

BOOK92R

Notes:

"Room 202 Instrument & Equipment Record" on front

"NB-WI-4" on spine

"3-59/12-67" on spine

Blank pages: page opposite page 1, 299, 300, inside back cover sheets

- page 43 has 2 graph sheets taped to it
- page 75 has 1 (8.5x11) sheet taped
- page 78 has red tab with "inst location" wrote on it at top of page
- pages 86/87 have 3 large graphs between pages
- page 87 has 1 (8.5x11) graph and 1 (8.5x11) sheet taped to it
- page 99 has 3 graphs taped to it
- page 101 has 1 (8.5x11) graph sheet
- page 105 has 1 large graph sheet attached
- page 123 has 1 half sheet taped to it
- page 131 has 1 long thin sheet taped to it
- page 173 has 2 graphs taped to it
- page 176 has 3 small thin graphs taped to it
- page 177 has 7 small thin graphs taped to it

Scanned by:

Sheila Finch

RSICC /Oak Ridge National Lab.

September 3, 1999

NB-WI-4

3/58-



Standard Blank Book

No. 38

Journals Double \$ and Cts. no Units

S. E. Ledgers " " "

D. E. Ledgers Full Page Form "

Records with Margin Line

In 150, 200 and 300 Pages

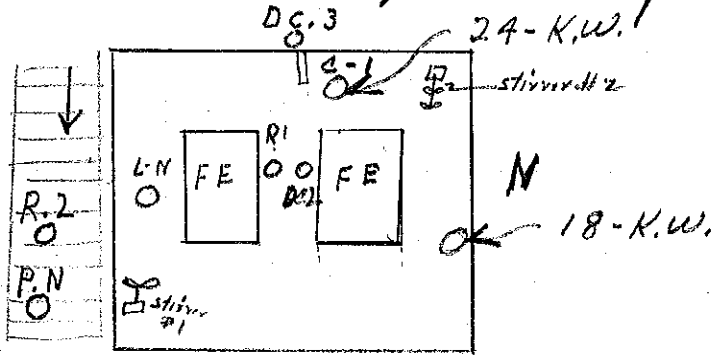
Made in U. S. A.

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

A BOORUM & PEASE PRODUCT

INSTRUMENT CHECK				
Date	3-20	1958	Time 8 ²⁰	AM PM Source No. 8
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	82	50x10		
DC-3	52	50x10		
Log N	7 sec	period		
R-1	8	10x1000		
R-2	8	Reprints		
P. M.	1/2"	800V		

Water pump seal leaks badly - pumps installed should be closed off when not in use to limit water spilled on floor.



Note - R-1 & DC-2 are under the tank.

3/20/58

Log N - Panel meter reads 0.15 } while
Recorder reads 0.036 } operating

Calibrating after shutdown
Co Hi
Panel .0003.3 3.1
Recorder .00029 2.9

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

3-20-58

water pump for Well leaks badly
seal probably needs adjustment

INSTRUMENT CHECK					
Date	3-21	1958	Time 8:35	AM	Source No. 8
		Trip			
Instrument	Value	Scale	Source	Distance	Start-Up Scale
DC-1					
DC-2	82	50x10			
DC-3	50	50x10			
Log N	7	1000			
R-1	8	1x1000			
R-2		responds			
P. M.	1/2"				

1:40 PM 3/21/58 Cal - meter recorder Log N
.00015 .00030
33 30

3-24-58

9:00 AM Log N calibrated at .00022 and 22 (on Red mark)
by J. Ellis Log N calibrated and linearity of
amp & recorder checked - see tag on instrument.

INSTRUMENT CHECK					
Date	3-24	1958	Time 2:15	AM	Source No. 8
		Trip			
Instrument	Value	Scale	Source	Distance	Start-Up Scale
DC-1					
DC-2	82	50x10			
DC-3	50	50x10			
Log N	7	1000			
R-1	6	10x1000			
R-2		responds			
P. M.	1"	800V		1"	

INSTRUMENT CHECK				
Date	3/25	1958	Time 9:30	AM
Instrument		Value	Scale	Start-Up Scale
DC-1				
DC-2	85	50x10		
DC-3	45	50x10		
Log N	7 sec	period		
R-1	30	10x1000		
R-2	ok			
P. M.	2"	800V		

DC 3 erratic on 1x5 scale jumped from 60 to 30 and oscillated

INSTRUMENT CHECK				
Date	3-26	1958	Time 8:30	AM
Instrument		Value	Scale	Start-Up Scale
DC-1				
DC-2	82	50x10		
DC-3	50	50x10		
Log N	7 sec	period		
R-1	8	10x1000		
R-2	Response			
P. M.	1"	800V		

INSTRUMENT CHECK				
Date	3-27	1958	Time 2:15	AM
Instrument		Value	Scale	Start-Up Scale
DC-1				
DC-2	64	50x10		
DC-3	50	50x10		
Log N	7 sec	period		
R-1	7.5	10x1000		
R-2	Response			
P. M.	1"	800V		

INSTRUMENT CHECK				
Date	3-28	1958	Time 12:30	AM
Instrument		Value	Scale	Start-Up Scale
DC-1				
DC-2	80	50x100		
DC-3	45	50x100		
Log N	7 sec	period		
R-1	8	50x1000		
R-2	Response			
P. M.	1"	800V		

INSTRUMENT CHECK				
Date	3-31	1958	Time 10:30	AM
Instrument		Value	Scale	Start-Up Scale
DC-1				
DC-2	82	50x100		
DC-3	48	50x100		
Log N	7 sec	period		
R-1	8	10x1000		
R-2	Response			
P. M.	1"	800V		

Varian controls on magnet supply - giving trouble magnet release safety.

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
		Trip		
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	92	50x10		
DC-3	46	50x10		
Log N				
R-1	8	10x1000		
R-2		responds		
P. M.	112"	850V		

Log N calibrate meter new value
 Hand+
 .0012 .00/
 110 100

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
		Trip		
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	90	50x10		
DC-3	45	50x10		
Log N	free	respond		
R-1	80	10x1000		
R-2		responds		
P. M.	112"	850V		

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
		Trip		
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	95	x500		
DC-3	52	x500		
Log N		trip		
R-1		trip		
R-2		responds		
P. M.		trip	Sattles responded to	

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
		Trip		
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1	*			
DC-2	90	x500		
DC-3	50	x500		
Log N		trips		
R-1		8		
R-2		resp.		
P. M.		trips		

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
		Trip		
Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	94	x500		
DC-3	50	x500		
Log N		trips		
R-1				
R-2				
P. M.		trips		

INSTRUMENT CHECK

Date 4/10/8 1958 Time 820 AM Y Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	85	X 500		
DC-3	50	X 500		
Log N	TRIPS			
R-1	"			
R-2	Resp			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 4/11/8 1958 Time 820 AM 8 Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	85	X 500		
DC-3	50	X 500		
Log N	TRIPS			
R-1	"			
R-2	Resp			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 4/14/8 1958 Time 820 AM 8 Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	90	X 500		
DC-3	50	X 500		
Log N	TRIPS			
R-1	"			
R-2	Resp			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 4/15/8 1958 Time 823 AM 8 Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	90	X 500		
DC-3	45	X 500		
Log N	TRIPS			
R-1	TRIPS			
R-2	Resp			
P. M.	TRIPS			

Note: LN Pile Power seems to Lag & then jump on scale after period M. has responded for minutes

INSTRUMENT CHECK

Date 4/16/8 1958 Time 823 AM 8 Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	90	X 500		
DC-3	50	X 500		
Log N	TRIPS			
R-1	"			
R-2	Resp			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 4/17/8 1958 Time 845 AM V Source No. V

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	75	on 500		
DC-3	45	on 500		
Log N	trip			
R-1	trip			
R-2	responds			
P. M.	trip			

* trip level lowered on DC-2 to that shown

INSTRUMENT CHECK

Date 4/18/58 1958 Time 11 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 70 x 500
 DC-3 50 x 500
 Log N TRIPS
 R-1 TRIP
 R-2 RESP
 P. M. TRIPS

INSTRUMENT CHECK

Date 4/21/58 1958 Time 1:20 PM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 75 x 500
 DC-3 50 x 500
 Log N TRIPS
 R-1 _____
 R-2 RESP
 P. M. TRIPS

INSTRUMENT CHECK

Date 4/24/58 1958 Time 8:10 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 70 10 x 50
 DC-3 50 50 x 10
 Log N TRIP
 R-1 TRIP
 R-2 RESPONDS
 P. M. TRIP

INSTRUMENT CHECK

Date 4/23 1958 Time 8:25 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 75 on 10 x 50
 DC-3 45 10 x 50
 Log N TRIP
 R-1 TRIP
 R-2 RESPONDS
 P. M. TRIP

INSTRUMENT CHECK

Date 4/24 1958 Time 11 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 70 x 500
 DC-3 48 x 500
 Log N TRIP
 R-1 _____
 R-2 RESP
 P. M. TRIPS

INSTRUMENT CHECK

Date 4/25 1958 Time 9:55 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 70 x 500
 DC-3 50 x 500
 Log N TRIPS
 R-1 _____
 R-2 RESP
 P. M. TRIPS

INSTRUMENT CHECK

Date 4-29 1958 Time _____ AM _____ PM Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>72</u>	<u>50 x 10</u>		
DC-3	<u>45</u>	<u>50 x 10</u>		
Log N	<u>7m</u>			
R-1	<u>80</u>	<u>100000</u>		
R-2	<u>responds</u>			
P. M.	<u>1908</u>			

