked by _____ Source No. _____
 Emergency Equipment in Control Room Checked by _____
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195

Fos Am.T.



Fuel ht

10.02"

Rock ht

22.06

crit

common crit. ht.

10.04

22.07

25.5 am

CV = 25.9 l

CM = ~~2.5~~ 7.52

4:20 Report

$H/x = 85.7$

-207

Expr. 138 Time 9:30 AM Date 4-6-1957
 Purpose Same as 137 except separation 3"
 Personnel: LWG JF

DC-2-70x200
 DC-3-55 x1000

START-UP CHECK LIST
 Equipment Checked by _____ Personnel Check by
 Instrument and Safety Labels and _____
 *Source label applied to _____ Source No. 124
 Emergency _____ checked by _____
 Red Light _____
 Start Up OK'd by Time _____ AM
 PM Date _____ 195

LN Trips
 PM "
 R-1 resp
 R-2 resp.

Fuel ht Rock ht.
11.44" 25.11" Critical
 CH = 29.1 cm CV = 29.5 l
 CM = ~~2.57~~ 8.57

Expr. 139 Time 9:40 AM Date 4-6-1957
 Purpose Same as above except separation 6"
 Personnel: LWG JF

Fuel ht Rock ht
12.18" 26.40 Crit.
 30.9 cm CV = 31.3 l
 CM = ~~2.18~~ 9.09 kg

$$H/x = 85.7$$

Expr.	140	Time	10 ³⁰ AM	Date	4/6 - 1957
Purpose	Same as above except spacing 12-11				
Personnel:	LWCF	J.P.			

Fuel ht Nocht
 12.72" 2.756 crit.

$$32.3 \text{ cm}$$

$$C.V = 32.7 \text{ l} \quad (32.3 \times 1.014)$$

$$CM = .2905 \times 32.7 = 9.50 \text{ kg.}$$

Expr.	141	Time	AM	Date	1957
Purpose	Single 10" cyl. at $H/x = 83$ 85.7 F-OS cyl.				
Personnel:	LWCF	J.P.			

Fuel ht Nocht
 13.22 \approx 33.54
 9.3
 40
 Cor. C.H. 34.9 cm 21.4 uncorrected
 data.
 C.V = 17.7 (34.9 x 507) C.V = 17.0
 C.M = 5.14 kg. C.M = 4.94

H/x = 83
 H/x = 85.7

4/5/57 Sample taken from pitfold at nominal 330 W/x

Gross 86.6220 Reg. # 354870 * .07223
 22.2410 ✓ .07780 gmU/gm - .07223 gmU/gm
 5.00 gm 64.3810 Cl. 0965 @ 25°
 * - ~~.0755~~ gmU/gm = .0775
 Specific gravity taken by hydrometer = 1.100

4/5/57 Sample taken from 3" slab

Gross 50.0659 Reg. # 354869
 6.88 gm Tare 20.1966
 29.869
 Specific gravity taken by hydrometer = 1.363
 Anal. ✓ 0.23028 gmU/gm 2146 gmX/gm
 Sp. gr. ✓ 1.3595 at 25°C
 * - .2293 gmU/gm - .2137 gmX/gm

Ref 354870:

$$* \frac{H}{X} = \frac{26.11 \times .899}{.07223} = \frac{23.4}{.07223}$$

1.000	1.000
2010	1.000
8990	1.000
	1.000
	8990

H/x for Expts 137-141:

Reg. 354869

$$* \frac{H}{X} = \frac{26.11 \times .702}{.2137} = \frac{857}{.2137}$$

1.000	1.000
2989	1.000
7020	1.000

H/x 326 - * - .0792 gmX/cm³

H/x = 857 - * - .2905 gmX/cm³

* applying purity correction - on basis of 2 spec. on slabs sample

210 326
 $H/X = 324$

Expr. 142 Time 10:20 AM Date 4/16/1957
 Purpose C.C. 2" Dia. cyl. Bare
 outside for period
 Personnel: L.W.G. R.G. J.F.

DC-2-75X200
 DC-3-60X1000
 LN TRIPS
 PM "
 R-1 resp.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by _____ PM Date _____ 195

Crit ht.

$7.22^* \approx 18.3 \text{ cm.}$
 Bot. cor $\frac{14}{18.7}$

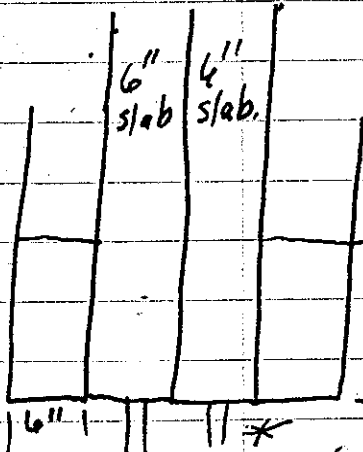
$C.V. = 2027 \times 18.7 = 379.300$
 $C.M. = 379 \times 0.799 = 2.97 \text{ kg}$

$H/X = 326$
 $H/X = 330$

Expr. 143 Time 9:00 AM Date 4/22/1957
 Purpose C.C. 2-6" slabs refl.
 on back at 2" separation
 Personnel: L.W.G. J.F.

85X200-DC-2
 35X1000-DC-3
 LN TRIPS
 PM "
 I-R resp.

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195



7.98 crit ht.

8.60"

critical

$C.H. = 21.8 \text{ cm}$
 $C.V. = 21.8 \times \frac{3.640}{3.840} = 7.98 \text{ l.}$
 $C.M. = \frac{83.7}{73.8} \times \frac{0.799}{0.792} = 6.56 \text{ kg.}$

8.5" H=0 - slightly above 8.5" on each side

Subtract 0.03" for zero correction

H/X = 324

Expr. 144 1105 - 4/22 / 1957
 Purpose same as above
except separation 6"
 Personnel: L.W.G. J.F.

START-UP CHECK LIST

Equipment Checked by ✓
 Instrument and Safeties Checked and OK'd by ✓
 "Source In" Checked by ✓
 Emergency Equipment in Control Room Checked by 124
 Red Light On by ✓
 Start-Up OK'd by ✓ Time AM
 Date 195

Fuelht 10.07" H₂O ht 9.8" crit.
10.04" 10.0

$C.H. = 25.5 \text{ cm}$ $C.V. = 25.5 \times 3.640 = 93.3$
 $C.M. = 93.3 \times 0.784 = 73.3$
 ~~$C.V. = 25.5 \times 3.840 = 97.9$~~
 ~~$C.M. = 97.9 \times 0.784 = 76.7$~~

Expr. 145 Time 100 Date 4/22/1957
 Purpose same as above
spacing 12"
 Personnel: L.W.G. J.F.

Fuelht 11.15" H₂O ht 11.13" crit

$C.H. = 28.3 \text{ cm}$ $C.V. = 28.3 \times 3.640 = 104$
 $C.M. = 104 \times 0.784 = 81.5$
 ~~$C.V. = 28.3 \times 3.640 = 103.6$~~
 ~~$C.M. = 103.6 \times 0.784 = 81.2$~~

Expr.	146	Time	2 ³⁰ AM	Date	4/22/1957
Purpose	Same as above except spacing 24"				
Personnel:	LWG C.C. J.F.				

$$H/A = 326$$

Fuel ht H₂O ht
12.18 12.25"

$$C.H = 30.9 \text{ cm}$$

$$C.V = 30.9 \times 3660 = 112,513$$

$$C.M = 112,513 \times 0.0784 = 8828.88 \approx 895$$

Expr.	147	Time	3 ³⁰	Date	4/22/1957
Purpose	Single 6" slab refl				
	One on side				
Personnel:	LWG J.F.				

Fuel ht. H₂O ht
13.07 13.25" cont

Estimate 13.40 for 13.10

$$C.H = 33.3 \text{ cm}$$

$$C.V = 33.3 \times 1820 = 606$$

$$C.M = 606 \times 0.0792 = 475 \approx 480$$

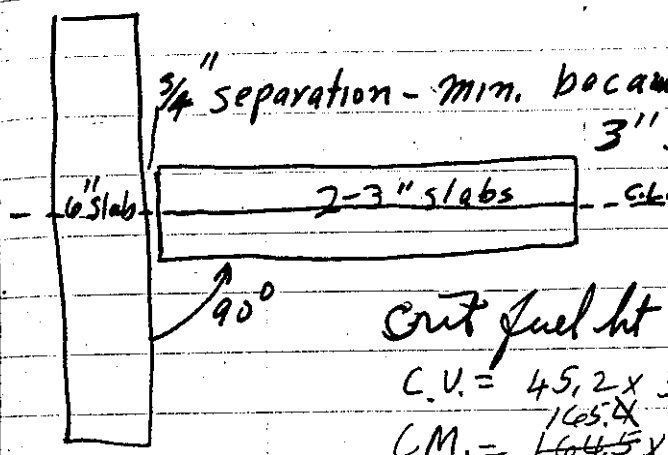
See Palm book #2 page 22 Expt 7A
6" slab refl. by concrete wall C.H = 12.76"

Expr. 148 Time 2:10 AM Date 4/23/1957
 Purpose C.C. 2-6" slabs in a T-shaped Array Bare separation
 Personnel: C.C. LWGT JF

Sol'n Inventory
 ~ 165 km 171
 Storage Tanks

$1,684/165 = 277.87$
 $\frac{6}{283.9}$
 $\frac{29}{312}$
 DV: $\frac{12}{300}$

START-UP CHECK LIST
 Equipment Checked by _____
 Instrument and Safeties Checked and Rec'd by _____
 "Source In" Checked by _____
 Emergency Equipment _____
 Red Light _____
 Start-Up OK'd by _____ AM _____ PM Date _____ 195____



Cut fuel ht - $17.81'' = 45.2 \text{ cm}$
 $C.V. = 45.2 \times 3.660 = 164.5 \text{ kg}$
 $C.M. = 164.5 \times 0.784 = 12.90 \text{ kg} \rightarrow 13.1$

All slabs now with same zero.

Expr. 149 Time 3:20 AM Date 4/23/1957
 Purpose Same as above except 3" separation
 Personnel: LWGT JF

Cut fuel ht - $21.17'' = 53.8 \text{ cm}$
 $C.V. = 53.8 \times 3.660 = 196.9 \text{ kg}$
 $C.M. = 196.9 \times 0.784 = 15.44 \text{ kg} \rightarrow 15.6$

Expt. 150 Time 948 M Date 4/24/1957
 Purpose Same as above except d = 9"
 Personnel: LWG J.F.

DC-2-80x200
 DC-3-55x1000
 P-1 resp.
 PM TRIPS
 LN TI

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safety checked and ✓
 Source in ✓ 124
 Emergency ✓ Room checked by ✓
 Red light on by ✓ AM ✓
 Start-Up OK'd by ✓ Date 4/24/1957 PM Date 1957

Crit fuel ht — 26.54" = 67.4 cm.

$C.V. = 67.4 \times 3.660 = 246.6$
 245.3

4/24/57

$C.M = \frac{246.6}{245.3} \times .0792 = 19.6$

Reg 354871 Sample from P. Bottle at ~ 329 H/x

filed 7.60
 20.0
 51.0 gm net

H. sp gr = 1.098 at 75°F

$\rho_m U / \rho_m = \sqrt{.07652}$
 $\rho_{sp} = 1.0961$ at 25°C
 * Total imp = 3500

Reg 354872 Sample from Manifold

filed 78.3
 20.0
 58.3

H. sp. gr = 1.099 at 75°F

$\rho_m U / \rho_m = \sqrt{.0772}$
 $\rho_{sp} = 1.0968$ at 25°C
 * Total imp. 1800

incl. imp. in total salt calc

P.B $\frac{H}{X} = \frac{26.11 \times .8992}{.0713} = 329$

Man $\frac{H}{X} = \frac{26.11 \times .8996}{.0719} = 327$

* 2 spec. samples reversed (probably)

Expt. 151	Time 1:25 PM	Date 4/24/1957
Purpose Same as above except d = 20.0"		
Personnel: LWA J.F.		

32.51" out of calm. sub-crit. ~~5.10~~
 required for crit
omit

Expt. 152	Time 2:45 PM	Date 4/24/1957
Purpose Same as above except d = 18.0"		
Personnel: LWA J.F.		

At 32.50 very slightly sub-crit. certainly within
 D.1"; C.H = 32.6" = 82.8 cm

$$C.V. = 82.8 \times 3.660 = 301.4 \text{ l}$$

$$C.M. = 301.4 \times \frac{0.0792}{0.0784} = \frac{23.43}{24.0} = 23.76 \text{ } \rightarrow 23.8$$

→ Since there is some question about
 the 2nd manifold sample (Req. 35487.2) use
 result of req. 35487.0 $H_x = 326$

Using revised imp. correction

$$\text{Man } H_x = \frac{26.11 \times 9.0045}{0.07148} = 329$$

216

Expr. 153 Time 8:38 AM Date 4/25/1957
 Purpose C.C. 1-6" slab & 1-3" slab
 in T-shape d=18.0"
 Personnel: LWG J.F.

DC-2 - 80x200
 DC-3 - 56x1000
 R-1 resp.
 LN Trips
 PM "

6" slab



3" slab →

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 Source In' checked by _____ Source No. 124
 Emergency Equipment Control Room checked by
 Red Light On by AM
 Start Up OK'd by Time _____ PM Date _____ 195

crit. fuel ht. $41.60'' = 105.7 \text{ cm.}$
 $C.V. = 105.7 \times 2.740 = 289.6 \text{ l}$
 $C.M. = \frac{289.6}{290} \times 0.784 = 22.78 \text{ 23.0}$

Expr. 154 Time 10:20 AM Date 4/25/1957
 Purpose C.C. same as above
 except d=9"
 Personnel: LWG J.F.

crit fuel ht. $37.36'' = 94.9 \text{ cm}$
 $C.V. = 94.9 \times 2.740 = 260.0 \text{ l}$
 $C.M. = 260.0 \times \frac{0.792}{0.784} = 20.6 \text{ kg}$

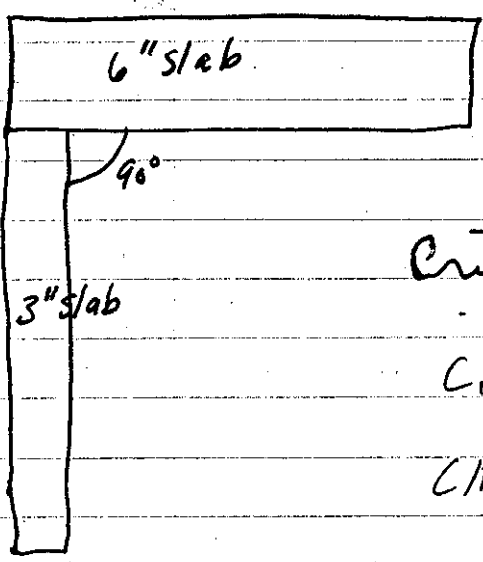
Expr. 155 Time 12:45 PM Date 4/25/1957
 Purpose Same as above except
 d = 3"
 Personnel: L.W.G. J.F.

Critical fuel ht = $31.23'' = 79.3 \text{ cm}$

$CV = 79.3 \times 2.740 = 217.2 \text{ p}$

$CM = 217.2 \times \frac{0.0784}{0.0792} = 17.2 \text{ kg}$

Expr. 156 Time 7:25 AM Date 4/25/1957
 Purpose C.C. for 1-6" slab & 1-3" slab
 in L shape d = 0
 Personnel: L.W.G. J.F.