INSTRUMENT CHECK

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

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

INSTRUMENT CHECK

Date 5/5 1958 Time 8²⁰ AM _____ PM Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>65</u>	<u>10 x 50</u>		
DC-3	<u>45</u>	<u>10 x 50</u>		
Log N	<u>trip</u>			
R-1	<u>trip</u>	<u>full scale</u>	<u>10 x 1000</u>	
R-2	<u>responds</u>			
P. M.	<u>trip</u>			

INSTRUMENT CHECK

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

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

INSTRUMENT CHECK

Date 5-7 1958 Time 9¹⁰ AM _____ PM Source No. PN113

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>65</u>	<u>50 x 70</u>		
DC-3	<u>45</u>	<u>50 x 10</u>		
Log N	<u>7m</u>			
R-1	<u>178</u>	<u>10 x 100</u>		
R-2	<u>responds</u>			
P. M.	<u>24</u>			

INSTRUMENT CHECK

Date 5/8 1958 Time 8²⁰ AM _____ PM Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>65</u>	<u>(50 x 50)</u>		
DC-3	<u>48</u>	<u>(50 x 50)</u>		
Log N	<u>responds</u>			
R-1	<u>65</u>			
R-2	<u>responds</u>			
P. M.	<u>trip</u>			

Date 5/9 1958 Time 2:30 AM

Instrument _____

DC-1 _____

DC-2 70 on 10x50

DC-3 45 on 10x50

Log N trip 10 sec

R-1 trip

R-2 responds

P. M. trip

Date 5/12 1958 Time 8:15 AM

Instrument _____

DC-1 _____

DC-2 65 10x50

DC-3 48 10x50

Log N trip

R-1 trip

R-2 responds

P. M. _____

Date 5/13/58

Instrument _____

DC-1 _____

DC-2 60 x 500

DC-3 50 x 500

Log N TRIPS

R-1 trip

R-2 _____

P. M. TRIPS

INSTRUMENT CHECK

Date 5/14/58 Time _____ AM

Instrument No. 8

Instrument _____

DC-1 _____

DC-2 48 x 500

DC-3 67 x 500

Log N TRIPS

R-1 _____

R-2 resp

P. M. TRIPS OK

INSTRUMENT CHECK

Date 5/15/58 Time _____ AM

Instrument No. _____

Instrument _____

DC-1 _____

DC-2 63 x 500

DC-3 45 x 500

Log N _____

R-1 TRIPS

R-2 resp

P. M. TRIPS

zero recheck; Probe: 0.11", manometer - .058
 Probe reserved.

INSTRUMENT CHECK

Date 5/17 1958 Time 9⁴⁵ AM Source No. Y

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	65	10x50		
DC-3	45	10x50		
Log N				
R-1	20	10x1000		
R-2	responds			
P. M.	800			

INSTRUMENT CHECK

Date 5/19 1958 Time _____ Source No. K

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	48x560			
DC-3	60x560			
Log N	TRIPS			
R-1				
R-2	RESP			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 5/23 1958 Time _____ Source No. _____

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	50	10x50		
DC-3	50	10x500		
Log N	trip			
R-1	trip			
R-2	responds			
P. M.	trip			

INSTRUMENT CHECK

Date 5/26 1958 Time 2³⁵ PM Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	50x50			
DC-3	50x50			
Log N	TRIPS			
R-1				
R-2	RESP			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 5/27 1958 Time _____ Source No. _____

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	45x50	x500		
DC-3	45	x500		
Log N	TRIPS			
R-1				
R-2	RESP			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 5/28 1958 Time _____ Source No. _____

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	40	10x50		
DC-3	45	10x50		
Log N	trip			
R-1	trip			
R-2	responds			
P. M.	trip			

INSTRUMENT CHECK

Date 5/29 1958 Time 8²⁵ AM Source No. ✓

Instrument _____

DC-1 42 10x50

DC-2 trip 45 10x50

Log N trip

R-1 trip

R-2 _____

P. M. trip

INSTRUMENT CHECK

Date 6/2/58 Time _____ AM Source No. ✓

Instrument _____

DC-1 _____

DC-2 20 10x50

DC-3 40 10x50

Log N trip

R-1 responds

R-2 responds

P. M. trip

INSTRUMENT CHECK

Date 6/3/58 1958 Time 8³⁰ AM Source No. _____

Instrument _____

DC-1 _____

DC-2 25 10x50

DC-3 45 10x50

Log N trip

R-1 trip

R-2 responds

P. M. trip

INSTRUMENT CHECK

Date 6/4 1958 Time _____ AM Source No. ✓

Instrument _____

DC-1 _____

DC-2 25 10x50

DC-3 40 10x50

Log N trip

R-1 trip

R-2 responds

P. M. trip

INSTRUM			
Date	1958	Time	
6/5		9:00	
Instrument	Value	Scale	Rate
DC-1			
DC-2	20	10 x 50	
DC-3	40	10 x 50	
Log A	trip		
R-1	trip		
R-2	responds		
P. M.	trip		

Date	6/6	58	
Instrument	Value	Scale	Rate
DC-1			
DC-2	20	10 x 50	
DC-3	40	10 x 50	
Log A	trip		
R-1	trip		
R-2	responds		
P. M.	trip		

INSTRUMENT CHECK	
Date	6/9 1958 3:5
Instrument	Value No. V
DC-1	~ 5
DC-2	3.5 10 x 50
DC-3	
Log A	trip
R-1	responds
R-2	responds
P. M.	trip

Note: DC-2 not operating properly. The trip level has been lowering over several days and is now ~5 on 10 x 50. Also chart viewing light(s) are intermittent. Trace is some times erratic.

INSTRUMENT CHECK

Date 6/24 1958 Time 10³⁰ AM Source No. Y

Instrument Volts Scale 10x50

DC-1 trip

DC-2 trip

DC-3 trip

Log # trip

R-1 trip

R-2 trip

P. M. trip

Kitchley trip

Backman - responds

INSTRUMENT CHECK

Date _____ 195____ Time _____ AM Source No. _____

Instrument _____ Scale _____

DC-1 _____

DC-2 _____

DC-3 _____

Log # _____

R-1 _____

R-2 _____

P. M. _____

INSTRUMENT CHECK

Date 6/27 1958 Time _____ AM Source No. _____

Instrument _____ Scale _____

DC-1 _____

DC-2 trip

DC-3 trip

Log # trip

R-1 trip

R-2 trip

P. M. trip

INSTRUMENT CHECK

Date 6/30 1958 Time 9³⁰ AM Source No. Y

Instrument _____ Scale _____

DC-1 _____

DC-2 4.5

DC-3 trip

Log # trip

R-1 trip

R-2 _____

P. M. trip

7-1 Removed DC-2 & R-2 chambers from 202 and installed in 201 between Well & Sid. Checked for Y-source response after warm-up. OK.
 ⇒ Do NOT use DC-2 as trip instrument. Level too low & unstable.

INSTRUMENT CHECK

Date 7-1 1958 Time _____ AM Source No. _____

Instrument _____ Scale _____

DC-1 _____

DC-2 responds

DC-3 4.5

Log # trip

R-1 trip

R-2 responds

P. M. trip

INSTRUMENT CHECK				
Date	7/2	1958	Time	
			Trip	
Instrument	Value	Scale	Source	Distance
DC-1				
DC-2	Resp.			
DC-3	40 X 500			
Log N.	Trips			
R-1	"			
R-2	Resp.			
P. M.	Trips			

INSTRUMENT CHECK				
Date	7-7	1958	Time	8:45 AM
				Source No. 8
Instrument	Value	Scale	Source	Distance
DC-1				
DC-2	response - trip n.c.			
DC-3	45	10 X 50		
Log N.	Case			
R-1	70	10 X 1000		
R-2	response			
P. M.	trip			

INSTRUMENT CHECK				
Date	7-8	1958	Time	10 AM
				Source No. 8
Instrument	Value	Scale	Source	Distance
DC-1				
DC-2	TRIPS			
DC-3	"	45 X 500		
Log N.	TRIPS			
R-1	"			
R-2	"			
P. M.	"			

Top of A Stack 32.4m above table

INSTRUMENT CHECK				
Date	7/11/	1958	Time	8:15 AM
				Source No. 8
Instrument	Value	Scale	Source	Distance
DC-1				
DC-2	Resp.			
DC-3	40	X 500		
Log N.	TRIPS			
R-1				
R-2	Resp.			
P. M.	TRIPS			

INSTRUMENT CHECK

Date 7-15 1968 Time 8 ^{AM} ~~PM~~ Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<i>responds</i>	<i>trip</i>		
DC-3	<u>35</u>	<u>10x50</u>		
Log N	<u>7</u>			
R-1	<u>92</u>	<u>10x1000</u>		
R-2	<i>responds</i>			
P. M.	<i>trip</i>	<u>800V</u>		

INSTRUMENT CHECK

Date 7/14/58 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<i>TRIPS</i>			
DC-3	<u>40</u>	<u>x500</u>		
Log N	<i>TRIPS</i>			
R-1	<i>TRIPS</i>			
R-2	<i>TRIPS</i>			
P. M.	<i>TRIPS</i>			

INSTRUMENT CHECK

Date 7-17 1968 Time 3 ^{PM} ~~AM~~ Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2				
DC-3	<u>35</u>	<u>10x50</u>		
Log N	<u>7</u>			
R-1	<u>6</u>	<u>10x100</u>		
R-2	<i>responds</i>			
P. M.	<u>800V</u>			