Critical fuel ht = $38.55'' = 97.9 \text{ cm}$

$CV = 97.9 \times 2.740 = 268.2 \text{ p}$

$CM = 268.2 \times \frac{0.0792}{0.0784} = 21.2 \text{ kg}$

Expr. 157 ³³⁰ — 4/25/1957
 Purpose Same as above
 except d = 6"
 Personnel: LW G J, F

crit fuel ht. 40.31" = 102.4 cm.

$$C.V = 102.4 \times 2.740 = 280.6 \text{ l}$$

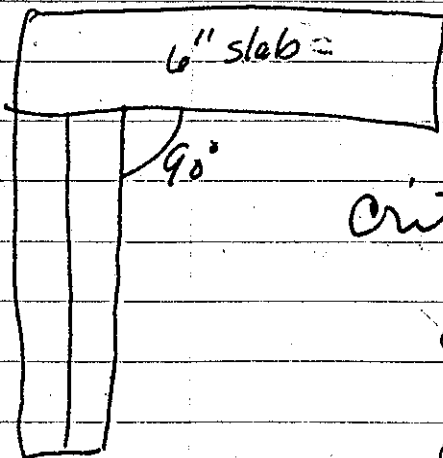
$$C.M. = \frac{280.6 \times .6792}{2.81} = \frac{22.3}{2.81} = 7.94$$

Expr. 158 Time 8⁵⁰ AM Date 4/26/1957
 Purpose C.C. 2-6" slabs in L-shape
 d = 0
 Personnel: LW G C.C. JF

START-UP CHECK LIST

Equipment Checked by Instrument and Safety
 Source in Emergency
 Red Light Start-Up OK'd by Date 1957

DC2 - 95/200
 DC3 - 55/1000
 LN TRIPS
 PM 11
 R-1 RESP.

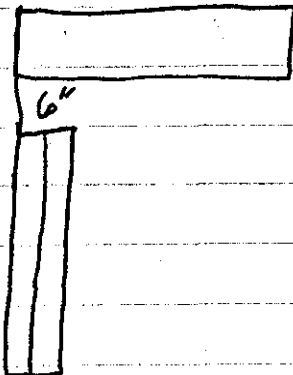


critical fuel ht = 22.40" = 56.9 cm

$$C.V = 56.9 \times 3.640 = \frac{208.2}{2.81} \text{ l}$$

$$C.M. = \frac{208.2 \times .0792}{16.3} = \frac{16.5}{16.3} \text{ hg}$$

Expt. 159	Time 10 ⁰⁵	Date 4/26/1957
Purpose same as above except		
d = 6"		
Personnel: LWG JF		



Critical Fuel ht 28.07" = 71.3 cm

$$C.V. = 71.3 \times 3.660 = \overset{261}{\cancel{259.5}}$$

$$C.M. = \overset{261}{\cancel{259.5}} \times \overset{0.792}{\cancel{0.784}} = \overset{20.4}{\cancel{20.14}} \rightarrow 20.5$$

Expt. 160	Time 10	Date 4/26/1957
Purpose same as above except		
d = 11.0"		
Personnel: LWG JF		

crit fuel ht = 30.17" = 76.4 cm

$$C.V. = 76.4 \times 3.660 = \overset{280}{\cancel{278.8}}$$

$$C.M. = \overset{280}{\cancel{278.8}} \times \overset{0.792}{\cancel{0.784}} = \overset{22.0}{\cancel{21.95}} \rightarrow 22.2$$

Expr	161	Time	2:30 PM	Date	4/26/1957
Purpose	C.C.	Same as	159		
	Above except d = 180"				
Personnel:	LWG	JF			

Out of calm at 32.40" not cut - high m' omit

Expr	159A	Time	8:45 AM	Date	4/29/1957
Purpose	C.C.	Same as	159		
	* Repeat				
Personnel:	LWG	C.C.	JF		

PC-2 - 854200

PC-3 55X1000

PM Trips

LN "

R-1 "

START-UP CHECK LIST	
Equipment Checked by	✓
Instrument and Safety checked and	✓
Source in the checked	124
Emergency equipment checked	
Red light checked	✓
Start Up OK'd by	✓
Date	1957

crit fuel lit. 28.03 = 71.2 a

$$CV = 71.2 \times 3.660 = \overset{261}{259.2} \text{ l}$$

$$CM = \overset{261}{259.2} \times \overset{0.792}{0.784} = \overset{20.5}{20.32} = 20.17$$

* Probably to check on effect of added fuel

Expt.	162	Date	4/29/1957
Purpose	Same as Expt 161 except d = 14"		
Personnel	LWG C.C. J.F.		

31.40" slightly super
31.34 " just crit
C.H. = 79.4 cm 291

$$C.V. = 79.4 \times 3.660 = 289.7$$

$$C.M. = 289.7 \times \frac{.0792}{.0784} = 22.71 \quad \text{22.8} \quad 23.0$$

added fuel to system at same density

Expt.	163	Time	8:40 AM	Date	4/30/1957
Purpose	C.C. Same as above except d = 22.0"				
Personnel	C.C. LWG J.F.				
START-UP CHECK LIST					
Equipment Checked by	<input checked="" type="checkbox"/>	Checked by	<input checked="" type="checkbox"/>		
Instrument and Safety	<input checked="" type="checkbox"/>	checked and	<input checked="" type="checkbox"/>		
Source in		Source No.	124		
Emergency		Hours checked by			
Red Light	<input checked="" type="checkbox"/>	AM			
Start-Up O.K'd by	<input checked="" type="checkbox"/>	Time		PM	Date 195

DC-2-1084200
DC-3-58X1000

LN Trips
PM "
R-1 "

Fuel ht - 33.47" slightly super
33.27 " " crit
crit 33.3" = 84.6 cm.

$$C.V. = 84.6 \times 3.660 = 307.9 \quad 310$$

$$C.M. = 307.9 \times \frac{.0792}{.0784} = 24.14 \quad 24.3 \quad 24.6$$

164

Expr. 1022	Time 1022 AM	Date 4/30/1957
Purpose same as above		
except d = 30"		
Personnel: L.W.G. J.F.		

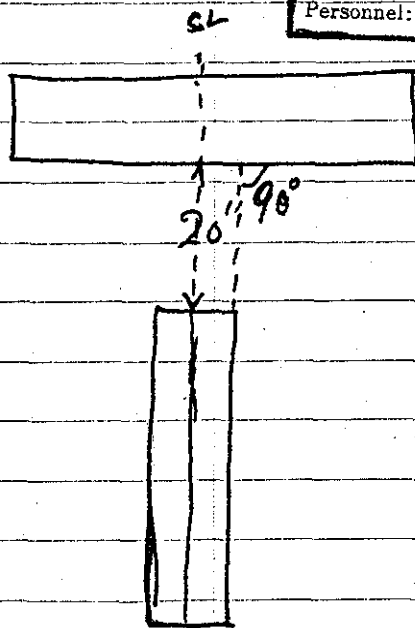
out of hole at 34.3" not cut
 indication from removal of source
 that cut ht would be ~ 35"

Est. 35-37" ≈ 89-94 cm

CV ≈ 91 × 3.660 ≈ 330

CM ≈ 330 × $\frac{0.784}{0.792}$ ≈ 26 kg

Expr. 151A	Time 115 PM	Date 4/30/1957
Purpose C.C. 2-6" slabs 1 in		
T-shape, d = 20"		
Personnel:		



cut fuel ht. 33.11" = 84.1 cm.

CV = 84.1 × 3.660 = 308

CM = 308 × $\frac{0.782}{0.784}$ = 24.4

See Sahn Book #2 page 54 for single 6" slab C.H.

5-15-57 W.T.M. done

H/X = 326

Expt. 165	300	4/30/1957
Purpose Same as above		
except d = 24"		
Personnel: LWT, CC, JF		

out fuel ht. 34.58" = 87.8cm

CV = 87.8 x 3660 = 319.4

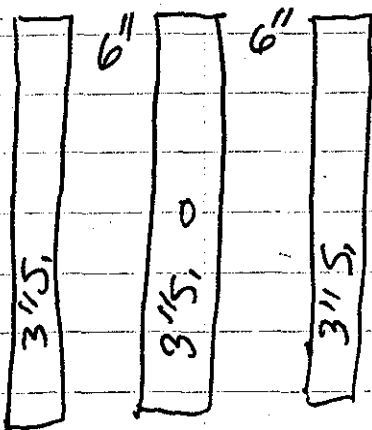
CM = 319.4 x .0792 = 25.4

H/X = 326

Expt. 166	Time 1222 PM	Date 5/17/1957
Purpose C.C. 3-3" Slabs Bare		
outside sep. 6"		
Personnel: CC, LWT, JF		

DX-2 - 280x200
 DX-3 - 35x1000
 R-1 Trips
 PM "
 LN "

START UP CHECK LIST	
Equipment Checked by	Personnel check by
Instrument and S	checked and zero
Source In	checked
Emergency	checked
Red Light	checked
Start-Up OK	checked
	Date 1957

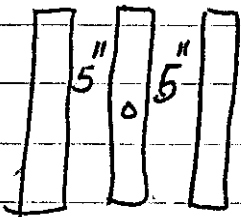


44.39 out of saln - not crit
M-1 moderate

omit data

224

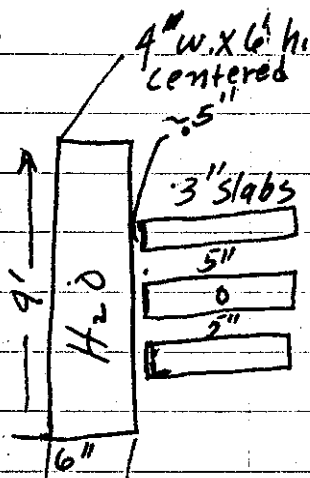
Expr. 167	Time 2:10	PM Date 5/17/1957
Purpose C.C. 3-3" slabs Bare outside		
Sep. 5"		
Personnel: LWG, J.F.		



crit. fuel ht $37.12'' = 94.3 \text{ cm}$

$$C.V. = 94.3 \times 2.740 = 260.3$$

$$C.M. = 260.3 \times 0.792 = 20.4 + 20.4$$



Expr. 168	Time 3:50	PM Date 5/17/1957
Purpose Same as above except		
6" slab H ₂ O added across end		
d = 2.5" on av. because of bulging of the tank		
Personnel: LWG, J.F.		

6" slab H₂O approx. center Hor. & Vert.
d - in contact at 2-points

crit fuel ht. $33.69'' = 85.6 \text{ cm}$

room temp 23°C

$$C.V. = 85.6 \times 2.740 = 234.3$$

$$C.M. = 234.3 \times 0.792 = 18.5 \text{ kg}$$

H/x = 324

-225

Expr.	169	Time	9:00 AM	Date	5/20/1957
Purpose	Same as above except H ₂ O slab moved back to ~125"				
Personnel:	C C LWG, J.F.				

DC-2 - 75X200
DC-3 - 55X1000

PM TRIPS

LN " "
R-1 " "

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and	<input checked="" type="checkbox"/>
"Source In" Checked by	<input checked="" type="checkbox"/>
Emergency Equipment in	No. 124
Red Light On by	<input checked="" type="checkbox"/>
Start-Up OK'd by	<input checked="" type="checkbox"/>
195	

crit fuel ht. 36.38" = 92.4 cm.

CV = 92.4 x 2.760 = 255.0 l

CM = 255.0 x ^{0.792}0.784 = ~~20.55~~ 20.2

Expr.	170	Time	10:00 AM	Date	5/20/1957
Purpose	Same as above except H ₂ O slab at ~24"				
Personnel:	LWG, J.F.				

crit fuel ht 36.84 = 93.6 cm.

CV = 93.6 x 2.760 = 258.1 l

CM = 258.1 x ^{0.792}0.784 = ~~20.25~~ 20.4

(soln change)

226

$H/X = \sim 14$ in block stack

$H/X = \sim 50$ in slab.

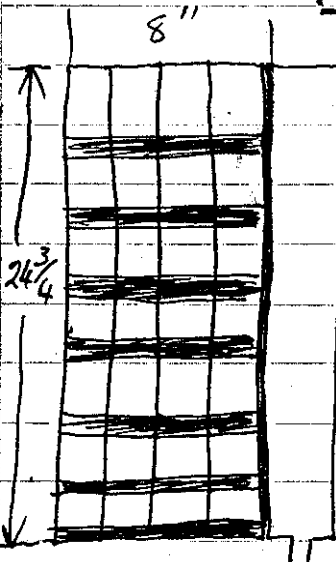
1 enriched to
1 depleted ratio
Av. Assay = 18.8

3/4 Plastic between
horiz. Layers only
9-layers of
blocks

Expt. 171	Time 902 AM	PM Date 7/19/1967
Purpose Interaction between blocks		
8.3" soln. slab		
Personnel: LWG, J.R., J.F.		

DC-2 - 25X200
X-3 ~ 50X1000
P-1 resp.
LN TRIPS
PM "

START-UP CHECK LIST	
Equipment Checked by <input checked="" type="checkbox"/>	Personnel Check by <input checked="" type="checkbox"/>
Instrument and Settings checked and Reset by <input checked="" type="checkbox"/>	
"Source In" Checked by <input checked="" type="checkbox"/>	Source No. 124
Emergency Equipment in Control Room Checked by <input type="checkbox"/>	
Red Light On by <input type="checkbox"/>	AM
Start-Up OK'd by <input type="checkbox"/>	PM Date 195



Fuel ht
 * 15.87" slightly super
 15.86 level LN, 015"
 15.87 Exp. val.

Repeat after raising
 solution slab 3/4" so that both
 slabs have same zero.

32-Enriched/Layer
 Total 288 Blocks
 = 66.6 hg.
 17.4
 84.2

Fuel ht
 15.67 just crit
 = 39.8 cm
 CV = 39.8 x .92 = 36.6
 CM = 36.6 x .48 = 17.6

* sel syn reach 9995 at zero

Expt. 172 Time AM Date 7/19/57
 Purpose Same as Expt 171 except separation 1" Personnel: L.W.G., J.R., J.F.

66.6
 24.0

 90.6

Qual ht.
 ~ 21.45 ± .02 just crit.
 54.5 cm

CV = 50.1
 CM = 24.0

Expt. 173 Time 1:50 PM Date 7/19/57
 Purpose Same as above except separation 1 1/2" Personnel: L.W.G., J.R., J.F.

At same ht of 44.2" far from crit

44.2"	245	27.5	49	.102
39.9	335	19.	29	.172
33.3	48	14	19	.243
3.2	6.75		5	

66.6
 57

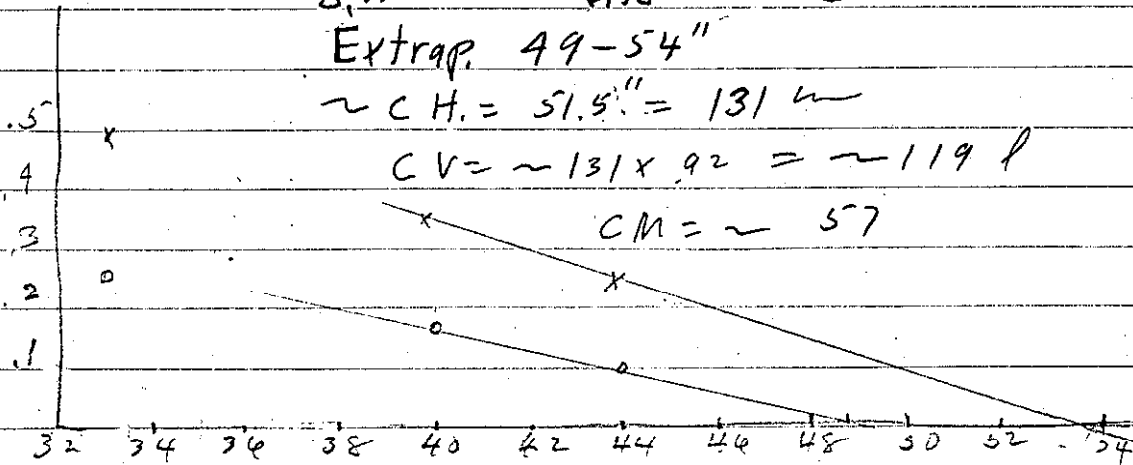
 123.6

Extrap. 49-54"

~ CH = 51.5" = 131 cm

CV = ~ 131 x .92 = ~ 119 l

CM = ~ 57

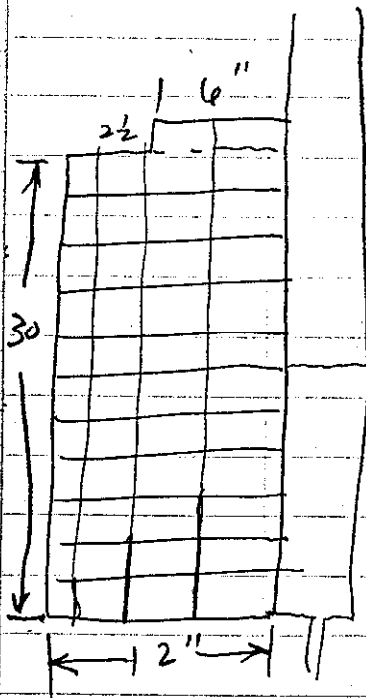


9/22/58.