INSTRUMENT CHECK

Date 7-18 1968 Time 8 ^{AM} ~~PM~~ Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<u>28</u>	<u>1x100</u>		
DC-3	<u>15</u>	<u>10x50</u>		
Log N	<u>7</u>			
R-1	<u>9</u>	<u>10x1000</u>		
R-2	<i>responds</i>			
P. M.	<u>800V</u>			

INSTRUMENT CHECK

Date 7/23 1968 Time 2 ^{PM} ~~AM~~ Source No. 8

Instrument	Value	Scale	Source Distance	Start-Up Scale
DC-1				
DC-2	<i>responds</i>			
DC-3	<i>trip</i>	<u>7100</u>	<u>on 10x20</u>	
Log N	<i>trip</i>			
R-1	<i>trip</i>			
R-2	<i>responds</i>			
P. M.	<i>trip</i>			

INSTRUMENT CHECK

Date 7/29 1958 Time 8 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 responds (leg. passed)

DC-2 trip 35 on 10x50

DC-3 trip

Log N. trip

R-1 trip

R-2 responds

P. M. trip

INSTRUMENT CHECK

Date 7-31 1958 Time 9:30 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 responds - no trip

DC-2 40 10x50

DC-3 7 on 10x1000

Log N. responds -

R-1 800

R-2

P. M.

INSTRUMENT CHECK

Date _____ 195__ Time _____ AM Source No. _____

Instrument Value Scale Source Distance Start-Up Scale

DC-1 responds

DC-2 trip 20 10x50

DC-3 trip

Log N.

R-1

R-2 resp.

P. M. trip

INSTRUMENT CHECK

Date 8/4 1958 Time 9:30 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 resp

DC-2 50x500

DC-3 TRIPS

Log N. resp

R-1 TRIPS

R-2 ||

P. M.

INSTRUMENT CHECK

Date 8/5 1958 Time 1:40 PM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 resp.

DC-2 trip 40 10x50

DC-3 trip

Log N. trip

R-1 trip

R-2 resp.

P. M. trip

INSTRUMENT CHECK

Date _____ 195__ Time _____ AM Source No. _____

Instrument Value Scale Source Distance Start-Up Scale

DC-1

DC-2

DC-3

Log N.

R-1

R-2

P. M.

INSTRUMENT CHECK

Date 8/7 1958 Time _____ PM Source No. Y

Instrument _____

DC-1 _____

DC-2 responds

DC-3 30 10x50

Log N trip

R-1 trip

R-2 responds

P. M. trip

INSTRUMENT CHECK

Date 8-8 1958 Time 10⁴⁰ PM Source No. 8

Instrument _____

DC-1 _____

DC-2 poor response

DC-3 38 10x50

Log N 10 10x100

R-1 responds

R-2 3 80V

P. M. _____

R1 recorder
squeals &
hits below zero

INSTRUMENT CHECK

Date 8/11 1958 Time 12⁵⁶ PM Source No. Y

Instrument _____

DC-1 _____

DC-2 no response

DC-3 trip 40 10x50

Log N trip

R-1 trip

R-2 responds

P. M. trip

Zero on DC-3 was lowered and rechecked and the trip operated at the same reading on chart.

INSTRUMENT CHECK

Date 8/12 1958 Time 12⁴⁵ PM Source No. Y

Instrument _____

DC-1 _____

DC-2 responds

DC-3 40 10x50

Log N trip

R-1 trip

R-2 responds

P. M. trip

INSTRUMENT CHECK

Date 8/19 1958 Time 3:00 AM Source No. 8

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 responds
 DC-3 responds
 Log N. 7 sec
 R-1 10 (10x1000)
 R-2 responds
 P. M. 1 1/2" at 800V

INSTRUMENT CHECK

Date 8/20 1958 Time 8:15 AM Source No. 1

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 _____
 DC-3 trip 40 10 x 50
 Log N. trip
 R-1 trip
 R-2 responds
 P. M. trip

INSTRUMENT CHECK

Date 8/21 1958 Time 8:07 AM Source No. 1

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 _____
 DC-3 trip 40 10x50
 Log N. trip 7 sec
 R-1 trip 70 x1000
 R-2 responds
 P. M. trip

INSTRUMENT CHECK

Date 8/22 1958 Time 9:40 AM Source No. 1

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 _____
 DC-3 trip 40 10x50
 Log N. trip
 R-1 trip
 R-2 responds
 P. M. trip

INSTRUMENT CHECK

Date 8/25 1958 Time 9:10 AM Source No. 1

Instrument Value Scale Source Distance Start-Up Scale

DC-1 _____
 DC-2 _____
 DC-3 35 @ 10x50
 Log N. trip
 R-1 trip
 R-2 responds
 P. M. trip

INSTRUMENT CHECK

Date 8/26 1958 Time _____ Bar _____

Trip _____

Instrument Value Scale _____

DC-1 _____

DC-2 _____

DC-3 _____

Log N trip

R-1 respond (trip)

R-2 responds

P. M. trip

INSTRUMENT CHECK

Date 8/26 1958 Time 145 AM PM Source No. 1

Trip _____

Instrument Value Scale _____

DC-1 _____

DC-2 _____

DC-3 _____

Log N responds

R-1 trip

R-2 _____

P. M. trip

INSTRUMENT CHECK

Date 8/27 1958 Time 8²⁵ AM Source No. 1

Trip _____

Instrument Value Scale _____

DC-1 _____

DC-2 _____

DC-3 _____

Log N 35. 10x50

R-1 trip

R-2 responds

P. M. trip

INSTRUMENT CHECK

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

Trip _____

Instrument Value Scale _____

DC-1 _____

DC-2 _____

DC-3 _____

Log N _____

R-1 _____

R-2 _____

P. M. _____

INSTRUMENT CHECK

Date 8/29 1958 Time 8:15 AM Y

Instrument _____ Value _____ Source Distance _____ Chart-Up Scale _____

DC-1 _____
 DC-2 _____
 DC-3 trips 40 10x50
 Log N. trips
 R-1 trips
 R-2 responds
 P. M. trips

INSTRUMENT CHECK

Date 9/1 1958 AM _____ PM Source No. _____

Instrument _____ Value _____ Source Distance _____ Chart-Up Scale _____

DC-1 _____
 DC-2 _____
 DC-3 TRIPS-45x50
 Log N. 11
 R-1 11
 R-2 _____
 P. M. 11

INSTRUMENT CHECK

Date 9/24/58 1958 Time 7:00 PM Source No. J

Instrument _____ Value _____ Source Distance _____ Chart-Up Scale _____

DC-1 _____
 DC-2 out
 DC-3 trips 45 on 50 x 10
 Log N. operated
 R-1 4 on 1000 x 10
 R-2 responds
 P. M. trips at 1"

INSTRUMENT CHECK

Date 9/23 1958 Time 4:30 AM PM Source No. J

Instrument _____ Value _____ Source Distance _____ Chart-Up Scale _____

DC-1 _____
 DC-2 _____
 DC-3 55 10x50
 Log N. trips 7 sec
 R-1 10 10x1000
 R-2 _____
 P. M. 5:00 1/2 sec

10/22/58

Starting Range:	K1	10×10^{-13}	In Well tube.
for Well	K2	10×10^{-12}	Between tanks.
	R1	10^{-12}	Between tanks closer to Well
	R2	10^{-5}	Between tanks in paraffin
	PM2	1000	Between tanks near Well

H₂O @ 2' put in source - K1 3×10^{-13} to 6×10^{-13}
 R1 & R2 | Log 10^{-12} to 5×10^{-12}
 went thru peak - had to raise gain slightly
 since went neg. after source on.

At level 10^{-8} Log, 8×10^{-11} K1 PM set to 1100 to get 50% recorder reading.
 One may want to start with PM at even higher voltage.

Observations: { log trace seems sluggish - may be recorder
 PM - recording circuit could be dampened.
 Period - circuit extremely sensitive, may need to be dampened =

??
 00

Trouble w/ 3rd when S3 supply fan on -
 K2 - log N - most noticeably -> \uparrow div K2 neg
 log neg.
 K2, R1, R2, PM slightly -

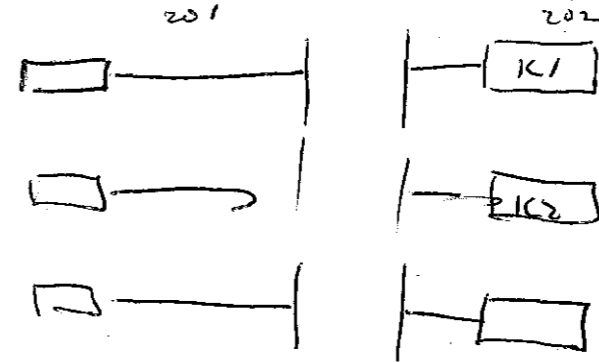
shielding?
 vibration?

10-23-58

Investigation of trouble with instruments -
 K2 & Log disturbed by operation of S-3 supply fan.

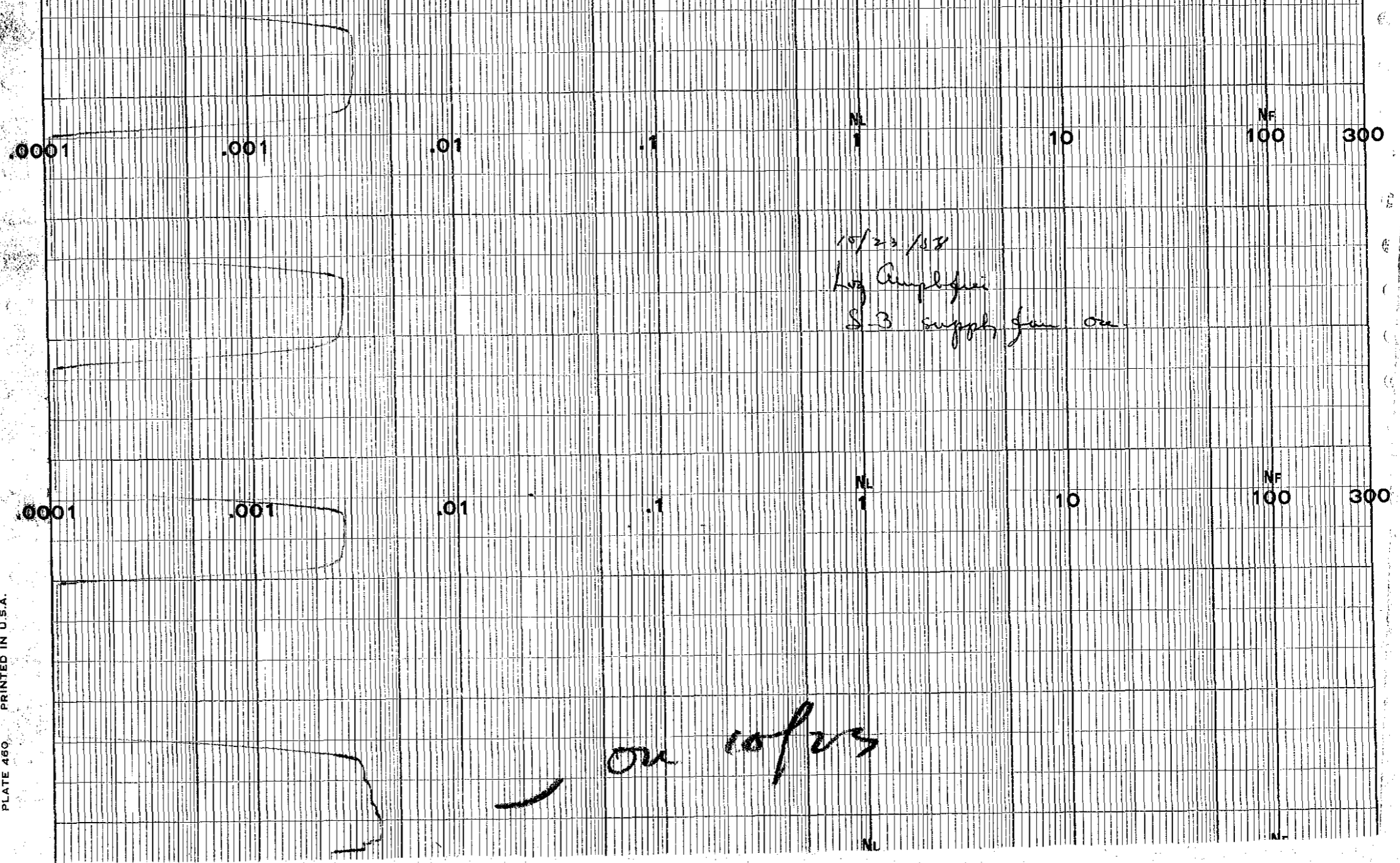
Turned on all recorders (K1, K2, R1-R2, Log, PM).
 Check & see if disturbance present (S-3 fan on).
 K1, R1-R2, PM do not seem to be bothered.
 K2 & Log amp. still acting wild. Peaks & valleys occur together.
 Disconnect K2 detector lead - still present on both
 Log " " - still present on both.

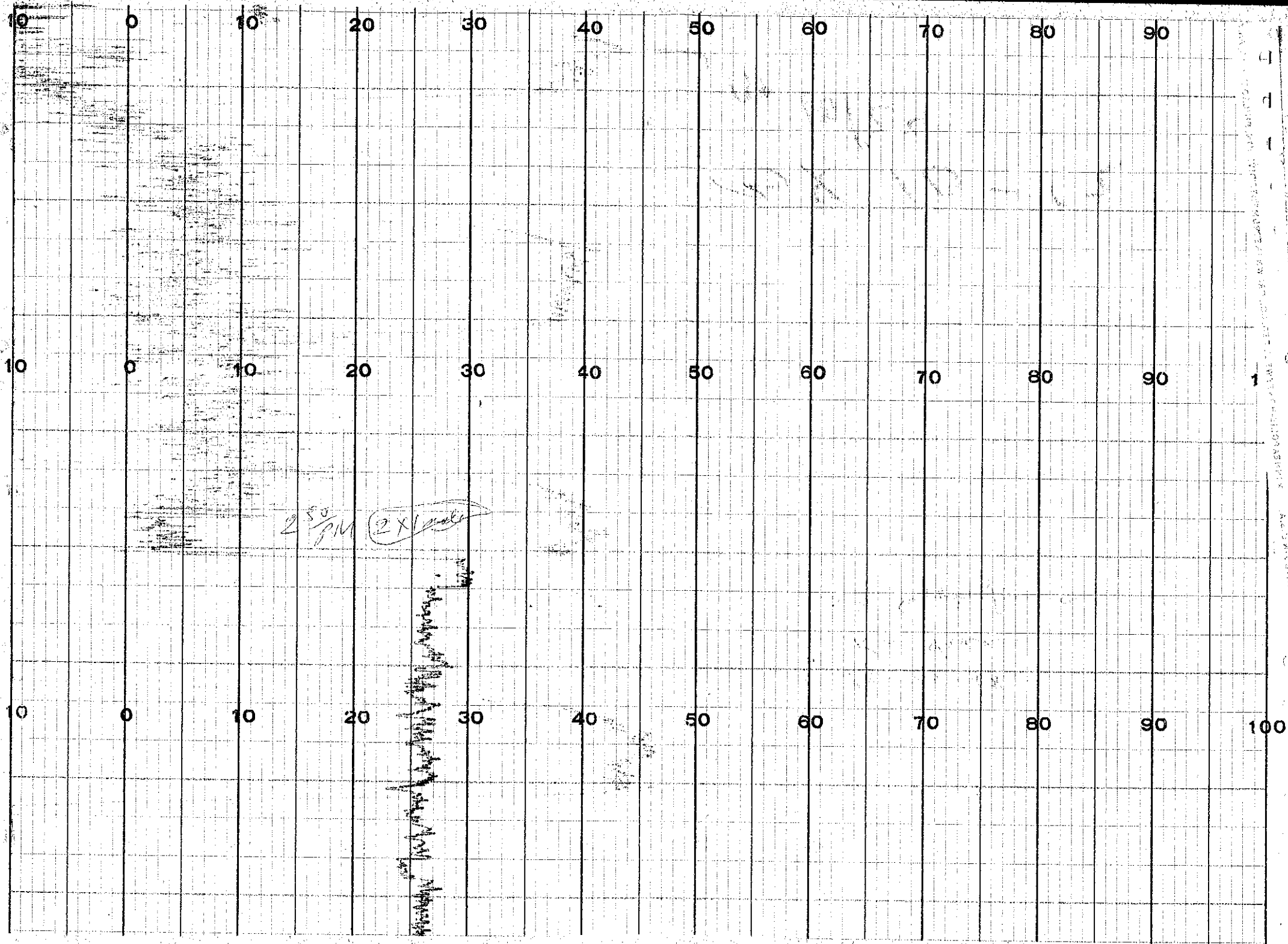
- Removed shield wire to receptacle K2-log - no change
- Short K2 shield-lead log wild - K2 - flat -