12.5% Assay

stack 12" x 48" x 32

Plastic in Horiz
Plane 1/2" Thick



Expr.	174.	Time	1:00 AM	Date	7/25/1957
Purpose	C.C. 12.5% Assay Blocks				
US	3" soln slab. in contact				
Personnel:	LWG, J.R., J.F.				

DC-3 - 50x100
 DC-2 - 75
 PM - Trip
 LN - 11

START-UP CHECK LIST	
Equipment Checked by	Personnel Check by
Instrument and Safeties Checked and Reset by	
"Source In" Checked by	Source No. 124
Emergency Equipment in Control Room Checked by	
Red Light On by	AM
Start-Up OK'd by	Time PM Date 1957

Fuel ht. in
 16.94 Exp. rise
 16.925 just critical
 = 43.0 a
 CV = 39.4
 CM = 19.0

85.1
 19.0
 104.1

32 Enriched/Layers
 11.5 x 32 = 368 Blocks
 = 85.1 kg

Expr.	175	Time	2:00	Date	7/25/1957
Purpose	C.C. same as above except separation 1"				
Personnel:	LWG, J.R., J.F.				

Neglecting contribution in U₂₃₅ from
 Depleted Blocks: ~19.5kg

85.1
 24.3
 109.4
 use 110 kg

Fuel ht.
 21.72 Exp. rise
 21.65 just crit.
 = 55.0 km.
 CV = 53 x .92 = 50.60
 CM = 24.3 kg

Expr. 176 Time 3:25 AM PM Date 7/25/57
 Purpose same as above except
separation 1 1/2"
 Personnel: LWG, J.K., J.F.

Fuelht m

85.1
 28.2

 113.3

25.17 super
 25.13" sub. crit
 crit at ~ 25.15 = 63.9 cm.
 CV = 58.81
 CM = 28.2

Expr. 177 Time 8:30 AM PM Date 7/26/1957
 Purpose same as above except
separation 2"
 Personnel: LWG, J.F.

DC-2-80
 DC-3-#3
 LN TRIPS
 PM "
 P-1 "

START-UP CHECKLIST

Equipment Checked by _____ Check by _____
 Instrument and sensor checked and _____
 "Source In" checked _____ 124
 Emergency _____
 Red Light _____
 Start Up OK'd by _____ PM Date _____ 195

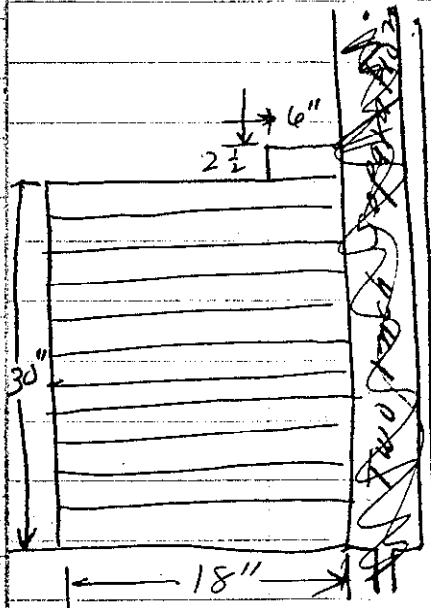
Fuel ht.: 30.08" just crit
70.4c

85.1
 33.7

 118.8

CV = 70.3
 CM = 33.7

Expt. 178 Time 12:30 PM Date 7/26/1957
 Purpose C.C. 18" Thick (12.5%) Block-stack
VS 3" sol'n Slab separation 3"
 Personnel: LWG, J.R., J.F.



Fuel ht in
 18.63 slightly sub.
 18.65 " super
 18.64 just out.
 = 473 inf
 CV = 43.5 l
 CM = 43.5 x .48 = 20.9 kg

126
 21
 147 kg total

Total 544 Blocks (enriched)
 126 kg

Expt. 179 Time 1:30 AM Date 7/26/1957
 Purpose same as above except
separation 3"
 Personnel: LWG, J.R., J.F.

25
 126
~~126~~
~~126~~
 151

Fuel ht in.
 22.32 slightly super
 22.30 just out
 CH = 56.4 cm
 CV = 52.1
 CM = ~~25.0~~ 25.0

Expr. 180 Time 2:10 AM Date 7/26/1957
 Purpose same as above except separation 4"
 Personnel: LWG, JK, JF

Fuel ht

27.09" super crit

27.04 just crit

= 68.7 crit

LV = 63.2

CM = 30.3

$$\begin{array}{r} 126 \\ 30.3 \\ \hline 156.3 \end{array}$$

181

Expr. 181 Time 3:22 AM Date 7/26/1957
 Purpose same as above except soln slab in contact
 Personnel: LWG, JK, JF

Fuel ht in.

7.3.00 slightly super

12.99 just crit

CH 33.0 cm

CV = 30.4

CM = 14.6 kg

$$\begin{array}{r} 126 \\ 14.6 \\ \hline 140.6 \end{array}$$

→ 141

232

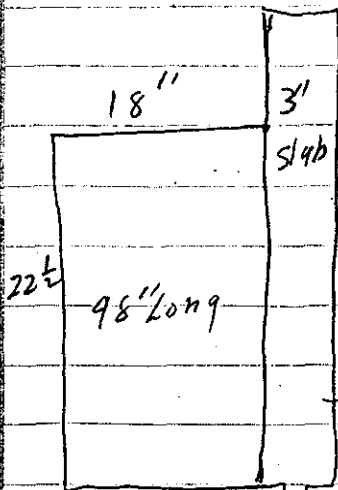
Expr. 18P Time 8:30 AM Date 8-2-1957
 Purpose C.C. 3" soln slab #250
VS 18"W X 22 1/2" high X 48" long in contact
 Personnel: LWG, J.F.

18" X 22 1/2" X 48"
 Block slab
 1/2 crit. quant.
 9-Layers high

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date 195

DC-2 - 80X200
 DC-3 - 50X1000
 LN TRIPS
 PM "
 R-1 "

T61



crit ht $14.16'' = 36.0\text{cm}$

CV = 33.1 p.

CM = 15.9 kg

99.9
 15.9
 115.8
 → 114

$9 \times 48 = 432$
 432×2.312
 99.9 kg

Expr. 18B Time 9:25 AM Date 8-2-1957
 Purpose Same as above except
separation 2"
 Personnel: LWG, J.F.

not crit. M' very roughly .5
 soln added to 45"

Expr. <u>187</u>	Time <u>1020 AM</u>	Date <u>8/2/7</u>	195 <u>7</u>
Purpose <u>Same as above except</u>			
<u>separation 1 1/2"</u>			
Personnel: <u>L-W GT, JF</u>			

Total Kg

$$\begin{array}{r} 99.9 \\ 23.6 \\ \hline \end{array}$$

123.5

→ 124

crit fuel ht - 21.03" = 53.4cm

CV = 49.18

CM = 23.4

End of Block vs UO_2F_2 soln series

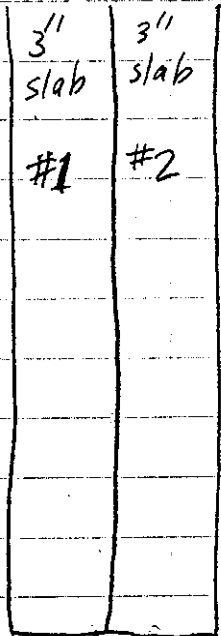
234

H/K ≈ 50

Expr. 186 Time 3:12 AM Date 8-2-1957
 Purpose C.C. for 2-3" slabs
in contact - outside
 Personnel: LWG, JF

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957



Fuel ht
 * 13.17" super crit
 13.10 just. crit.
 C.H. = 13.13 = 33.4 cm.
 $CV = 33.4 \times 1840 = 61.5 \text{ l}$
 CM =

Expr. 186 Time 8:40 AM Date 8-5-1957
 Purpose same as above except
separation now 1"
 Personnel: LWG, J.F.

START-UP CHECK LIST

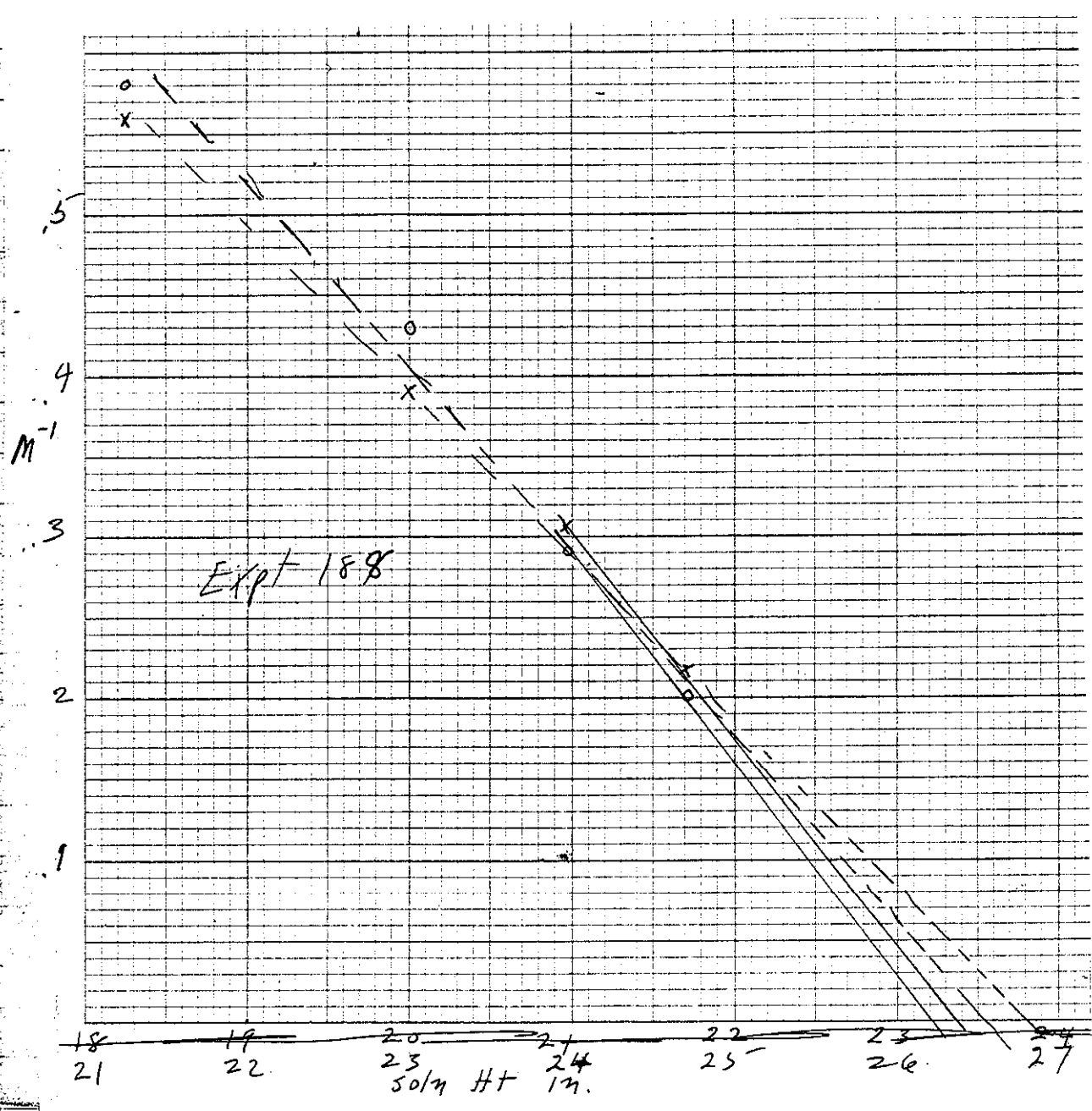
Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset by
 "Source In" Checked by _____ Source No. 124
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

DC-2-50
 DC-3 TRIPS
 LN "
 PM "
 R-1 Resp.

Fuel ht
 * 17.58 just crit.
 C.H. = 17.53" = 44.5 cm
 $CV = 44.5 \times 1.840 = 81.9$

* zero read 9997

-2-50
3 TRIPS
"
"
RESP.



8-8.

187
 Expr. ~~187~~ 935 Date 8-5-1957
 Purpose Same as above except separation 2"
 Personnel: LWG, J.F.

* Fuel ht.

23.42 Super crit
 23.40 just out
 23.38 just in
 C.H. = 59.4
 C.V = 109.3 l
 C.M =

188
 Expr. 188 Time 10:45 AM Date 8-5-1957
 Purpose Same as above except separation 2 1/2"
 Personnel: LWG, J.F.

Fuel ht.

	²¹⁸ C4	C5
24.70 (out of calm)	48.7	.20 70.75
23.96	.305 34.5	.29 48.75
23.03	.39 27.0	.43 33.25
21.24	.56 18.75	.58 24.50
17.97	10.15	14.25

Extrapolates between 26-27"

8-21-57

236 Sample from Mamfold

Pursham 7545

Req. No. 354886

Sample wt 71.1
 20.1
 net 51.0 gm
 17 gm

9-2-57 Sample from Mamfold

Req. No. 354888

354886

7.4
 2.1
 5.3

gm/gm = .3269 → .30467 gm X/gm
 sp gr. 1.589
 .984 gm U₂₃₅/cm³

$$H/X = \frac{26.11 \times .5757}{.30467} = 49.3$$

1.0000
 .4243
 .5757

Better value done by Sbutnansky lab.

354888 - .32307 gm U/gm → .3010 gm X/gm

sp gr. 1.599

.981 gm X/cm³

$$H/X = \frac{26.11 \times .5808}{.3010} = 50.4$$

1.0000
 .4198
 .5808

Interaction 6" cyl. hex away
Outside sid

H/X \approx ~~309~~ 309
354894
Soln Book #237
Page 109

$g_{m/gm} = 0.0812$
 $Sp.gr = 1.1051$

DC-3 770 on 10x50

DC-2 70 on 10x20

log W trip

PM trip

2-1 trip

Expr: 18-9	Time	AM	Date	196
Purpose: 7-6" cyl in hex away				
2 1/4 inch edge to edge spacing				
base				
Personnel: Crown-Rohrer-Gilley				

EQUIPMENT CHECK LIST	
Equipment Checked by	Checked by
Instrument	
Source	
Emergency	
Red Light	
Start-Up OK'd by	Date
J.W.H.	10/24 1957

Probe relay reads 0.03 at zero

Probe can be raised \approx 42-43"

Safety rod is $\frac{18}{16}$ " below top of reactor when set.

fuel ht.