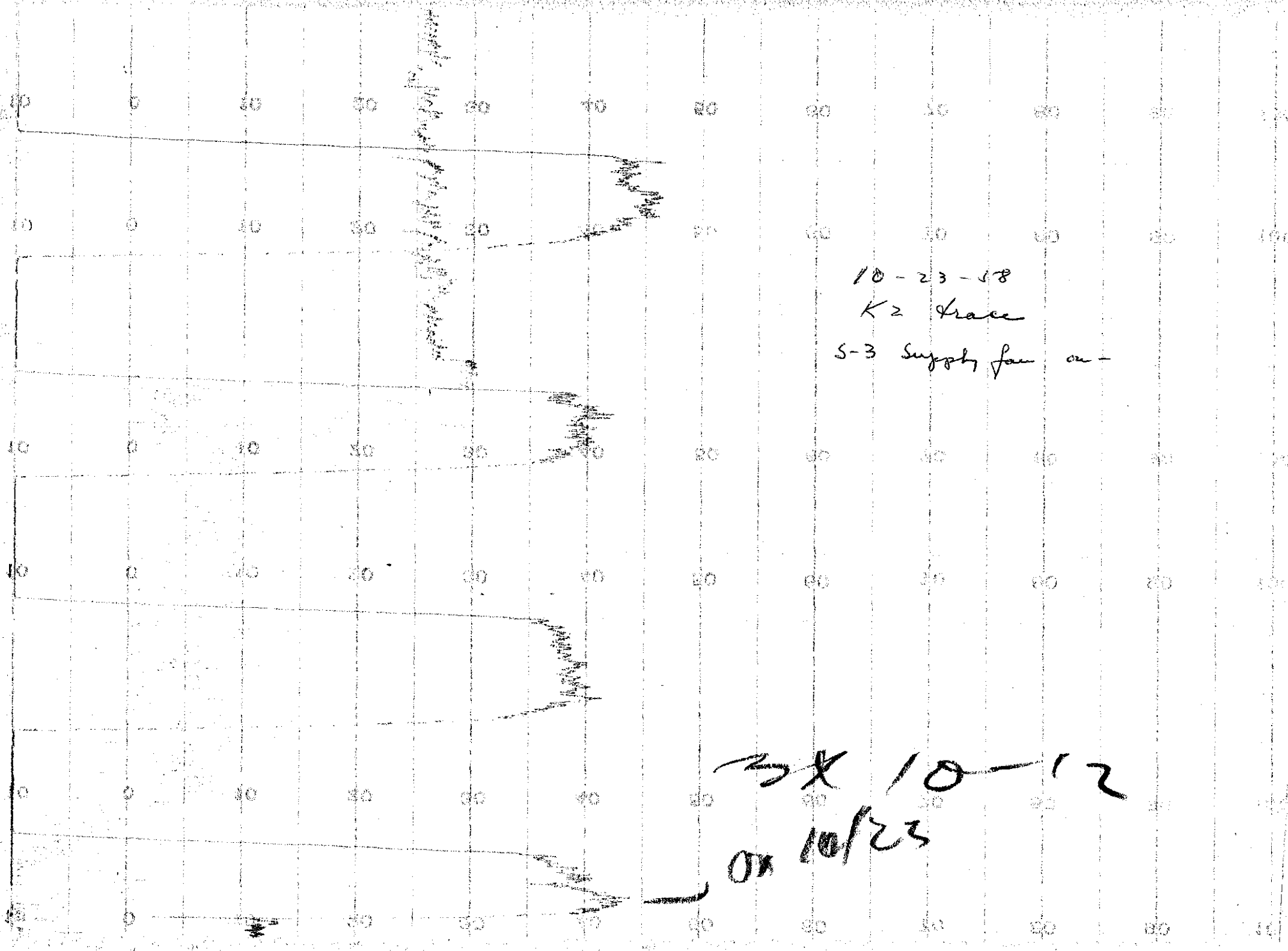
Seems to be cable -
 put another cable on K2 amp (either ^{old} C4-C5), terminated unshielded at JB. - trace smooth.
 w/o supply fan all normal -
 12:45 recorder in live circuit.

PLATE 460 PRINTED IN U.S.A.





151123456789



10-23-58
 K2 trace
 S-3 Supply fan on -

3X 10-12
 on 10/23

10-24 7:30 A: K1: Zero Check 1/4 d. low, set ; 10×10^{-13} - 2×10^{-13} (20%)
 K2: Zero Check sl. high, set ; 10×10^{-13} - 7.15×10^{-13} (15%)
 R1: x1 13%
 R2: x1 7%
 Log: Cal: 10^{-13} , 10^{-7} , 10^{-11} slight adj in 10^{-13} less width

No overnight false trips -

PM: w/o HV check zero OK Hpot @ 439 - I_L 1.2 HV =
 I_H 10 1100V
 I_R ~100u

Supply fan off - all normal -

Noted "long" term drift on K2 10-35% limits - this has been present since installation -

Swapped input leads at amplifiers. drift over on K1 drift is a cable 1/2 detector phenomenon.

Chamber for Sid:

Trace - settles to 4.5×10^{-13} & stays there - > 10 min

no drift noted K2 during this time

4:50 K2 peaked 18 to 33 in v 3 m. @ 33 - 1/2 m drops 3u -

Log up for 5×10^{-13} to 8×10^{-13} - slowly, as above

Made battery cable for Sid K2 chamber - RG62/U ~15', "leftover"

Chambers in Sid tubes.

Log again exhibits neg period ~15 sec after power level change - even neg. period for positive traces.

Ground loop:

Chamber out of tube on platform to ungrounded condition. ∞ period - definite ground loop

Insulated K1 & log well

00
00

INSTRUMENT CHECK				
Date	10-23	1968	Time	3:10
PM Source No.	5m, Ra			
Instrument	Value	Scale	Source Distance	Start-Up Scale
R1	>fs	3×10^{-11}		10×10^{-13}
R2	>fs	10×10^{-12}		3×10^{-12}
Log N	OK			
R1	>fs	x1-2		x1-4
R2	>fs	x1-4		x1-4
H.V.	1100V	>fs. operate		1100V

10/24

Service notes continued

Removed chain from chamber, taped flanges to insulate chamber from walls of tube & bottom flange. Chamber supported by wire loops on top flange & ropes to top of tube.

K2 & log N Sid treated this way. - & put back in tubes.

Log OK. No more constant ~15 sec period.

Instruments respond to source -

K2: 40% on 3×10^{-12} - 1.20×10^{-12} amps

Log(S): 1.1×10^{-12} a. 1.1×10^{-12} amps

2:35 recorders on -

Inst: K1 (Well) as before only insulated*
 Log (Well) as before only insulated*
 K2 (Sid) new location - insulated

} same inst. as before different conditions

Supply fan on ~2:40 -

all OK until 3:12 at which time K2 & log sharply neg & began cycling. - cable affected by temp. changes in supply air, blowing directly over cables -

T.M. = Trip Meter

10/27/58

8¹⁵ AM Instrument Preliminary Check

K1 Zero OK; Reading 1.8×10^{-13} (10×10^{-13}) 14% / 18
 K2 Zero 1/2 high, set; Reading 1.2×10^{-12} (3×10^{-12}) 30% / 44
 R1 15-20% - X1
 R2 15-20% - X1

PM - I_h 1.2 ma; I_H 10 ma; I_R 0 HV off RB 439

No false trips over weekend.

Recorder on -

Deflector on N duct - plywood clamped to beam -

C duct changed to extend to beam -

8:15 log N - Cal. points OK. Adj recorder - was high 10^7

All instruments respond to source - No trip checks

At 8:40 K2 & log dipped away after 3 m. no repeat of cycling, however

Recorder off - 852 A

SUGGESTED Instrument Check Form ->

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
				5mg Ra
Instrument	Value	Scale	Source Distance	Start-Up Scale
K1	>fs	3×10^{-12}		10×10^{-13}
K2	>fs	3×10^{-12}		3×10^{-12}
Log N	35			
R-1	>fs	X1	(6-7")	X1
R-2	>fs	X1	(6-7")	X1
P.M. Z	(45-50%) Trip Chk	1100v	(20" low)	Open 1100v
			(3" high)	

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
				5mg Ra
Instrument	Value	Scale	Source Distance	Start-Up Scale
K1	>fs	3×10^{-12}		10×10^{-13}
K2	>fs	3×10^{-12}		3×10^{-12}
Log N	35			
R-1	>fs	X1	6"	X1
R-2	>fs	X1	6"	X1
P.M. Z	45% Trip Chk	1100v	3" high	Open 1100v

K1: both trips about same

K2: VT trip before mtr

Drift on R2 record - also in amplified meter.

K2 & Log N still shows similar drift pattern much less drastic $.9 \times 10^{-11}$ - 1.3×10^{-12} avg - may be temp-cap effect

10/28

8¹⁵ AM K1 Zero v; N 25%; 2.5×10^{-12}
 K2 Zero v; N 33%; 10^{-12}
 R1 20-25% X1
 R2 20% X1
 PM I_h 1.2; I_H 10; I_R 0; RB 439 set zero "B" 437
 log - Adj cal -

INSTRUMENT CHECK				
Date	1958	Time	AM	PM Source No.
				5mg Ra
Instrument	Value	Scale	Source Distance	Start-Up Scale
K1	✓	3×10^{-12}		10×10^{-13}
K2	✓	3×10^{-12}		3×10^{-12}
Log N	✓			
R-1	✓	X1		X1
R-2	✓	X1		X1
P.M. Z	✓	Open	1100v	1100v

K2 (cont)
 not triggered
 work in Hall

PRC
 2/27

10-28-58 2:40 P Instrument Scram. Pm 1.

This instrument had been put into service
 v 1 hour. Indication Ip = 0, Pm 1 "Trip"
 Trouble - 6SN7 heater open - (new tube)
 Panel meter normally set between .4 & .8 ma.
 Trips @ .4 ma resets at .8 ma.

	Zero.	Panel Meter	Range	
10-29-58 8:17 A	K1: slightly neg-adj	17%	10x10 ⁻¹³	1.7x10 ⁻¹³ a
	K2: "	42	3x10 ⁻¹²	1.26x10 ⁻¹² a
	R1:	30	x1	
	R2:	21	1	
	Pm1: .58 adj to 60 -4 adj RB	—	—	

Pm2: 1.12; 10; to 4.39. HV on 1100 (63) Operate
 Log: Ad check - just OK, slight tadj on recorder

no false scram during night.
 Check R1-R2 pans - R-1 one plunger; R-2 three plungers.
 K2 & log still drifting together

Pm1: head attached & checked w/ source - OK

INSTRUMENT CHECK

Date 10-29-1958 Time _____ AM
 PM Source No. _____

Instrument	Value	Scale	Source Distance	Start-Up Scale
K1				
K2				
Log				
R-1				
R-2				
P.M. 1				
P.M. 2				

INSTRUMENT CHECK

Date 10/29 1958 Time _____ AM
 PM Source No. _____

Instrument	Value	Scale	Source Distance	Start-Up Scale
K-1	<u>1.5</u>			
K-2	<u>1.5</u>			
Log				
R-1	<u>1.5</u>	<u>X1</u>		
R-2	<u>1.5</u>	<u>X1</u>		
P.M. 1				
P.M. 2			<u>oper</u>	<u>1100 v</u>

10-30-58 Reactor Room Temperature 14°C - No demand for heat over night (Controller @ 25°F)

820 Instrument Readings - Heating underway DFC adding H₂O

R1: Zero 10×10^{-13} - 50%

R2: Zero slightly 3×10^{-13} - 54%

R1: X1 15%

R2: X1 neg.