12.24" } crit. h. 12.25" slightly super
12.24" } $\frac{1.03}{12.22}$ " sub

$C.H = 12.25'' \approx 31.1 \text{ cm}$ 31.0

$C.V. = .31 \times 0.182 \times 7 = 39.6 \approx 39.5$

$C.M = 39.5 \times 0.08363 = 3.31$ 3.30

H/K = 309

Just Check,

DC-3 55 on 10x50

DC-2 75 on 10x20

log N trip

PM trip

R-1 trip

Expr. 190	Time 10 ⁵⁵ AM	Date 10/25	1957
Purpose 7-6" dia cyl in hex array base. Separation = 1 in.			
Personnel: Rohrer, Cross, Gilley			
START-UP CHECK LIST			
Equipment Checked by	<input checked="" type="checkbox"/>	Personnel Check by	<input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>		
"Source In" Checked by	<input checked="" type="checkbox"/>	Source No.	
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>		
Red Light On by	<input checked="" type="checkbox"/>	AM	
Start-Up OK'd by J.W.H.	Time	PM Date	1957

Probe of relay reads 0.03" at 0.0
 Safety ~ 5" above bottom when released.

fuel ht.

22.34" ≈ 56.8 cm

$C.V = 7X182 \times 56.8 = 1274 \times 56.8 = 72.4$ just crit.
 $C.M = 72.4 \times .08363 = 6.05$

1274

Expr. 191	Time 2 ⁴⁵ AM	Date 10/25	1957
Purpose 7-6" dia. al. cyl in hex array base separation = 2"			
Personnel: Rohrer, Cross, Gilley			
START-UP CHECK LIST			
Equipment Checked by	<input checked="" type="checkbox"/>	Personnel Check by	<input checked="" type="checkbox"/>
Instrument and Safeties Checked and Reset by	<input checked="" type="checkbox"/>		
"Source In" Checked by	<input checked="" type="checkbox"/>	Source No.	
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>		
Red Light On by	<input checked="" type="checkbox"/>	45 AM	
Start-Up OK'd by J.W.H.	Time 2 ⁴⁵	PM Date 10/25	1957

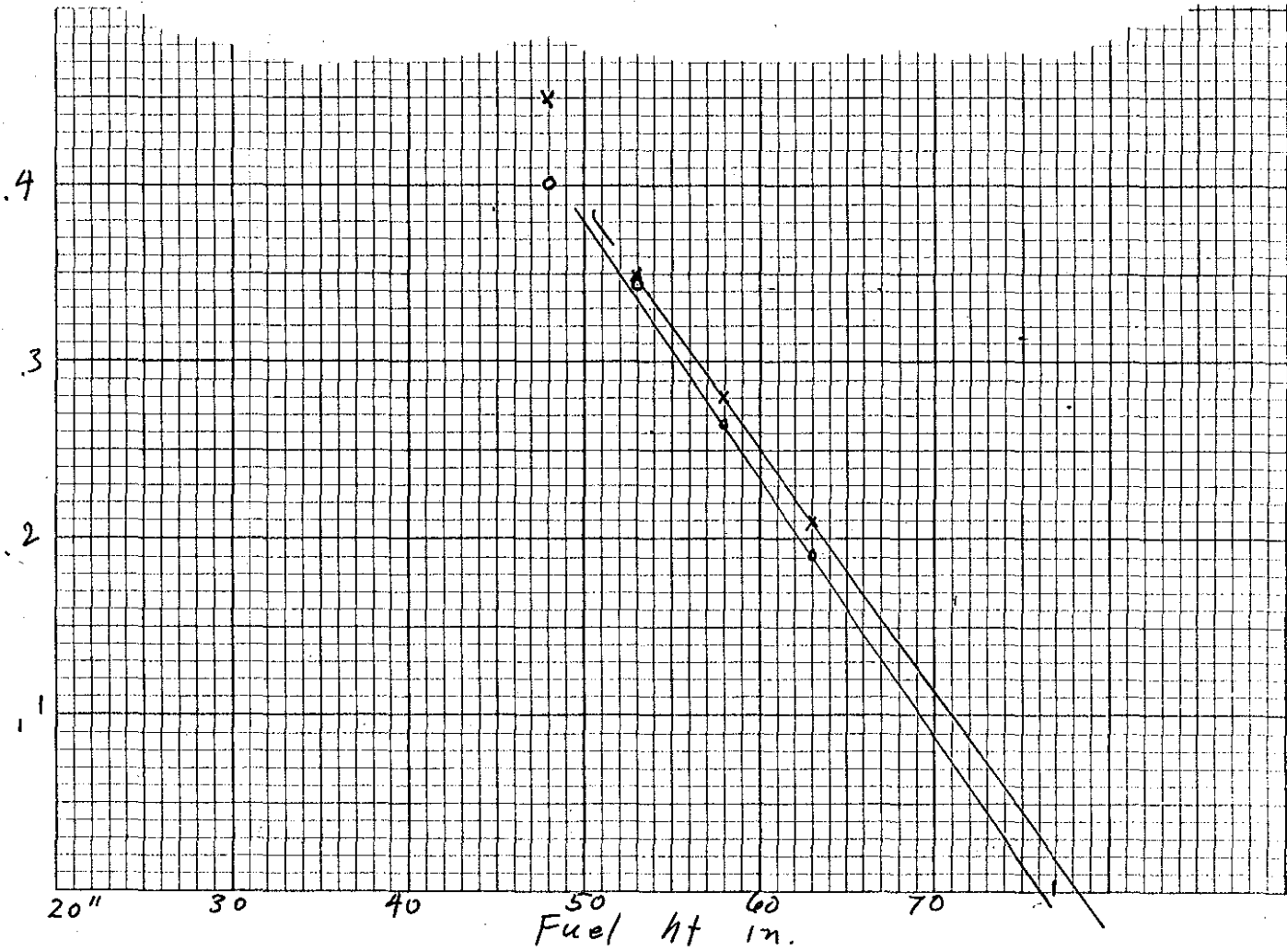
3⁴⁰ PM

Sol'n up to 43.0 in - log N barely on scale
 so shut down til Mon after drain back.

Say
 up at
 at ~

NO. 340 110 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

M^{-1}



H/A = 309

239

Exp 191

Probe changed. After change relay reads 19.80" when solution is at 19.85" as measured by previous probe.

Note: If solution is raised above 54" safety rod will have to be raised.

Exp. discontinued 4:20 10/25/57

Safety rod up at 64" or at ~ 16" down

Expr.	191A	10 ¹⁰	10-28-1957
Purpose	Repeat of above		
Personnel:	C. C. R. Rohrer, J. F.		

DC-2 - ~ 657200
DC-3 - ~ 301000

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/>
Instrument and Safeties Checked and	<input checked="" type="checkbox"/>
Source In checked by	Source No. 123
Emergency Equipment in Control	<input checked="" type="checkbox"/>
Red Light	<input checked="" type="checkbox"/>
Start-Up OK'd by	Date 1957

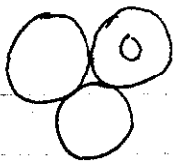
Fuel ht in"	C4	C5
63.07"	63.5 .21	96.8 .191
58.01	47.0 .28	69.5 .266
53.14	37.15 .35	53.6 .345
48.00	29.0 .45	46.0 .90
39.95	22.5 .58	33.3 .54
30.02	16.9 .77	26.9 .69
18.71	13.0	18.5

Extrap. to crit. at $\approx 77'' \approx 196$ cm

$C.V \approx 196 \times 7 \times .182 \approx 250$ l.

$C.M \approx 250 \times .08363 \approx 21$ Kg

240



H/K = 309

Exp. 192 Time 1⁰⁵ - 10-30-7
 Purpose C.C. 3-8" DIA. cyls. 1m
 Contact Bare outside
 Personnel: C.C. R.E.R., J.F.

DC-2 Trips
 DC-3 - 30X1000
 LN - Trips
 PM "
 R-1 "

STARTUP CHECK LIST
 Equipment Checked by / Checked by
 Instrument and Stables Checked and
 Sources in by 213
 Emergency Plan
 Red Light
 Start-Up OK'd by 195

Fuel ht in.

16.32 slightly end.
 16.325 just crit
 $C.H. 16.33 \approx 41.5/cm$
 $C.V. = 3 \times 3.25 \times 41.5 = 40.5$
 $C.M. = \frac{41.5}{40.3} \times 0.8363 = 3.39$ by



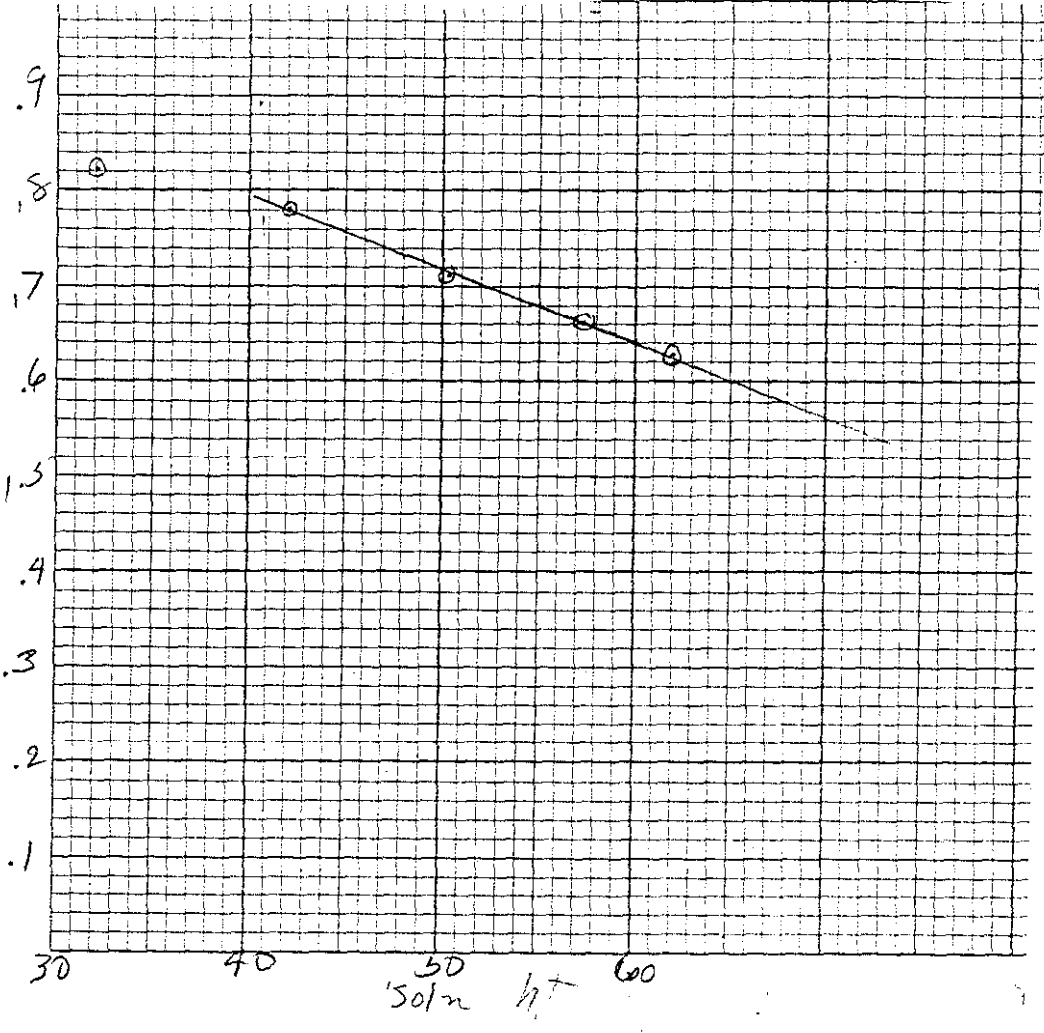
Exp. 193 Time 2³⁵ - 10-30-7
 Purpose C.C. 3-8" DIA. cyls. Sep. 2"
 Bare
 Personnel: C.C., J.F., J.F.

Fuel ht in	C ₉ H ₁₀	C ₅ H ₁₀
62.00	out	99.0 163
57.63	-	94.0 66
50.56	-	87.0 71
42.06	-	79.5 78
32.00	-	75.4 82
21.40	-	62.0

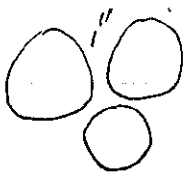
Extrap. indefinite
 Probably infinite

NO. 340 110 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

11-1.5



= 309
08363 gm⁴/cm³ 241



Exp. 194 9¹² - 10-31-7
 Purpose C.C. 3-8" Dia. Cyls. SER. 1.0" Side Side
 Base OUTSIDE
 Personnel: RER, J.F.

DC-2 - 40x200
 DC-3 - 30x1000

START-UP CHECK LIST
 Instrument checked by _____
 Instrument in working order _____
 Pressure in _____
 Temperature _____ 213
 Fuel level _____
 Start Up _____

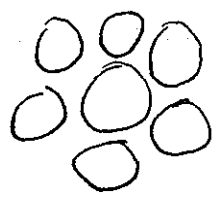
LN TRIPS
 PM "
 R-1 "

Fuel ht. in.

CH 31.18 crit 31.17 slightly sub.
 ≈ 79.2cm 31.19 " super ent

$C.V = .975 \times 79.2 = 77.2 \text{ l}$

$C.M = 77.2 \times .08363 = 6.46 \text{ kgX}$



Exp. 195 215 - 10-31-7
 Purpose C.C. 7-8" Dia. Cyls. SER. 1.0"
 Base
 Personnel: EC, RER, JF

Fuel ht in

11.28 slightly super
 11.245 just crit

$C.H = 11.27 \approx 28.4 \text{ cm}$

$C.V = 7 \times .325 \times 28.4 = 65.1 \text{ l}$

$C.M = 65.1 \times .08363 = 5.44 \text{ kgX}$

242

= 309

6" cyl = 515 ft

Expt. 196	Time 8:45 AM	Date 11-1-1957
Purpose: C.C. 7-8" dia. cyls. Hex. pattern		
Bare Sep. 3.0"		
Personnel: R.E.R., C.C. J.F.		

DC-2 - 45x200
DC-3 - 55x500

overhead tank:

14823 = 37 ft

long. hold
= 204 ft.

START-UP CHECK	
Equipment Checked by	<input checked="" type="checkbox"/>
Instrumentation	<input checked="" type="checkbox"/>
Source in 't checked by	<input checked="" type="checkbox"/>
Emergency Equipment	213
Red Light On by	<input checked="" type="checkbox"/>
Start-Up OK'd by	<input checked="" type="checkbox"/>
Time	Date 195

LN Traps
PM
R-1

11-1-57

Fuel ht. in

Spqr. 1,108
at 75°F

17.82" slightly sub.

17.82" " super critical

C.H = 17.82" ≈ 45.3 cm

C.V = 7 x 3.25 x 45.3 = 103.1 l

C.M = 103.1 x 0.08363 = 8.62 kg x

Expt. 197	Time 11:00 AM	Date 11-1-1957
Purpose: C.C. 7-8" cyls. Hex. pattern		
Bare Sep. 6.0"		
Personnel: R.E.R., C.C., J.L., J.F.		

Fuel ht in

35.38 slightly sub.

35.44 just crit.

C.H = 35.44" ≈ ~~87.9~~ cm 90.0

C.V = 7 x 3.25 x 90.0 = 204.8 l → 205

C.M = ²⁰⁵204.8 x 0.08363 = 17.1 kg x

a
s
m
at
ch
w-1
m
=/
amu
sa
H/x
2.2
Re
A

added ~
801 to
manifold
at same
density
1.1085

Note # lower
some
assuming C.M. in
same
H/X = 305

Expr. 197A Date 12-11-57
Purpose Same as 197 except that
more soln added to manifold
Personnel: LWA, JF

H/X = 305

DC-2 - 45x200
DL-3 - 50x500
LN Trips
PM "
R-1 "

START-UP CHECK LIST
Equipment Checked by Personnel Check by
Instrument and Safeties Checked and Reset by
"Source In" Checked by Source No. 213
Emergency Equipment in Control Room Checked by
Red Light On by AM
Start Up OK'd by Time AM Date 195

17 mol ht in
35.21" just crit = 89.4
C.V = 7x.325 x 89.4 = 203 l
approx. CM = 203 x .0844 = 17.1

Expr. 198 Date 8-25-57 AM 11-6-195
Purpose C.C. 7-8" Dia. cyls in
Hex array Bare sep = 7.0"
Personnel: LWA, JF, TF

DC-2 - 45x200
DC-3 - 600x500
LN TRIPS
PM "
R-1 resp.

START-UP CHECK LIST
Equipment Checked by Personnel Check by
Instrument and Safeties Checked and Reset by
"Source In" Checked by Source No. 213
Emergency Equipment in Control Room Checked by
Red Light On by AM
Start Up OK'd by Time PM Date 195

2.270/cm

7 mol ht in.
46.88 slightly sub.
46.89" just crit
C.H = 119

Report on #309
since only 1 expt. at
H/X = 305

Drainett to 46.6" - lower manifold readi
22.5 cm x .14 x 183 = 57.6 l
46.6 x 254 = 118.3 cm x 2.27 = 268 l +
57
325 = l

C.V = 7 x .325 x 119 = 271 l
CM = 271 x .0844 = 22.9 leg x
0844 22.6

24 ~~1/4~~ = ~~259~~
 297
 Actual # nearer
 to 297 than 309

Expr.	199	Time	8:25 AM	Date	11-7-1957
Purpose	C.C. 2-9 1/2" DIA. Cyls. Bare sep. 1.0"				
Personnel:	C.C., LWG, JF				

DC-2-45 x 200
 DC-3-53 x 500
 LN TRIPS
 PM "

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Person Check by <input checked="" type="checkbox"/>
Instrument and Safeties Checked and	<input checked="" type="checkbox"/>
'Source In' Checked by	No. 213
Emergency Equipment in Control Room Checked by	<input checked="" type="checkbox"/>
Red Light On by	<input checked="" type="checkbox"/> AM
Start-Up OK'd by	Time PM Date 1957

Fuel height in.

24.10 slightly super crit.
 61.1cm = 24.08" just crit

918

$$C.V = 2 \times 4.59 \times 61.1 = 56.1$$

$$C.M = 56.1 \times 0.08684 = 4.87 \checkmark$$

Expr.	200	Time	9:30 AM	Date	11-7-1957
Purpose	C.C. 2-9 1/2" DIA. Cyls. Bare Sep. 3.0"				
Personnel:	LWG C.C. JF				

Fuel ht. in.

31.76 super crit
 31.72 "
 31.66 slightly sub
 80.5cm = 31.69" just crit

$$C.V = 2 \times 4.59 \times 80.5 = 73.9 P.$$

$$C.M = 73.9 \times 0.08684 = 6.42 \checkmark$$

H/x = ~~297~~
297

Expr.	201	Time	10 ³⁰	Date	11-7-1957
Purpose	CC 2-9 1/2" D. Cyls. Bare				
	Sep 6.0"				
Personnel:	LW Ct, CC, JF				

9 1/2" cyl AV. O.D. $\approx 24.50 - 1.32$
 TH. AI. $\sqrt{24.18}$
 $A \approx 4.59 \text{ cm}$ $\frac{12.09}{2}$
 Calibrated? \rightarrow

Fuel ht
 44.60" super crit
 44.52 slightly super
 44.45 very slightly emb.
 C.H. 44.48 crit = 113 cm

$C.V = 2 \times 4.59 \times 113 = 104 \text{ l}$
 $C.M = 104 \times 0.0868 = 9.03 \text{ kg}$

Safety up $\approx 59"$
 at $\approx 11"$ when
 down

Expr.	202	Time	8 ³⁰ AM	Date	11-8-1957
Purpose	C.C. 2-9 1/2" D. Cyls Bare				
	Sep 8.0"				
Personnel:	LW Ct, JF				

DC-2-40x200
 DC-3-60x500
 LN TRIPS
 PM "
 R-2 resp.

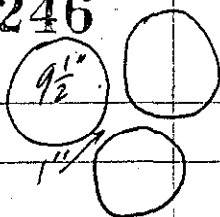
START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> Personnel Check by <input checked="" type="checkbox"/>
Instrument and Safety Checked and	<input checked="" type="checkbox"/>
Source in checkable	<input checked="" type="checkbox"/>
Emergency	App No. 213
Red	<input checked="" type="checkbox"/>
Start Up OK	<input checked="" type="checkbox"/>

Fuel ht. in
 54.22 slightly super crit
 54.11 " "
 53.91 " Just "

(crit ht $\approx 54.00"$) $\approx 137 \text{ cm}$

$C.V = 2 \times 4.59 \times 137 = 126 \text{ l}$
 $C.M = 126 \times 0.08684 = 10.9 \text{ kg}$

246



Expt.	203	Time	10:30 AM	Date	11-8-1957
Purpose	C.C. 3-9 1/2" dia cylinder Bare				
	sep. 1.0"				
Personnel:	LWGT JF				

 $\frac{H}{L} = \frac{359}{297}$

Fuel ht. in

13.44 Super crit.

13.43 Just "

$$C.H = 13.44 \approx 34.1 \text{ in}$$

$$C.V = 3 \times 4.59 \times 34.1 = 47.0 \text{ l}$$

$$C.M = 47.0 \times 0.868 = 4.08 \text{ kg} \checkmark$$

$$4.59 \times 3 = 13.77$$

Safety up $\approx 49''$ Irregular
array

Expt.	204	Time	1:10 PM	Date	11-8-1957
Purpose	C.C. 3-9 1/2" DIA. cylinder Bare				
	sep. 4.0"				
Personnel:	LWGT JF				

Fuel ht. in.

20.25 just crit

$$C.H = 51.4 \text{ cm}$$

$$C.V = 3 \times 4.59 \times 51.4 = 70.8 \text{ l}$$

$$C.M = 70.8 \times 0.868 = 6.15 \checkmark$$

Triangular
array

#2 = ~~297~~ 297 -- 247

Expr. 205	Time 2:00 AM	Date 11-8-1957
Purpose C.C. 3-9 1/2" D. cyls. Base		
Sep 8.0"		
Personnel: L.W.G. J.F.		

Fuel ht. in

28.08 just crit.

C.H. = 71.3 cm

C.V. = 1.377 x 71.3 = 98.2 l

C.M. = 98.2 x .0868 = 8.53 kg

Triangular
array

Expr. 206	Time 2:50 AM	Date 11-8-1957
Purpose C.C. 3-9 1/2" D. cyls. Base		
Sep 12.0"		
Personnel: L.W.G. J.F.		

Fuel ht. in

36.31 just crit

36.34 just crit

C.H. = 92.3 cm

C.V. = 1.377 x 92.3 = 127 l

C.M. = 127 x .08684 = 11.0 l

248

#/2 = ~~297~~
297

○ ○
18" ○

Expr.	207	Time	9:02 AM	Date	11-11-1957
Purpose	C.C. 3-9 1/2" D. cyls. Tri angular Array Base sep 18.0"				
Personnel:	L.W.G., C.C., J.F.				
START-UP CHECK LIST					
Equipment Checked by	✓				
Instrument and Safeties Checked and	✓				
Source Isotopes checked by	✓				
Emergency Equipment in Control Room	✓				
Red Light On by	✓				
Start-Up OK'd by	✓				
	Time	AM		PM	Date
					1957

DC-2-357200

DC-3-60X500

LN TRIPS

PM "

Fuel hit in

49.66 just

49.69 slightly just

49.72 just crit

C.H. = 126 cm

C.V. = 1.377 x 126 = 174 l

C.M. = 174 x 0.8684 = 15.1

○ ○
○

Expr.	208	Time	10:35 AM	Date	11-11-1957
Purpose	C.C. 3-9 1/2" D. cyls. TRI-ANGLE Array sep 22" Bare				
Personnel:	L.W.G., C.C., J.F.				

Fuel hit

60.09" just crit.

C.H. = 153 cm

C.V. = 1.377 x 153 = 211 l

C.M. = 211 x 0.8684 = 18.3

H/X = 34297

249

02" 02" 02"

Expt.	209	Time	2 ¹⁰ PM	Date	11-11-1957
Purpose	C.C. 3-9 1/2" D, cycle in line				
	Dep. 2.0"				
Personnel:	L.W.G., C.C., J.F.				

Fuel ht. in.

22.31 just crit.

C.H = 56.7 cm

C.V = 1.377 x 56.7 = 78.1 l.

C.M = 78.1 x 0.08684 = 6.78 kg x

06" 06" 06"

Expt.	210	Time	3:35 AM	Date	11-11-1957
Purpose	3-9 1/2" D, cycle in line Bare				
	Dep. 6.0"				
Personnel:	L.W.G., C.C., J.F.				

Fuel ht. inches

33.21 slightly emb.

33.23 just crit.

C.H = 84.4 cm

C.V = 1.377 x 84.4 = 116 l.

C.M = 116 x 0.08684 = 10.1 kg x

250

$\frac{H}{L} = 297$

0000
6"

Expr.	211	Time	5:40	Date	11-12-57
Purpose	C.C. 4-9 1/2" D. Cyls in Line				
	Bare sep 6.0"				
Personnel:	LWA JF				

DC-2-40X200

DC-3-60X500

LN TRIPS

PM "

P-1 resp.

START-UP CHECK LIST	
Equipment Checked by	<input checked="" type="checkbox"/> L <input checked="" type="checkbox"/> JF
Instrument and Safeties Checked and	<input checked="" type="checkbox"/>
Source In Checked by	213
Emergency Equipment in Control Room checked by	<input checked="" type="checkbox"/>
Red Light On by	AM
Start-Up OK'd by	<input checked="" type="checkbox"/> Time <input type="checkbox"/> AM <input type="checkbox"/> PM Date 195

Fuel ht. inches

29.61 slightly sub.

C.H. 29.63" ≈ 75.30 29.65^{1.63} " super crit

$C.V = 4 \times 4.59 \times 75.3 = 138$

$C.M = 138 \times 0.8684 = 12.0$ ✓

006000

Expr.	212	Time	10:10 AM	Date	11-12-1957
Purpose	C.C. 5-9 1/2" DIA. Cyls. in Line				
	sep 6.0"				
Personnel:	LWA, S.C., JF				

Fuel ht. inches

28.33 slightly super

28.32 " "

71.8 cm ≈ 28.28 just crit

$C.V = 5 \times 4.59 \times 71.8 = 165$

$C.M = 165 \times 0.8684 = 14.3$ kgX ✓

Hz = 297
X = 251

0 0 0 0 0
10"

Expr.	213	Time	1:42 PM	Date	11-12-1957
Purpose	CC. 5-9 1/2" Dia. w/gh 1/2 line Bare				
	Sep. 10.0"				
Personnel:	LWG, C.C. J.F.				

~~Person~~ ^{tube}
~~at~~ at 2.49"
 2750 ml/cm
 for Ce Gpt.

Fuel ht inches

36.21 Slightly sub. crit
 36.23 " Super

$$C.H. = 36.22" \approx 92.0 \text{ cm}$$

$$C.V. = 5 \times 4.59 \times 92.0 = 211.1$$

$$C.M. = 211 \times 0.08684 = 18.3 \text{ kgx} \checkmark$$

0 0 0 0 0
10"

Expr.	214	Time	2:45 AM	Date	11-12-1957
Purpose	CC. 4-9 1/2" Dia. w/gh 1/2 line Bare				
	Sep 10.0"				
Personnel:	LWG, J.F.				

Fuel ht. inches

38.45 Slightly sub.
 38.50 just crit

$$C.H. = 97.8 \text{ cm}$$

$$C.V. = 4 \times 4.59 \times 97.8 = 180 \text{ l}$$

$$C.M. = 180 \times 0.08684 = 15.6 \text{ kgx} \checkmark$$

252

H/x = 297

0 0 10" 0

Expr.	215	Time	3:45	AM	Date	11-12-57
Purpose	C.C. 3-	9 1/2" Dia.	44/5	In Line Bare		
Sep. 10.0"						
Personnel:	L.W.G. C.C. J.F.					

Fuel ht inches

43.79 sub. crit

43.83 ~~slightly sub.~~ slightly super

C.H = 43.81" = 111.

C.V = 3 x .459 x 111 = 153 l.

C.M = 153 x .08684 = 13.3 kg x V

0 0 15" 0

Expr.	216	Time	8:35	AM	Date	11-13-57
Purpose	C.C. 3-	9 1/2" Dia.	44/5	In Line Bare Sep. 15.0"		
Personnel:	L.W.G. C.C. J.F.					
START-UP CHECK						
Equipment Checked by	✓					
Instrument and Safety checked and	✓					
"Source In" checked	✓					
Emergency Equipment	213					
Red Light On by	✓					
Start-Up OK'd by	Time AM PM Date 195					

DC-2 = 30x200
 DC-3 = 50x500
 LN TRIPS
 PM 11
 P-1 11

Fuel ht. in.

60.08 slightly sub.

C.H = 60.14 60.19 111 Super

= 153 cm

C.V = 3 x .459 x 153 = 211 l.

C.M = 211 x .08684 = 18.3 kg x V

#/x = 297
253

Expr.	217	Time	11:40 AM	Date	11-13 1957
Purpose	C.C. 4-9 1/2" cyls in line				
Sep 3.0"					
Personnel	L.W.C. C.C., J.F.				

Bare

0000
1.1
3.0

Fuel ht in.

22.69 slightly Super

C.H. = 57.4 cm = 22.67" just crit

C.V = 4 x .459 x 57.4 = 106 l.

C.M = 106 x .0868 = 9.20 kgx ✓

200

500

000000
3.0"

Expr.	218	Time	1:15 AM	Date	11-13 1957
Purpose	C.C. 5-9 1/2" D. Cyls in line				
Sep. 3.0					
Personnel	L.W.C. C.C., J.F.				

Bare

Fuel ht in.

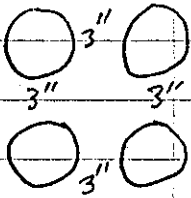
21.75 Super crit

C.H. = 55.2 cm = 21.73" just crit.

C.V = 5 x .459 x 55.2 = 127 l.

C.M = 127 x .08684 = 11.0

254



Expr.	219	Time	2:45	Date	11-13-7
Purpose	C.C. 4-9 1/2" D. Cyls in square				
	Array sep. 3.0"				
Personnel:	LWG, C.C., JF				

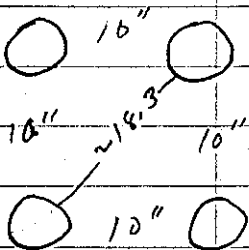
H/2 = 297

Fuel ht. in.
15.84 just crit

C.H = 40.2 cm

C.V = 4 x 4.59 x 40.2 = ~~734~~ ^{73.8} l

C.M. = ~~73.4~~ ^{73.8} x 0.08684 = ~~6.37~~ 6.40 ✓



Expr.	220	Time	8:45	Date	11-14-1957
Purpose	C.C. 4-9 1/2" D. Cyls in square				
	Array sep. 10.0"				
Personnel:	LWG, C.C., JF				

START-UP CHECK LIST	
Equipment Checked by _____	Operator Check by <input checked="" type="checkbox"/>
Instruments & Sensors checked and _____	<input checked="" type="checkbox"/>
"Source In" checked by _____	Source No. 213
Emergency Equipment in Control Room checked by _____	<input checked="" type="checkbox"/>
Red Light On by <input checked="" type="checkbox"/>	AM
Start-Up OK'd by <input checked="" type="checkbox"/>	Time _____ PM Date 1957

DC-2-30x200
DC-3-50x500
LN Trips
PM "
R-1 "

Fuel ht. in.