Log:

PM1: .661 HV=0

PM2: 6% HV=0 RB=439 set to 437 for 2%

PM1 & 2 HV on. 1 = 1100V

2 = 1100V

R2 adj to 10% on X1 scale

INSTRUMENT CHECK					
Date	10-30-	1958	Time	12:15	PM
Trip		PM Source No. 2123			
Instrument	Value	Scale	Source	Distance	Start-Up Scale
R1	✓				
R2	✓				
Log N	✓				
R-1	✓				
R-2	✓				
P. M-2	✓				

INSTRUMENT CHECK					
Date	10/30	1958	Time	1:00	PM
Trip		PM Source No. 2			
Instrument	Value	Scale	Source	Distance	Start-Up Scale
R-1	to	3×10^{-12}			
R-2	to	3×10^{-12}			
Log N	na				
R-1	to	X1			
R-2	to	X1			
P. M.					
PM2			op.v.	1100V	

11-3-58 Instrument Start-Up Procedure - Daily

* Turn On - Linear Amplifier C1-C4

- Scalers C2 & C4

60 cycle scaler check:

	C ₁	C ₂	C ₃	C ₄
	3580	224 ¹² +3	3580	224 ¹² +3
	3570	14 ²⁵ +6	3570	14 ²⁵ +4

C2 - re-checked scale w scale Hall - 1" RCL op.v. 2000 3¹⁶+15

C2 - under table in Sid. 1/2" RCL op.v. 1800 80

C3 - got wet 10/31

C4 & C5 not connected -

Ion Chamber Channels - Zero & Background Check

R1 Zero - 1/2 hi - set same as 10/21 - 16% (3×10^{-12}) $.47 \times 10^{-12}$ - Adj rec. ^{new} _{Patte}

R2 1/2 hi - mid. no zero - 20% (3×10^{-12}) 1.2×10^{-12} - Rec OK.

R1 40% X1 - Rec OK

R2 14% X1 - Rec OK.

* Log Cal - adj necessary

PM1 Set 1.6 w/o HV. Set HV 1100V - Hammer. I = .597

PM2 Set 10⁴ Set R₀ RB=435 HV on @ 1100 v.

11/3/58

Relay of higher

INSTRUMENT CHECK				
Date	Time	Source No.	Trip	Start-Up Scale
11-3	8:40 AM	574	574	574
Instrument	Value	Scale	Source Distance	Start-Up Scale
K-1	✓	3×10^{-12}		same
K-2	✓	3×10^{-12}		same
Log N	✓			
R-1	✓	x1		same
R-2	✓	x1		same
P.M.L.	✓	1100		same
P.M.2	✓	1100 op.		same op.

Observations during run DFC & Nell run--

R2 - true beam - with sluggish - Needs service

K2 - Normal no steps in beam as reported 10-38

C2 - to LCRM - Beam +1

10²⁵ best working well. → Manometer not well - poor contact photo cell

Date	Run	Scale	Value	Scale	Value
11-4-58	Pawn on	1A 1-4	7160	1-4	447 8
	600 chd (2m)		7160		447 8
			7160		28 15

Ion Chamber & Pm channels (40x10⁻¹³)

K1 Zero check - (10×10^{-13}) 45% ✓

K2 Zero check slight change; (3×10^{-14}) 40% ✓

R1 15% x1 ✓

R2 50% x1 change zero ✓

PM1 .6 w/o HV 1KV on 1100V - I = .59+

PM2 Zero w/o HV < 5% Hg; I_L I_H ✓, HV on 1100V

Log Cal. adj. ✓

C4 - 1" AF₂ on bottom 1/2 edge Nell outside

INSTRUMENT CHECK				
Date	Time	Source No.	Trip	Start-Up Scale
11-4	8:30 AM	574	574	574
Instrument	Value	Scale	Source Distance	Start-Up Scale
K-1	✓	3×10^{-12}		same
K-2	✓	3×10^{-12}		same
Log N	✓	3500		
R-1	✓	as	x1	same
R-2	✓	as	x1	same
P.M.1	✓	1100		1100
P.M.2	✓	1100		1100

Level	Level	Level	Level
critical run 18-1: Log: 2.6×10^{-10}	45s.	20x10 ⁻⁹	240s. 4×10^2 OK.
LCRM: $450 \mu m$	40s.	$2700 \mu m$	220s. 3.8×10^4 OK.
K1: 5.2×10^{-10}	-	3.2×10^{-10}	7.1×10^9 ✓
Pm2: 3/1100	-	9/1100	26/850V ✓

moved by chamber 21" away to NW of tank -

Run	Log	LCRM	K1
Run 18-2			
Crit - CR1 6.87	.008 8×10^{-12}	2.4×10^3	2.6×10^{-10}
+ Per CR1 8.00	145×10^{-11}	125×10^4	-
+ Per	315×10^{-10}	325×10^5	-
+ per	245×10^{-9}	$4,02, 15, 2000$	-
- per	2.6×10^{-9}	1.45×10^3	2.6×10^5 (4.1×10^5)
+ Change	1.5×10^{-10}	$< 10^5$ - 185 cur	3.6×10^4
-	1.2×10^{-10}	-150	2.6×10^2
+	2.2×10^{-9}	60s	5×10^3
-	10^{-10}		2×10^2
+	1.8×10^{-9}		3.4×10^3

11-5-58 R m
 K1 34% - 3×10^{-11} (33%) (29) Zero OK
 K2 43% 3×10^{-12} (42%) (35) Zero slight change (Zero setting drifting)
 R1 28% x1
 R2 18% x1 (set up zero to get this)
 PM1 OK 1100V
 PM2 Bkg zero < 5% ✓; HV 1100 75% mod. 150µa -
 Log Cal. adj. - Recorder ckt sluggish

Counters - 60N: C1 — no power
 C2 28x256 + 22 ; 28x256 + 19
 C3 7180 ; 7180 ✓
 C4 28x256 + 22 ; 28x256 + 18

Inst. Check.

INSTRUMENT CHECK				
Date	Time	AM	Source No.	Shy. Ra
11-5-1958	8:45			
Instrument	Trip	Scale	Source Distance	Start-Up Scale
K-1	as	3×10^{-11}		3×10^{-11}
K-2	as	3×10^{-12}		3×10^{-12}
Log R				
R-1	as	x1		x1
R-2	as	x1		x1
P.M. 1	as	1100V		1100V
P.M. 2	as	1100V		1100V
	Adj. OK			

E.R.R.

Observations:

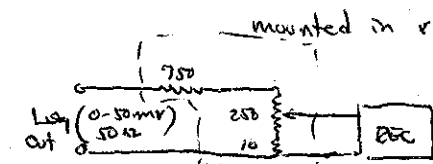
K1, R1, PM2 high background - assembly still "hot"
 K2 Zero drift slight - watch -
 Log - Recorder circuit sluggish
 R2 - Amplifier sluggish & noisier than R1.
 C1 fuse out - shop check needed.

Cleared 11/5

ER

11-5-58

Log Calibration w/ new divider



Signal	Rec	Panel Meter
10^{-11}	9.5×10^{-13}	$> 10^{-12}$
10^{-10}	was $> 10^{-11}$ set 10^{-11}	$> 10^{-11}$
10^{-9}	9×10^{-10}	$> 10^{-10}$
10^{-8}	9.1×10^{-9}	9×10^{-10}
10^{-7}	9.8×10^{-9}	9.9×10^{-9}
	$> 10^{-7}$	$> 10^{-7}$

Adj. w/ 10^{-7} set 10^{-7} amp & adj. see cal.