C.H = 69.2 cm ≈ 27.24" just crit

C.V = 4 x 4.59 x 69.2 = 127 l

C.M. = 127 x 0.08684 = 11.0 ✓

#/x = 297

255

○ 22" ○

22" 22"

○ 22" ○

Expt.	221	Time	10 ¹⁵ AM	Date	11-14-35
Purpose	C.C. 4-9 ¹ / ₂ " cyls sq. Array bare				
	Sep. 22.0"				
Personnel:	L.W.G., C.C., J.F.				

Fuel ht. in.

(1836 ml/cm) C.H. = 120 cm = 47.37 just crit

$$C.V = 4 \times .459 \times 120 = 220 \text{ l}$$

$$C.M = 220 \times .08684 = 19.1 \checkmark$$

○ 30" ○

30" 30"

○ 30" ○

Expt.	222	Time	2 ³⁰ PM	Date	11-14-1935
Purpose	C.C. 4-9 ¹ / ₂ " D. cyls. sq. Array bare				
	Sep. 30.0"				
Personnel:	L.W.G., C.C., J.F.				

Fuel ht. in

62.47 slightly sub.

62.52 just crit.

$$C.H = 159 \text{ cm}$$

$$C.V = 4 \times .459 \times 159 = 292 \text{ l}$$

$$C.M = 292 \times .08684 = 25.3 \text{ kg}$$

256

$H/X = 2.97$

0
0
0
0
0
0
0
0

Expr. 223 Time 3:35 PM Date 11-15 1957
 Purpose C.C. 7-9 1/2" D. Cyls In Hex.
Array Bare Sep. 3.0"
 Personnel: LWGT, C.C., JF,

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset
 "Source In" Checked by Source No. 213
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

DC-2-30X2
DC-3-55X500
R-1-TRIPS
PM "
LN "

Fuel ht. in

12.09 slightly up
12.08 just crit

$7 \times 4.59 = 32.13$

$C.H = 30.7$

$C.V = 7 \times 4.59 \times 30.7 = 98.4$; $C.M = 98.4 \times 0.8684 = 85.4$

0
0
0
0
0
0
0
0

Expr. 224 Time 9:30 AM Date 11-18 1957
 Purpose C.C. 7-9 1/2" D. Cyls In Hex. Bare
SEP. 10.0"
 Personnel: LWGT, C.C., JF

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Reset
 "Source In" Checked by Source No. 213
 Emergency Equipment in Control Room Checked by
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 1957

DC-2-58X200
DC-3-30X500
R-1-TRIPS
PM "
LN "

Fuel ht. in

20.09 slightly sub.
20.10 just crit

$C.H = 51.1$

$C.V = 7 \times 4.59 \times 51.1 = 164$

$C.M = 164 \times 0.8684 = 14.2$

#A = 297

257

Expt. <u>225</u>	<u>130</u>	Date <u>11-18-1957</u>
Purpose <u>C.C. 7-9 1/2" Dia. Cyls 17 Hex Bore</u>		
<u>SEP. 22"</u>		
Personnel: <u>LWG, CC, FF</u>		

Fuel ht. in.

32.87 just crit.

C.H = 83.5 cm

C.V = 7 x 459 x 83.5 = 268 l

C.M = 268 x 0.8684 = 23.3 ✓

30x2
55x50
TRIP

000000
L 3.0"

Expt. <u>226</u>	<u>2:00 PM</u>	Date <u>11-19-1957</u>
Purpose <u>6-9 1/2" Dia. Cyls 17 Hex Bore, sep. 3.0"</u>		
Personnel: <u>LWG, CC, J.F.</u>		

DC-2 - 50x200
DC-3 - 45x500

START-UP CHECK LIST	
Equipment Checked by <u>✓</u>	Source No. <u>213</u>
Instrumentation checked and OK'd by <u>✓</u>	Emergency Equipment in Control Room checked by <u>✓</u>
Red Light On by <u>✓</u>	Start-Up OK'd by <u>✓</u> Time <u>AM</u> PM Date <u>195</u>

Fuel ht. in

at 0002 hr 21.30 slightly super crit

21.305 just crit at 0007 hr

21.345 1st period } P between C.H for
21.395 2nd " } 58 that for 6 ≈ 264

we → 21.30x crit at 02 hr

C.H = 54.1 cm

C.V = 6 x 459 x 54.1 = 149 l

C.M = 149 x 0.8684 = 12.9

258

Expt. 227 Time 9:55 AM at 11-20-1957
 Purpose C.C. 6-9 1/2" cyls 1.77 Line Bare
Sep. 10.0"
 Personnel: C.W.G., C.C., J.F.

0000100
10"

START-UP CHECK LIST
 Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Safeties Checked and Reset by ✓
 Source In ✓ Checked by _____ Source No. 213
 Emergency Equipment in Control Room Checked by ✓
 Red Light On by ✓ _____ AM
 Start Up OK'd by ✓ _____ PM Date _____ 1957

DC-2 - Call 200
 DC-3 - 55X500
 LN Trips
 PM "
 R-1 "

36.22

7 rel ht.

34.770 just out 0007
 34.992 1st period } 26¢ P change
 35.163 2nd " } ≈ 1.45" - the

$C.H = 34.77" = 88.3 \text{ cm}$

diff. between
5 & 6 cyls.

$C.V = 6 \times .459 \times 88.3 = 243 \text{ l}$

$C.M = 243 \times .08684 = 21.1 \checkmark$

H/x Calc. using Av. anal. (354902 - 354903) $\frac{gm}{cm^3} = .08405$

$\frac{H}{x} = \frac{26.11 \times .8909}{.07833} = 297$

$\frac{1.0000}{.1091} \checkmark$
 $.8909$

AV SP. gr = 1.1086 $\frac{gm}{cm^3} = .08684$

gm
SP

12/18/57

Double samples were taken from the manifold (containing $H_2 \approx 300$) and from one 10-liter bottle (L-4) containing $H_2 \approx 50$.

From manifold:

Reg. # 354902

G 85.62 g

T 20

N 65.62 g

Reg. # 354903

G 76.72 g

T 20

N 56.72 g

From 10-liter bottle:

Reg. # 354904

G 67.44

T 20

N 47.44

Reg. # 354905

G 61.79

T 20

N 41.79

354 904

$\frac{gm\ U}{gm} = 0.3264 \checkmark$
 $SP_{9\%} = 1.605 @ 25^\circ C \checkmark$

FC = 1450 ppm

AI = 1200 "

354 905

$\frac{gm\ U}{gm} = 0.3266 \checkmark$
 $SP_{9\%} = 1.601 \checkmark$

FC = 1400 ppm

AI = 1150 "

354902

$\frac{gm\ U}{gm} = 0.0839 \checkmark$
 $SP_{9\%} = 1.1076 \checkmark$

AI = 1500 ppm

FC = 3750

354903

$\frac{gm\ U}{gm} = 0.0842 \checkmark$
 $SP_{9\%} = 1.1096 \checkmark @ 25^\circ C$

FC = 3500 ppm

AI = 1500

Expr. 1	Time 3 ^{00 AM}	PM Date 5/9	1958
Purpose Critical conditions for 6" elev. slab and 2-3" slabs spaced 12" apart			
base: Jim Sid			
Personnel: Jay, Reedy, Gilley			

Probe	Manometer
-.03"	0
.02	.054
1.14	1.223
5.27	5.406
14.00	14.080 slightly above 1 crit

3/12 Probe zero at -0.11"
manometer with float against bottom
reads 99350

Water "SOAK-UP" Test:

A 3" x 12" x 36" styrafoam slab was
weighed dry; wt 387 gm. Then it was

submerged in water overnight;

wt. after draining; 681 gm

" " wiping semi-dry; 617 "

" " drying 8hr 584 gm

3 gm loss due to abrasion in handling.

5/9/58 calibration of Probe Rack

#	sol ⁿ	meas. vernier	261 caliper
#1	12.00	12.030	
#2	12.00	12.054	
#3	12.00	12.058	
#4	12.00	12.050	

Expr. 1 a Time 8:42 AM Date 5/12/1958
 Purpose Repeat for checking equipment.
 Personnel: LWG, Reedy, FOX

START-UP CHECKLIST
 Equipment Checked by
 Instrument and Calibration by
 Source
 Emergency
 Readiness
 Start Up

manometer re-zeroed. Change mode

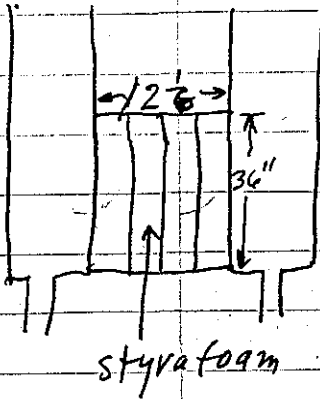
Probe	Manometer
3.01	2.966
14.05	14.022

262

Nominal
3" slabs of
Styrofoam are
slightly thicker
& add to ~12 1/8"

Expt. 2 Time 9:24 AM PM Date 5/14/1958
 Purpose 2 - 6" slabs separated 12 1/8" with styrofoam between bare
 Personnel: LWG, Reedy, Fox

START-UP CHECK LIST
 Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and OK'd by
 "Source In" Checked by No. PU
 Emergency Equipment in Control Room Checked by
 Red Light On by
 Start-Up OK'd by Time _____ AM PM Date _____ 1958



Probe	Manometer	
14.23	14.26	slightly super
14.21	14.24	crit.

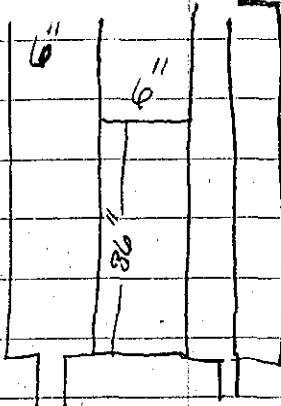
Expt. 3 Time 10:10 AM PM Date 5/14/1958
 Purpose same as above except reflected except top
 Personnel: LWG, Reedy, Fox

Probe	Manometer	Water
8.74	8.74	8.75"

Expt. 4 Time 12³⁰ PM Date 5/14/1958
 Purpose same as Expt # 1 except
separation ~ 12 1/2" instead of 12
 Personnel: LWG, Reedy, Fox, Bare

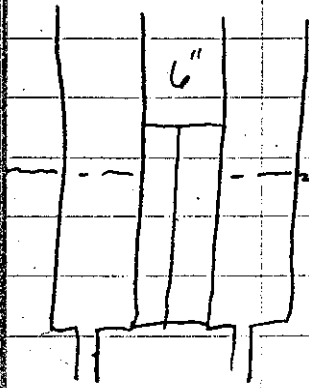
Probe	Manometer
14.61	14.58 sl. super
14.58	14.55 just crit.

Expt. 5 Time 2³⁰ AM Date 5/14/1958
 Purpose 2-6" slabs ~ 6" separation
with styra form between, otherwise Bare
 Personnel: LWG, Reedy, Fox



Probe	Manometer
12.20	12.18 sub super crit.
12.14	12.13 crit.

Expt. 6 Time 3:25 AM PM Date 5/14/1958
 Purpose 2-6" slabs separated ~6" with styrofoam between, Refl.
 Personnel: LWG, Reedy, Fox



Probe

7.93

!!!

7.82

Manometer

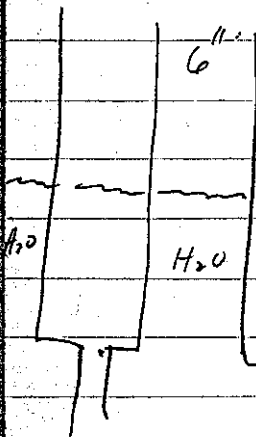
7.85 crit

Water

7.84"

zero check! Probe 0.11, ma = 0.03

Expt. 7 Time 8:45 AM PM Date 5/15/1958
 Purpose 2-6" slabs ~ 6" apart Refl. except top
 Personnel: LWG, W.A.P., JKT



START-UP CHECK LIST

Equipment Checked by ✓ Project check by ✓
 Instrument and Safeties Checked and ✓
 "Source In" Checked by ✓ No. ✓
 Emergency Equipment in Control Room checked by ✓
 Red Light On by ✓
 Start-Up OK'd by ✓ Time AM PM Date 195

Probe reversed!

Probe 7.90" man 7.90" crit

Water 7.87"

Expt. 8 Time 9:20 AM Date 5/15/1958
 Purpose Same as above except
Bare
 Personnel: LWC, W.A. Pyror JRT

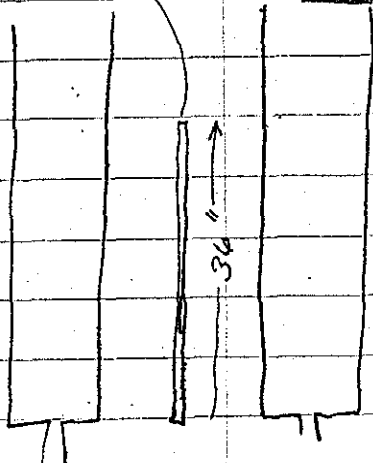
Probe 11.72" Man. 11.76" Critical
 Compare with styrofoam
 Difference probably due to difference in
 preparation

Expt. 9 Time 2:10 AM Date 5/14/1958
 Purpose 2-6" slabs separated 12.0" with
1-1/2" Plexiglas plate centered Bare other-
 wise
 Personnel: LWC, Reed, Fox

START-UP CHECK LIST

Equipment Checked by Personnel Check by
 Instrument and Safeties Checked and Ready by
 "Source in" Checked by
 Emergency Equipment Checked in Lab Room Locked by PU
 Red Light On by AM
 Start-Up OK'd by Time _____ PM Date _____ 195__

1/2" Th. Plexiglas
 5" Long



Probe 14.24 Manometer 14.38" Critical

Probe considered to be more accurate

266

Expr. 10 Time 3:35 ^{AM} PM Date 5/16/1958
 Purpose Same as above except
Added 1/2" plexiglas. Plate (total 1")
 Personnel: LWG Reedy, Fox

Probe
-13.74

Manometer
13.83 Critical

Expr. 11 Time AM PM Date 5/19/1958
 Purpose Same as above except
plexiglas now 1 1/2" thick
 Personnel: LWG Reedy Fox

START-UP CHECK LIST

Equipment Checked by ✓ Personnel Check by ✓
 Instrument and Settings Checked and ✓
 Source In' checked by ✓ Source No. PU
 Emergency Equipment in Location ✓ Checked by ✓
 Red Light On by ✓ AM
 Start-Up OK by ✓ Time AM Date 1958

Probe
13.77

Manometer
13.81 crit

11

Expr. 12 Time 10:15 AM Date 5/19/1958
 Purpose Same as above except
Plexiglas now 2" thick
 Personnel: LWG Reedy Fox

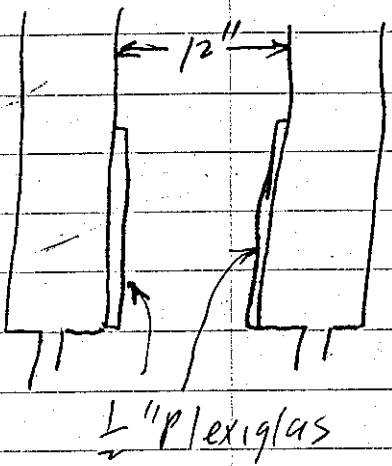
Probe
 14.36

Manometer
 14.91 critical

Expr. 13 Time 11:25 AM Date 5/19/1958
 Purpose 2 12" slabs separated 12"
with 1/2" plexiglas against each slab inside
 Personnel: LWG, Reedy Fox

Probe

Manometer

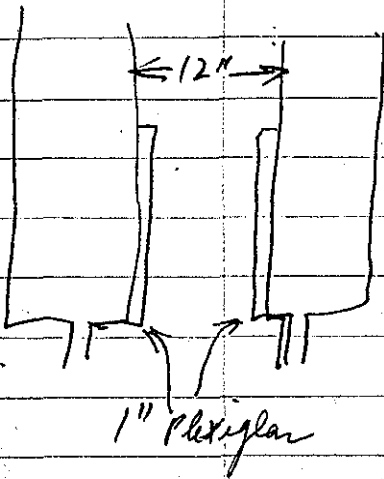


12.28

12.34 Crit.

1/2" plexiglas

Expt.	14	Time	1:35	Date	5/19/58
Purpose	Same as above except 1" plexiglas against each slab.				
Personnel	L. W. C. Reedy, Fox				



Probe	Manometer
11.75	11.82 crit.

12" steel
Ruler indicates
separation
slightly under
12"

Expt.	15	Time	1:40	Date	5/19/58
Purpose	Recheck of 12" spacing Bar (exact spacing used in previous expts)				
Personnel	L. W. C. Reedy, Fox				

Probe	Manometer
14.01	14.11 crit.

see page 260

5/19/58

Duplicate samples taken from manifold
(HX ~ 290). Tops were sealed with electrical tape.

Sample for ~~Reg # sent for analysis~~

Reg # 354932, sent for analysis at this time.

Reg # 354932

Gross 105.72

Tare ~~net~~ 20.1

net 85.62

Reg. # 354933

Gross 99.51

Tare 20.1

net 79.41

$$\frac{\text{gm}_4}{\text{gm}} = 0.08498$$

$$\text{Sp. gr} = 1.108$$

$$\frac{\text{m} 0.235}{\text{cc}} = 0.0878$$

$$\frac{\text{HX}}{\text{X}} = \frac{.8897}{108498} \frac{2411}{.932} = 293.2$$

Fe = 3750 ppm

Al = 370

Cd = 2

270

7/18/60 Beginning of 5" plastic bottle Interaction Exp.
 Sample from bottle #4 sent for spec. to check on dark colored
 impurities floating on top. Reg # 593105; gross = 103.570g, tare = 10.826g

~~10³⁰~~~~bottles and added to slab~~10³⁰

counting rates from counter against slab:

1st bottle added 105392

105448

1/2 min counts

2nd bottle added 98012

98295

12⁴⁵3rd bottle added 108507

109245

1⁰⁰
PM4th and 5th added 143177

143179

6th

145404

7th ~~bottle~~ bottle added 146117

147353

8th bottle added 147612

147748

9th bottle added 1474211³⁰
PM10th bottle 14800011th bottle 148100

These nominally $\frac{1}{2}$ full bottles have 22.25" of soln in them. These arrays are built using Al. frameworks in front of Big Sid.

7/18/60

Exp. # 1 ; Run 1

2 $\frac{30}{PM}$

5 polyethylene bottles placed $1\frac{1}{8}$ " edge to edge
in form of cross i.e. $\begin{matrix} & & 0 & & \\ & & 0 & & \\ & & 0 & & \\ & & 0 & & \\ & & 0 & & \end{matrix}$

3 $\frac{25}{PM}$

~~Soln~~ Solution $\text{rel} \text{sgn} = 0.0$ at soln zero

Instruments R1, R2, PM-1, PM2, log N O.K.

Source in

Soln stopped ~~to~~ at 36". No appreciable increase in multiplication for last few (4-6) inches.

272

7/19/60

Exp. 1 ; Run 2

4 half full bottles added to ^{corners of preceding} array to give
 3x3 array when center five are full [1 1/8" edge-to-edge]
 Instruments checked OK

9²⁰

began adding soln to 5 center bottles

9⁴⁵Instrument ~~scram~~ due to changing ^{battery}10⁰⁵
AMSystem cut with 5 bottles filled
to ~ 19.7".Manometer did not operate properly. ∴
this run should be repeated

Exp. 1 ; Run 3

1⁰⁵
PM

9 bottles in 3x3 spaced 1.19" edge-to-edge

Sub. cut with 22.25" in inverted bottles.

with source near end of guide tube: ~ 40" up
 system at steady state & fuel ht. = 23.07"

Fuel ht	C ₁ (1/2 min.)	C ₂	C ₃
22.45"	147,619.0265	226931.029	17091.032
"	148,522	228,571	17138
21.90	80,191	123,739	9177.059
"	79,337.049	122,474.053	9212

Fuel ht

ing

]

ing

w

up

2

C₁

C₂

C₃

21.09

43815

67423

5031

.104

"

43410 .090

67175 .097

5142

20.09

26720

41116

3078

.171

"

26137 .148

41081 .159

3223

17.97

13423

21136

1661 .325

↑

"

13307 .294

21336 .309

1632

1/2 min

14.90

26588 .592

43467 .607

3432

.621

2 min

"

26564

42917

3538

↓

12.20

15746

26471

2107

"

15667

26024

2221

(1570)

(2629)

(216)

392

655

540

274

7/20/60

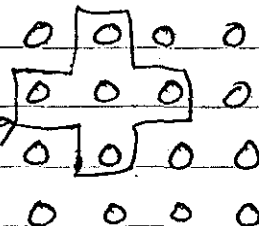
Exp. 2: Run 1

16 ^{one bottle full} plastic bottles put in 4x4 array with
2.0" ~~inch~~ edge to edge spacing

12 ³⁰ PM

Just Crit. at 18.97"

bottles
filled
remotely



Run 2

4x4 array as above but with nominal
2.1" edge to edge spacing

2 ²⁸ AM

began feeding 2 ²⁸ PM
Just Crit @ 30.85"

Run 3

4x4 array as above but with spacing
of 2.2" edge-to-edge
began feeding 8 ³⁷

7/21/60

8 ³⁵ AM

Instruments checked - OK

8 ⁵³ AM

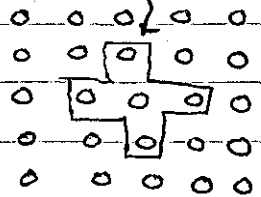
Just Crit @ 23.10"

7/21/60

Exp. 3 : Run 1

1²⁰_{PM}

started feeding 5x5 array at 2.4" edge to edge spacing

bitter
filled
remotely1³⁰_{PM} just crit 13.86"

Exp. 3 : Run 2

7/21/60

5x5 array with 2.5" edge to edge spacing

3¹⁵_{PM}

began feeding

3³⁰

just crit. 15.17"

7/22/60

Exp 3 : Run 3

5x5 array with 2.8" edge to edge spacing

10⁵⁰_{AM}

just crit 19.33

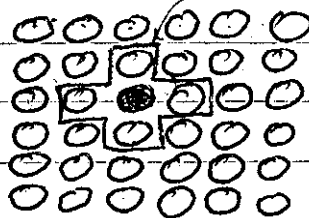
Exp 4

Run 1

remotely filled
~~5~~ 6 bottles

7/26/60

6x6 array
1/2" full bottles
3.6" edge to edge spacing



Instruments checked - OK

8¹⁵ AM

Started feeding into 5 bottles

8⁴⁰ AM

just crit ~~22.44~~" in 5 bottles
22.44"

7/26/60

3⁰⁰ PM

Exp. 5: Run 2

Began assembling 8x8 at 4.4" edge to edge spacing
to obtain multiplication curve

1st point: 3 rows of 8 (except 5 center bottles
are empty)

source is in center bottle

	C ₁	C ₂	C ₃
5 min count	9128	15443	993
	9032	15346	1040

3⁵⁰ PM

3 rows of 8 with 5 center bottles filled
to same ht. as rest

	C ₁	C ₂	C ₃
5 min count	18134	31366	2387
	1806	31251	237
	17994	31136	2341

278

7/28/60

1 ³⁵/_{PM}

5th point 7x8 with 5 empty bottles.

c ₁		c ₂		c ₃
24976	365	37775	407	2366 426

7x8 with all bottles containing soln

X	268038	67	382527	814	24887	948
---	--------	----	--------	-----	-------	-----

2 ⁴⁵/_{PM}

6th point (Critical)

8x8 array @ 4.4" spacing edge to edge
just crit with 21.11" in fine remotely
filled bottles

3 ²⁵/_{PM}

4 corner bottles removed from

8x8 array @ 4.4"

3 ³⁵/_{PM}

just crit. 22.60"

4.43

$$\begin{array}{r} 22.25 \\ 21.11 \\ \hline 1.14 \end{array}$$

Part 1
Beginning

7/29/60

Exp. 6¹ Mult. Curve for 10x10 array

Instruments checked: OK

1st point: 4 rows of 10 bottles each, spaced 5.0"
(five remaining, filled bottles ^{1/2} full) - edge to edge

	C ₁	C ₂	C ₃
8 ⁴⁰ AM	25240 2536 25474	39468 3915 38836	2107 2063 2019

9³⁵ AM 2nd point 5x10 all bottles filled, spaced 5.0"

	C ₁	C ₂	C ₃
	40423 .629 40317	60231.652 59974	2902 2825 .724

3rd point 6x10 all bottles filled to 22.25", spaced 5.0"

	C ₁	C ₂	C ₃
	61735 .414	89312 .438	4090 .504

4th point 7x10 all bottles filled to 22.25", spaced 5.0"

	C ₁	C ₂	C ₃
12 ⁴⁵ PM	104087 .248	147811 .264	6709 .306

5th point 8x10 all bottles filled to 22.25", spaced 5.0"

	C ₁	C ₂	C ₃
	191838 .132	273518 .143	11845 .173

280

7/29/60

6th Point

9x10 array of 1/2 full bottles spaced 5.0" ^{is 22.25"}
edge to edge

C₁

C₂

C₃

8/1

2²⁵
PM

539420

469

732426
31109

532

31109

459

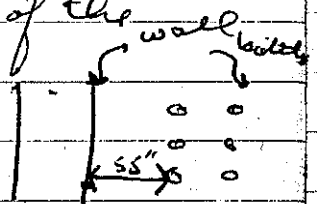
10
3 PM

7th Point

10x10 array of 1/2 full bottles spaced 5.0"

Just cut 20.60"

In the above array the distance between the 5 ft concrete wall and the edge of the nearest row of bottles was 55".



3

3³⁰
PM

The 4 corner bottles were removed from the 10x10 array
Just cut @ 21.45"

19 bottles which were stored immediately below the (above) array were moved to 102. Array same as above otherwise.

3⁵⁵
PM

Just cut @ 21.47"

8/1

4¹⁷
PM

4 more bottles remained from corner areas of 10 x 10 (leaving 92 bottles)
Just cut 23.26"

Page 2

Exp. 6, Run 1

8/1/60

10x10 array @ 5.1" edge to edge spacing
1/2 full bottles

Instruments checked - OK

2²⁰ PM

Started feeding into 5 remotely filled bottles.

2³⁷ PM

Just cut at 25.00"

Exp. 7, Run 2

3¹⁵ PM10x10 array plus five bottles added
as nearly in center of east face as
possible3³⁰

Just cut @ 21.50"

Exp. 7, Run 3

3⁵⁰ PM10x10 array plus three bottles (removed two)
added as nearly in center of east face as possible.

Just cut at 22.90

8/4/60

Two samples taken from manifold containing
solution from batch #1. #2-A sent for spec.*

Ref # 593106

2-A

g/g = .2671

2-B

G 52.152

G

T 8.668

T

*To see what was causing discoloration in sight
glass tube

The V-12 bottles previously used have been found to be somewhat cone-shaped since the wall thicknesses vary from about .2" at the top to about .5" at the bottom, more or less ~~varying~~ ^{changing} uniformly. In view of this 81 bottles made from polyethylene tubing (with bottom and top plates welded on) have been obtained from K-25, to check on the effect of wall thickness variation.

Measured OD of K-25 bottles = $5 \frac{9}{16}$
(results of several measures)

Measured ID of K-25 bottles = 5.08 in

5.11 "

5.06 "

5.04 "

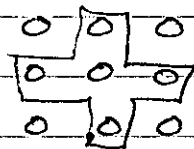
5.04 "

$\frac{5.08 + 5.11 + 5.06 + 5.04 + 5.04}{5} = 5.074$ ID _{ave}

8/10/60

Exp. 8, Run I

3x3 array of K-25 bottles (~~22.25" high~~)
 spaced 1.5" edge-to-edge. Five bottles
 in a cross are filled remotely
~~to~~ The other bottles contain
 solution to a height of 22.25",
 same as Y-12 bottles



11 ¹⁰/_{AM} Solu ht = 26.03" gas
 " " 25.98" sub
 26.00" crit

8/11/60

Exp. 9; Run 1

4x4 array of K-25 bottles spaced 2.6" edge-to-edge. All but remotely filled five "center" bottles have 22.25" of fuel.

9 ⁰⁰/_{AM} Instruments checked - O.K.

9 ³⁰/_{AM} Solu ht = 22.25 slightly sub.
 " " = 22.33 slightly super

284

8/14/60

Exp. 10 ; Run 1

8³⁰6x6 array spaced 4.1" edge to edge
not crit6x6 array of K-25 bottles spaced
4.1" edge to edge and filled to 22.25" (except
5 remotely filled bottles.)

Soln selign lin's remotely filled bottles = 19.17" just crit

Exp. 10 ; Run 2

8/14/60

6x6 array of K-25 bottles spaced 4.2"
edge to edge & increased above spacing 0.1")3⁴⁶ PMht in 5 remote^{filled} bottles = 21.33" just crit

Interpolated value = 4.24"

8/17/60

Exp 11 ; Run 1

8³⁰ AM1st point 6x8 K-25 bottles 5.3" spacing not crit2nd point 7x8 K-25 bottles 5.3 spacing not crit3rd array 8x8 K-25 bottles spaced 5.3"
edge to edge filled 22.25 (except 5 remotely filled)
5 remotely filled bottles = 21.80" just crit11⁰⁵ AM

Exp. 12 ; Run 1

8/18/60

9⁰⁵
AM

1st point 3x7 array of K-22 bottles spaced to
3.1" edge to edge (22.25" high) not cut.

The solution in the five center bottles was raised to 41.1" and was not cut. The linear instruments practically leveled though solution was added continuously for last several inches, indicating system would likely not be cut at any height.

9³⁰

2nd point 3x8 array of 1/2 full K-25 bottles. Not
cut at 22.25" in 5 center bottles.

Soln in the five center bottles was raised to 41.2" and the instruments indicated the system would not be critical at any height.

10⁴⁰
A.M.

3rd point 3x9 array of 1/2 full K-25 bottles
not cut at 22.25"

Soln in 5 bottles = 42.1" just cut

Exp 12 ; Run 2

3³⁰
PM

1st point 3x6 array of K-25 bottles spaced
2.8" edge to edge not cut (at 22.25")

4⁰⁰
PM

2nd point 3x7 array of K-25 bottles spaced
2.8" edge to edge not cut (at 22.25")

286

8/19/60

Exp. 12; Run 2 (cont.)