Signal	Rec	Panel Meter
10^{-7}	10^{-7}	10^{-7}
10^{-8}	9.1×10^{-9}	8.9×10^{-9}
10^{-9}	9.0×10^{-10}	8.3×10^{-10}
10^{-10}	9.8×10^{-11}	1.1×10^{-10}
10^{-11}	as	1.2×10^{-11}

more adj.
 10^{-7} set. 10^{-11} or.
 R-
 10^{-11} 1.15×10^{-11}
 10^{-10} 1.06×10^{-10}
 10^{-9} $.94 \times 10^{-9}$
 10^{-8} $.98 \times 10^{-8}$
 10^{-7} 1.07×10^{-7}

New log divider circuit improves recorder response greatly

11-6-58

Instrument Check Out

Counters: C1 Swollen still out -
 C2 27 + 248/256
 C3 7160
 C4 27 + 248/256 60N OK

Level of Safety:

K1 Zero ✓ $35\% - 1.0 \times 10^{-12}$ RRTM ✓
 K2 Zero ✓ $40\% - 3 \times 10^{-12}$ RRTM -
 R1 25% x1
 R2 10% x1 Need to reduce gain slightly to get west. to x1
 PM1 OK.
 PM2 Bkg < 5% HV 1100 Level = 20% 50µa -
 Log Cal. check - ✓



Units needing attention R2 - GI Scaler (C2 & C4) (L.A.)
 to change polarity output to
 R2 m -

INSTRUMENT CHECK

Date 11-6 1958 Time 8⁵³ AM Source No. 8

Instrument	Value	Scale	Source Distance	Start (ft)
K-1	✓ 10x10 ⁻¹²			3x10 ⁻¹²
K-2	✓ 3x10 ⁻¹²			3x10 ⁻¹²
Exp. R	3m			
R-1	X1			X1
R-2	X1			X1
P.M. 1	✓ 1100V			400V
P.M. 2	✓ 1100V			1100V

11-7-58 Counters - 600 - C2 28x256+13
 C3 7180
 C4 28x256+12 ✓

Level & Safety:

K1 Zero ✓ 72% (3x10⁻¹²)
 K2 Zero ✓ 40% (3x10⁻¹²)
 R1 26% X1 - Check T.P. - 140-150 l.f.s. 100%
 R2 4% X1 - 160% f.s. 100%
 PM1 ✓ 11/1100V

PM2 Zero adj to 5% (was just 5%) P.S. change from 434 to 433

Log - Cal check ok. - re-bal. recorder -

INSTRUMENT CHECK

Date 11/7 1958 Time 1³⁰ PM Source No. 8

Instrument	Value	Scale	Source Distance	Start (ft)
K-1	FS			
K-2	FS			
R-1	FS X1			
R-2	FS X1			
P.M. 1	1100V			
P.M. 2	1100V			

11-10-58 820A Counters : 600
 C2 (256) 7191 28+23 ; 28+26 7188
 C3 — 7190 7180 7180
 C4 (256) 28+22 ; 28+20 7184
 7190

Level & Safety:

Instrument	Zero	Range	Reading	Notes
K1	✓	3x10 ⁻¹²	84 82 71	(adj R to M)
K2	✓	3x10 ⁻¹²	44 44 36	✓
R1		50 X1		
R2		52 X1		
PM1		.6	11V on 1100V.	

PM2 In 8@PB433 set RB431.5 level 1100/62 R=15%

Log Cal - Amp Bal high set; 10⁷ OK. see very slight low adj up ok.
 8:30

INSTRUMENT			
Date	11/10	Time	11:20
Instrument	Volt	Scale	10 x 10 ⁻¹²
Log N	trip		
P.M. 1	trip	1100V	
P.M. 2	FS	1100V	

11-11 Counters C2, C3, C4

Level of Safety	Zero	Range	Reading		
			P	R	T
K1	✓	3x10 ⁻¹²	70	70	60
K2	✓	3x10 ⁻¹²	45	45	34
R1		x1		56	
R2		x1		16	
PM1		1100	58		
PM2	Blq w/o HV	RB 433	1100V		10-15%
Log	10 ⁻⁷	10 ⁻¹¹			

8064 OK

In case of PM1 & PM2, Blq taken w/o HV.

800

11-12-58	Level Safety	Zero/Blq	Range/HV	Reading		
				Panel	Recorder	Strip
	K1	✓	3x10 ⁻¹²	67	66	57
	K2	✓	3x10 ⁻¹²	30	30	24
	R1		x1	49	55	-
	R2	OS(-)	x1	10	11	-
	PM1	160	1100	60		
	PM2	195	at RB432, 1100		10%	

Log Cal check ✓

SER.

28 = 7168

Counters	C2 (x216)	24+11	7179
C3		7180	7180
C4 (x216)		28+11	7179

8119

807

11-13-58	Level Safety	Zero/Blq	Range/HV	Reading		
				Panel	Recorder	Strip
	K1	✓	3x10 ⁻¹²	58	58	49
	K2	W	3x10 ⁻¹²	4	4	2
	R1		x1	50	57	
	* R2	+15 50-adj	x1	(13)	15	big drift after adj
	PM1	16	1100V			
	PM2	15%	432, 1100V		10	

Log Cal - Amp Bal - 10⁻⁷ ok on log - Recorder high

Counter	C1	C2	C3	C4
	7180	7189	8290	7189
1159.8	7190	28+21	7191	28+21
	7200	28	7190	7190
		7210	7190	28+22
		28	7210	7210
		28		28 42

821

INSTRUMENT CHECK					
Date	11/17	1958	Time	9:45	AM
Source No.	Rayle				
Instrument	Value	Scale	Area	Distance	Start-Up Scale
K1	✓	3×10^{-12}			same
K2	✓	3×10^{-12}			same
R1	✓	X1			same
R2	✓	X1			same
PM1	✓	1100			same
PM2	✓	1100			same

Date	Level-Safety	Fans/Blkg	Range/HW	Panel	Reading	Strip
11-14-58	K1	✓	3×10^{-12}	58	58	50
	K2	✓	3×10^{-12}	3	3	2
	R1		X1	52	58	-
	R2	(15x16 or X1 adj.)	X1	46	45	-
	PM1	.6	1100			
	PM2	<5%	1100(92)			
	Log	Cal.	adj AB $\pm 10^{-7}$ only slightly		10	
	Counter	C1	(K250)	C3		C4
		2100.15	7200	28+35	7200	
			7200			

60u
 11-17-58 Counters - C1: 7180
 C2: 28+19 = 7187
 Fans-Blkg

Level Safety	Range-HW	P	R Reading	T
K1 very slt	3×10^{-12}	43	43	3
K2 very slt	3×10^{-12}	5	5	3
R1	X1	66	72	✓
R2	X1	13	17	✓
PM1	✓	1100	16	
PM2	<1%	1100	86	220

11-18-58 Level Safety

Level Safety	Fans/Blkg	Range/HW	P	R Reading	T
K1	✓	3×10^{-12}	48	48	39
K2	✓	3×10^{-12}	4	4	2
R1	70x16	X1	26	30	-
R2	70x16	X1	40	45	-
PM1	✓	1100			
PM2	adj R1 to 430	1100		40%	
Log	✓				

11-18-58 Blotting paper placed over ~ 75% of total cable runs in Room 101-201 includes junction box

11-18-58 Level Safety

Level Safety	Range-HW	P	R Reading	T
K1	3×10^{-12}	46	46	38
K2	3×10^{-12}	5	5	3
R1	X1	36	40	-
R2	X1	40	48	-
PM1	✓	1100		
PM2	430.5	1100		210%
Log	✓			

INSTRUMENT CHECK

Date 11-19-58 Time 1:40 AM

Instrument Value Scale Range Accuracy Resolution Scale

DC-1 _____

DC-2 _____

DC-3 trip FS 3 x 10⁻¹²

Log 1: resp.

R-1 resp. X 1.0

R-2 resp. X 1.0

P. M. _____

K-2

11/20/58 huf or

INSTRUMENT CHECK

Date 11-20-58 Time 1:30 AM

Instrument Value Scale Range Accuracy Resolution Scale

DC-1 Trips

DC-2 "

Log 1: Resp.

R-1 "

R-2 "

P. M. Trips

P. M. "

K-1
K-2

INSTRUMENT CHECK

Date 11/21 1958 Time 1:40 AM

Instrument Value Scale Range Accuracy Resolution Scale

DC-1 FS trip 3 x 10⁻¹²

DC-2 FS " "

Log 1: responds

R-1 trip FS X 1

R-2 _____

P. M. 1 trip

P. M. 2 trip

R-1
R-2

INSTRUMENT CHECK

Date 11/24 1958 Time 12:40 AM

Instrument Value Scale Range Accuracy Resolution Scale

DC-1 RC FS 3 x 10⁻¹²

DC-2 _____

Log 1: responds

R-1 FS on 21

R-2 _____

P. M. 2 trip

P. M. 1 no trip

INSTRUMENT CHECK

Date 12-8 1958 Time 8 AM Source No. 8

Instrument 1 Trip 1

Log No. 1

R-1 1

R-2 1

P. M. 1

INSTRUMENT CHECK

Date 12/9 1958 Time 9:30 AM Source No. 8

Instrument 1 Trip 1

Log No. 1

R-1 1

R-2 1

P. M. 1

INSTRUMENT CHECK

Date 12-10 1958 Time 8:00 AM Source No. 8

Instrument 1 Trip 1

Log No. 1

R-1 1

R-2 1

P. M. 1

all trip

SC1 10ml (3) 35980
 SC2 140 + 144
 SC3 35990
 SC4 140 + 152

12-10-58 11:05 - Scale 60v check - 10ml (S-4 had been without input strips for some time - this was pulled to use in 102 (S. way))

Install C3 LA - 123800

Install C4 LA 100363 - this output modified for neg. polarity to drive LEM.

to shop HV-3 (used for C1) low HV indicator - max 3000 -

C4-2 for PDL output conversion.

back in cash 12/10

12-11-58 Linear Amplifier settings - LA1 & LA3 @ 2.5mv sens.

HV 1 & 3 1800v. GAIN 4, RT 0.8µs, PDL = 30

HV 2 & 4 2000v. LA2 & LA4 @ 4mv sens

GAIN 4, RT 0.8µs PDL = 30

Ten minute counts - some water in cell

	C1	C2	C3	C4	C5
Room count	180 [?]	68 + 2	310	128 + 7	1 + 7
"	150	70 + 15	300	129 + 4	1 + 14
Exp. Sing Ra	139	66 + 13	290	129 + 15	1 + 5
C3 Sing Ra					
set HV C1 & C3 @ 1600v.					
	120	87 + 0	280	164 + 12	
	100	70 + 3	310	125 + 14	

was sent to gamma at 1800 volts.