3rd pointinstruments checked OK
3x9 array of $\frac{1}{2}$ full K-25

bottles spaced 2.8" edge to edge

9⁰⁰
AM

Soln ht in 5 bottles = 20.93" just crit

4th point3x8 array of $\frac{1}{2}$ full K-25 bottles
spaced 2.8" edge to edge (removed

3 bottles from above array)

9²⁵
AM

Soln ht in 5 center bottles = 23.27" just crit

8/25/60

Exp. 13, Run 1

Plastic liners were inserted in 16
K-25 bottles. The plexiglas liners were
measured to be $0.20 \pm .02$ " thick and
the inside diameter of the bottles when with
plastic inserted was $4.63 \pm .03$ " as measured

Solution was removed from the bottles after liners
were inserted so as to maintain 22.25" height

1st point3x4 array spaced 2.6" edge to edge
not crit at 22.25" in five center bottles9²⁰
AM2nd point

4x4 array spaced 2.6" edge to edge

just crit with soln in five center bottles = 46.81"

8/25/60

Exp. 13, Run 2

1st point ^{1/2 full} 3x4 array of K-25 bottles
 containing plastic liners spaced 2.3" edge to edge
 not cut at 22.25" in 5 center bottles

10⁰⁰ PM

2nd point 4x4 array of 1/2 full (22.25")
 K-25 bottles containing plexiglas
 liners and spaced 2.3" edge to edge
 just cut with 20.96" in 5 "center" bottles

2⁰⁰ PM

Exp. 13, Run 3

4x4 array of 1/2 full K-25 bottles with
 plastic liners spaced 2.4" edge to edge
 just cut with solis in 5 center bottles = 23.96"
 Interpolated value of spacing = 2.34"

3⁵⁰ PM

288

8/29/60

Exp. 14; Run II

3x3 array of 4-12 bottles filled to height of $33\frac{3}{8}$ " spaced 1.45" 9/1
 Soln ht in 5 center bottles = 29.72" just crit
 3¹⁵ PM

8/30/60

Exp. 14; Run 2

3x3 array of 4-12 bottles filled to ht of $33\frac{3}{8}$ " spaced 1.55" 11
 Soln ht in 5 center bottles = 32.36" just crit.
 8³⁵ AM

Interpolated spacing for above two values = 1.59" 9/2

Exp. 15; Run 1

4x4 array of 4-12 bottles $33\frac{3}{8}$ " high spaced 2.70" edge to edge 10
 Soln ht in 5 remotely filled bottles = 27.55" just crit
 1⁰⁹ PM

Exp. 15; Run 2

4x4 array of 4-12 bottles $33\frac{3}{8}$ " high spaced 2.90" edge to edge 1²
 Soln ht in 5 remotely filled bottles = 33.63" just crit 9/6
 3⁰⁴ PM

Interpolated value = 2.89"

Exp. 16; Run 1

9/1/60

3x3 array of 4-12 bottles 44 1/4" high
spaced 1.80" edge to edge

crit

9²⁵

Solu ht in 5 remotely filled bottles 44 1/4" but
still sub. crit.

Exp. 16; Run 2

3x3 array of 4-12 bottles 44.25" high
spaced 1.70" edge to edge

crit.

11²⁰

Solu ht in 5 remotely filled bottles = 37.95" just crit

9/2/60

Exp. 17; Run 1

9"

1st point 4x5 array of 4-12 bottles 44.25"
high spaced 4.60" edge to edge

10⁵⁰ AM

Solu ht in 5 remotely filled bottles = 44" not crit

at crit

1³⁰ PM

2nd point 5x5 array of 4-12 bottles 44.25"
high spaced 4.60" edge to edge
Solu ht = 47" (up in vent) - not crit

at crit

9/6/60

Exp. 17; Run 2 Instruments checked - OK

5x5 array of 4-12 bottles 44.25" high
spaced ~~4.60"~~ 4.50" edge to edge

Solu ht in 5 remotely filled bottles = 39.94" just crit

290

9/9/60

Exp. 18; Run 1

Instruments checked OK

1st Point 6x9 array of full (4x4") y-12
bottles spaced 7.50" edge to edge

9/13/

11⁰⁶
AM

Soln in 5 remotely filled bottles raised to
40" (1 an out) - not crit

3

2nd Point 7x9 array of full y-12 bottles
spaced 7.50" edge to edge

No

Soln in 5 remotely filled bottles = 44" - not crit

3rd Point 8x9 array of full y-12 bottles
spaced 7.50" edge to edge

3⁰⁶
PM

Soln in 5 remotely filled bottles = 44" - sub. crit

4th Point 8x9 + 5 in 9th row of y-12 bottles
spaced 7.50" edge to edge

3⁵⁰
PM

Soln in 5 remotely filled bottles = 32.65 just crit

9/11

9/12/60

Instruments checked - OK

5th Point 9x9 array of y-12 bottles spaced 7.50"
edge to edge

9⁵⁵
AM

Soln in 5 remotely filled bottles = 28.08" just crit

Exp. 18 ; Run 2

9/13/60

9x9 array of full y-12 bottles spaced
7.60" edge to edge3 ⁵⁵ PM

Soln lit in 5 remotely filled bottles = 31.85" just crit

Notes: 9/13/60

Average volume of 13 full (44 1/2") y-12
bottles = 12.75 l as determined by weighing
contents and using density to determine vol.
average diameter determined from
the average vol = 4.73"

Exp. 18 ; Run 3

9/15/60

9x9 array of full y-12 bottles spaced
7.80" edge to edgeSoln lit in 5 remotely filled bottles = 47.17" just crit
i.e. Crit with soln up in vent tubes

$$\begin{array}{r} 5.375 \times 9 = 48.4 \\ 7.80 \times 8 = 62.4 \\ \hline 110.8 \end{array}$$

across array

Exp. 19; Run 1

9/15/60

Preliminary critical prior to running
flux traverse using ^{235}U chamber

9/16

$\text{min. } ^{235}\text{U} \text{ chamber on}$ South

Aluminum tubes containing
 $\frac{1}{2}$ " long by $\frac{1}{4}$ " dia fission
chamber is ~~so~~ ^{about} 40" from East West

tip to preamp
Center of active chamber is 1.75" from tip
1st traverse is to be taken

along center vertically and midway
between bottles of center row
and adjacent row, as shown →

line of traverse
is.

For this experiment the west most row of
9 bottles have been moved in toward
center 0.10" to increase reactivity

4¹⁵ pm

Salv ht = 45.8" just crit with counter
with counter with drawn so preamp
is removed from array

1¹

Exp. 19: Run 2

9/14/60

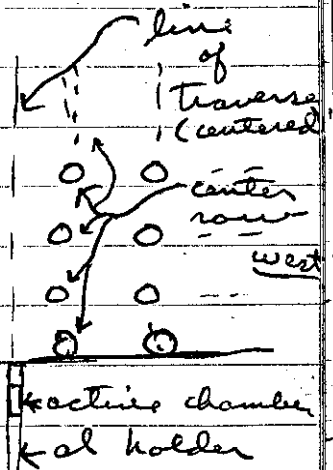
To further increase the reactivity of the array, the east most row (9 bottles) was moved in toward center 0.10" (west most row had been moved in previously)

Counter ~~reversed~~ ^{reversed} repositioned so that tip of aluminum tube holder was at the ~~east~~ ^{north} face of the array as shown when

the relay reads ~~70.98~~ ^{70.98}"

The center of the active (Boron) counter is 1.75" from the tip.

The line along which the traverse is to be taken is centered vertically and also centered midway between the center row of bottles and the adjacent row to the east



1¹⁵/_{PM}

Soln in 5 remotely filled bottles = 47.1 not crit

The apparent reduced reactivity of the system may be due to the fact that the counter motor drive mechanism has been moved from about 2' from the array to several feet from the array, thereby removing a little reflector.

Exp. 19; Run 3

9/16/60 Set up is the same as before (Run 2) except the east most and west most rows have been moved so they are now spaced 7.40" edge to edge from adjacent rows (spacing is same in north-south direction)

1 $\frac{45}{8}$ pm Temp = 23° C by thermometer

Slightly sub with with soln at 47.1

Exp. 19; Run 4

Set up same as above (Run 2-3) except a small amount of reflector was added to increase reactivity. The reflector consisted of a board (fir) 9.5' long x 7.6" wide x $\frac{3}{4}$ " thick placed against west face of array, centered vertically.

2 $\frac{45}{8}$ pm Soln in 5 remotely filled bottles = 42.52" just Crit (with pre amp outside of system) just C

3 $\frac{20}{8}$ pm With ^{counter} 5 soln = 99.99% (lit. 0.0) system crit of Soln
lit = 43.89" v. C
slight

	Selsyn Reading	Counter Position	Selsyn	C ₁	log N	C ₃	C ₁ /C ₃
3 ²² PM	0.0	-19.84		23147	.004	98087	.2359
	19.84	0.0		23560		96634	.2438
	19.84	0.0	43.15	30381	.004	112655	.2696
3 ³⁵ PM	"	"	"	31495	.005	115928	.2716
	26.44	6.6	42.89	34010	~.005	125655	.2706
3 ⁴⁷	"	"	"	34800	~.005	125854	.2765
	75.11	55.27	42.85	11162	~.005	128107	

Exp. 19: Run 5

9/19/60

set up is same as Run 4. Complete traverse to be taken.

Instruments checked - OK

	Selsyn ht	Counter Selsyn	Counter position*	C ₁	C ₃	C ₁ /C ₂	log N
just cut	8 ⁵³ AM	43.89	0.06	-19.77	33244	133866	.2483
	8 ⁵⁷	"	"	"	33204	133008	.2490
							.2496
cut	9 ⁰⁰	43.70	6.66	-13.18	39620	146597	.2703
	9 ⁰⁵	"	"	"	39844	147730	.2700
							.2697
slightly out	9 ¹⁰	43.50	9.96	-9.88	37874	140826	.2689
		"	"	"	36894	138810	.2673
							.2658

* Talking center of array as zero. Negative numbers measure south

normalized counts

	Solu ht	Counter Soluyn	Counter position	C ₁	C ₃	C ₁ /C ₃	C ₁ /C ₃
	43.34	13.25	-6.59	39943	144520	.2764	✓
9 ¹⁵	"	"	"	39892	143348	.2774 .2783	2.01
	43.34	16.54	-3.30	39852	147639	.2699	
9 ²³	"	"	"	40226	150439	.2687 .2674	2.01
	43.10	19.84	0.0	43375	157037	.2762	
9 ²⁹	"	"	"	43105	154877	.2773 .2783	2.01
	43.05	20.84	1.0	41849	151772	.2757	
9 ³³	"	"	"	41390	149223	.2766 .2774	2.01
	43.05	21.84	2.0	40751	149901	.2719	
9 ³⁸	"	"	"	40110	149173	.2704 .2689	2.01
	43.05	22.84	3.0	39876	148187	.2691	
9 ⁴²	"	"	"	39502	147508	.2685 .2678	2.01
	43.05	23.84	4.0	40241	147295	.2732	
9 ⁴⁶	"	"	"	40494	147200	.2742 .2751	2.01
	43.05	24.84	5.0	41086	149524	.2748	2.01
9 ⁵⁰	"	"	"	42375	153024	.2759 .2769	2.01
9 ⁵³ AM	42.90	25.84	6.0	42625	153911	.2769	2.01
	"	"	"	41899	151505	.2747 .2765	2.01
9 ⁵⁴ AM	42.90	26.84	7.0	41687	150928	.2762	2.01
9 ⁵⁸	"	"	"	41940	152437	.2757 .2751	
10 ⁰⁰	42.85	27.84	8.0	43023	155725	.2763	
	"	"	"	43122	154807	.2775 .2786	
10 ⁰⁵ AM	"	28.84	9.0	41761	152985	.2730	2.01
	"	"	"	41277	151805	.2725 .2720	

grad
log w
↓

	Solu ht	Counter Selayn	Counter Position	C ₁	C ₃	C ₁ /C ₃	log w
NDI	10 ¹⁰ 42.85	29.84"	10.0"	39430	15034	2623 2635 .2646	2.01
	"	"	"	39194	148113	.2696	
2.01	42.85	30.84"	11.0"	39032	144758	.2680 .2663	
2	10 ¹⁵ "	"	"	38478	144501	.2696	
3 2.01	42.85	31.84	12.0	39233	145507	.2698 .2700	2.01
7	10 ¹⁸ "	"	"	39330	145651	.2658	
2 2.01	42.85	33.04	13.2	39191	147433	.2675 .2691	
9	10 ²² "	"	"	40244	149540	.2569 2550	
9 2.01	42.85	36.32	16.48	38709	150704	.2531 2500 2432	
1	10 ²⁶ "	"	"	38493	152101	.2512 .2536	
8 2.01	42.85	39.61	19.77	38118	152459	.2501	2.01
2	10 ²⁹ "	"	"	39152	154336	.2414 2402	
2	"	"	"	39436	157673	.2389	
1 2.01	42.81	42.90	23.06	36893	152800	.2335 2353	
9 3.01	10 ³⁸ "	"	"	34929	146190	.2176 2163 2150	2.01
9 2.01	42.81	46.20	26.36	32706	140057	.2149 2077	
5 2.01	10 ³⁹ "	"	"	32425	136758	.2130 2110	2.01
2 2.01	42.82	49.50	29.66	29219	134293	.1956 1955	
1	10 ⁴⁶ "	"	"	28830	134100	.1954	
3	42.82	52.79	32.95	29402	136779		
6	10 ⁵¹ "	"	"	29284	138745		
0 2.01	42.82	56.08	36.24	27364	139914		
0	10 ⁵⁵ "	"	"	27452	140510		

	Sale wt	Counter w/eggs	Counter Point	cp	cd	4/4/43	fu
10 ⁵⁸	42.82	59.38	39.54	26843	144033	1864	206
"	"	"	"	26618	143883	1857 1850	72
	42.82	65.97	46.13	21903	145257	1508	210
10 ⁰⁸	"	"	"	21959	144662	1513 1518	-
	42.82	69.26	49.42	19921	144590	1378	
11 ⁰⁹	"	"	"	20203	145226	1382 1391	201
	42.82	72.56	52.72	16366	146307	1119	
11 ¹²	"	"	"	16597	148327	1119 1119	207
	42.82	59.38	39.54	28277	150654	1877	
11 ¹⁶	"	"	"	28329	151733	1872 1867	201
	42.82	46.20	26.36	35612	151381	2362	
11 ²²	"	"	"	35751	151124	2358 2364	201
	42.82	33.04	13.2	40863	153238	2667	
11 ²⁵	"	"	"	40916	154163	2661 2654	
	43.01	19.84	0.0	36292	130694	2777	
11 ²⁹	"	"	"	33890	122576	2711 2765	

2 min
count

11³⁰ Shut down.
Distance across array 110.6"

Exp. 20; Run 1

Cd covered traverse with identical
set up as in Exp. 19; Run 5
30 mil Cd tube used

		Soln	Counter	Counter	C ₁	C ₂	C ₁ /C ₂	Log W
		ht	Soln	Position				
201	2 min counts	2 ¹³ 43.22	19.84	0.0	18366	707474	.02596	.027
202		" "	" "	" "	18194	697403	.02603 .02609	.026
203		2 ²⁵ 42.96	26.43	6.59	17945	694715	.02583 .02546 .02548	.0229
204		" "	" "	" "	17336	680349	.02556 .02555 .02553	.0229
205		2 ³¹ 42.96	33.04	13.20 13.20	17316	677491	.02556 .02555 .02553	.0229
206		" "	" "	" "	17936	702507	.02362 .02368 .02373	.0220
207		2 ³⁹ 42.89	39.61	19.77	16752	709200	.02362 .02368 .02373	.0220
208		" "	" "	" "	16574	698360	.02362 .02368 .02373	.0220
209		2 ⁴⁵ 42.89	52.79	32.95	13308	686251	.01939 .01947 .01954	.02011
210		" "	" "	" "	13334	682367	.01939 .01947 .01954	.02011
211		2 ⁵³ 42.89	65.47	45.45 46.03	9744	692927	.01406 .01407 .01408	.05023
212		" "	" "	" "	9870	700773	.01406 .01407 .01408	.05023
213		2 ⁵⁹ 42.89	72.56	52.72	7627	713497	.01069 .01067 .01064	.03843
214		" "	" "	IF	7683	722310	.01069 .01067 .01064	.03843
215		3 ⁰⁶ 42.94	33.04	Chk Pnt 13.18 13.10	18844	735083	.02564 .02577 .02589	.09292
216		" "	" "	" "	19558	755301	.02564 .02577 .02589	.09292
217		3 ¹⁵ 43.19	19.84	0.0	17011	633927	.02683 .02687 .02691	.09611
218		" "	" "	" "	16499	613039	.02683 .02687 .02691	.025

1102 }
1101 }
10100