INSTRUMENT CHECK

Date 12-16 1958 Time 8 AM Source No. Y

Instrument Value Scale Source Distance Source Trip Scale

~~K-1~~
K-2 TRIPS

Log RESP.
R-1 "
R-2 "
P.M. 1 TRIPS
P.M. 2 RESP

INSTRUMENT CHECK

Date 12/16 1958 Time 8 AM Source No. 8

Instrument Value Scale Source Distance Source Trip Scale

~~K-1~~ resp
K-2 TRIPS

Log RESP
R-1 "
R-2 "
P.M. 1 TRIPS
P.M. 2 "

INSTRUMENT CHECK

Date 12/17 1958 Time 10⁰⁰ AM Source No. Y

Instrument Value Scale Source Distance Source Trip Scale

~~K-1~~
K-2 trip FS 3×10^{-12}

Log response
R-1 response
R-2 "
P.M. 1 trip
P.M. 2 trip

Counties:

12-19- LAZ - out of service - Detector & PM 2 into LAZ -

12-22- PM - check NVP5100

old NVP5 - HV low - check 7x2

However - gain control limited - check -

12-22- Low (W.H.) Phy. 1% - P.B. 433

NV 1100 fresh - 5%

8:30

12-23-58

Counters: 600
10mi

LA 4-30 8,-	LA 4-30 8,-	LA 4-30 8,-	LA 4-30 8,-
SC1	SC2	SC3	SC4
35980 HW 1600 100	562+24 T	35980 HW 1600 0	562+26 HW 2000 60+15/16

Level of Safety	Zen/10h	Range/HW	Panel	Reading Recorder	Trip
K1	adj to $\pm 0.3/10$	3×10^{-12}	27	27	22
K2	OK 3,10	3×10^{-12}	8	8	6
R1	set 10 (x1)	x1	10	11	-
* R2	set 9 (x1)	x1	10	15	-
Pm1	GI, A1, to 60 neg @ 433 RB	1100 (H-30)			
Pm2	0-1 @ 433 RB IL 12 OK IA 210 set to 10	1100 (60)	10pa	42(0)	
Log:	Not trip over night on Sid.				
	Mag Prod \checkmark	10^{-7} high, set	10^{-1} adj	adj-	

may be slight
script check

Date 12/30-58

Source No. L

K1 trip

K2 trip

R-1 res

R-2 "

INSTRUMENT CHECK

Date 1/1/59 Time 9:40 AM Source No. V

K-1 res.

K-2 trip

R-1 res.

R-2 res.

P.M. 1

PM-2 trip

1-5-59^m Pm-2 primary screen was tripped - Panel condition:
 $I_L = 12 \text{ ma}$
 $I_H = 10 \text{ ma}$
 $I_R = 10-20 \text{ pa}$
 $HW = 1100 \text{ @ } 60$

All these conditions OK - Reset OK when pushed reset button

1-14-59 - Log channel do shop for service - slow period meter -

1-15-59: Counting channels for Sid basket experiments -

$\frac{1}{2}$ " BF₃ proportional counters: C1, C3

20pinature fission counter: C4

(C2 - 1" counter in side of Nell)

Had taken 1" counter off C4 previously to use this channel

With counters in place -

C1 normal operation

C3 no counts on

C2 very few counts.

INSTRUMENT CHECK			
Date	1-12	1959	Time 9:30 AM
Instrument	Trip		
DC	K2 trip		
DC	K1 resp		
DC	R1 resp		
DC	R2 resp		
P.M.	1	trip	11.000
P.M.	2	trip	7.800

INSTRUMENT CHECK			
Date	1-14	1959	Time 9:00 AM
Instrument	Trip		
DC	K Trip		
DC	K-1 Trip		
DC	R1 Trip		
DC	R2 Trip		
P.M.	1	Trip	
P.M.	2	Trip	

Cont *
1-15-59

C3 LA - main chassis bind -
→ C3 pre-amp & counter signal to LA2. (power from C3 LA)
LA2 (C3) output to Scale 3.

1-14-59

LA3 repair -
New detectors C2, 3, & 4 2" BF₃ proportional counter -
one from stock, two from South ans.

1-23-59

Log N Chamber -

Noise on Hall chamber -

- Try: ① - R4 11/8 in place of R4 6/8 no improvement
- ② - Short cable for battery voltage to check original cable. no change

③ - Use Sid battery on Hall - good trace -
Check Hall batteries - units were weak - replaced both 300 volt cells -

Chamber had in steel pipe in Hall. with new signal cable, 25' of R4 11/8, and original battery cable taped together -

Trace much improved period below 30 sec -

Background - 5×10^{-13} to 10^{-12} a-

1-28-59

Pm-2 low-level screen overnight - OK when reset -

2/20/59

low trip set 1.25 ma. Trips @ ≈ 350 p.a.

5817

52% on Trip range

(100% Operate = 57% Trips)

INSTRUMENT CHECK

Date 2/5 1959 Time 3⁵⁰ AM Source No. 1

Instrument K-2 trip

Log N responds (sid)

R-1 _____

R-2 _____

P. M. _____

INSTRUMENT CHECK

Date 2/6 1959 Time _____ AM Source No. _____

Instrument K-2 responds trips

Log N responds

R-1 _____

R-2 _____

P. M. _____

INSTRUMENT CHECK

Date 2/9 1959 Time _____ AM Source No. _____

Instrument	Value	Scale	Source Distance	Sound-Up Angle
DC-1	<u>K-2</u>	<u>trip</u>		
DC-2				
DC-3	<u>R-1</u>	<u>trip</u>		
Log N				
R-1	<u>PM 2</u>	<u>trip</u>		
R-2				
P. M.	<u>log N</u>	<u>responds</u>		

INSTRUMENT CHECK

Date 2/12 1959 Time _____ AM Source No. _____

Instrument K-2 trip

R-1 _____

R-2 _____

P. M. _____

5-3-59 Counter Check - use Channel C-2

Detector: 1" BF₃ α chr: RCL#

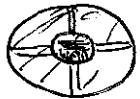
Pre-amp: AIC 205B #

1. Amp: AIC 204B # Y100303 (G R1 2W PDL
4 0.8 - 30)

Scaler: AIC 1010 Y89641 (Scale 256)

(HV = 1600v) 1580 @ 449

LCRM = Y123878



A → 0

1 minute ch.

Source hung from ring stand:

Detector in 3" paraffin:

	Register	Set	Clock	LCRM	Be
1:43					
1	384	13	59.6	9.5x10 ⁴	1.4x10 ⁵
2	383	233	59.6		adj
3	380	257	59.2		
1:49					
4	382	201	59.4		
5	381	75	59.4		
6	383	143	59.7		
7	384	13	59.8		
8	383	89	59.5		
9	382	185	59.9		
10	381	108	59.6		

Sam 6 =

Source Dist.

	Register	Set	Clock	LCRM
1	185	49	59.8	4.7x10 ⁴
2	183	72	59.3	
3	182	15	59.4	
4	181	98	59.8	
5	182	91	59.7	
6	183	125	59.8	
7	181	72	59.8	
8	179	189	59.2	
9	180	157	59.4	
10	182	196	59.7	

9 1/2

Blky

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

$$\sigma = \sqrt{\frac{N-1}{N}} \times \frac{1.65}{\sqrt{M}} = \frac{1.561}{\sqrt{M}}$$

70%

N=10

Run

Run	(256) Register	Interpolation	Counts	Correction factor	Counts/min
A	384	13	98217	$\frac{600}{596} \cdot 1.0067$	98976
	383	233	98281	$\frac{600}{596}$	98939
	380	251	97531	$\frac{600}{592} \cdot 1.0155$	98848
	382	201	97993	$\frac{600}{594} \cdot 1.0101$	98983
	381	75	97611	$\frac{600}{594}$	98597
	383	143	98191	$\frac{600}{597} \cdot 1.0050$	98682
	384	13	98317	$\frac{600}{598} \cdot 1.0033$	98641
	383	89	98137	$\frac{600}{591} \cdot 1.0084$	98961
	382	185	97977	$\frac{600}{599} \cdot 1.0017$	98144 *
	381	108	97644	$\frac{600}{596}$	98298

$$\sigma = \frac{1.561}{214.7}$$

$$= \frac{1.561}{.3147} \times 10^{-3}$$

$$4.969 \times 10^{-3}$$

4870 99432

98907

± 490.5

99197.5
98216.5

4994348
2497174

314.7

B

185	49	47409	$\frac{600}{598} \cdot 1.0073$	47565 *
183	72	46920	$\frac{600}{593} \cdot 1.0118$	47474 *
182	15	46607	$\frac{600}{594} \cdot 1.0101$	47078 ✓
181	98	46434	$\frac{600}{598} \cdot 1.0077$	46587 *
182	91	46683	$\frac{600}{597} \cdot 1.0050$	46916 ✓
183	125	46973	$\frac{600}{598} \cdot 1.0037$	47128 ✓
181	72	46408	$\frac{600}{598} \cdot 1.0077$	46561 *
179	189	46013	$\frac{600}{592} \cdot 1.0125$	46634 ✓
180	154	46234	$\frac{600}{594} \cdot 1.0101$	46701 ✓
182	106	46788	$\frac{600}{597} \cdot 1.0050$	47022 ✓

$$\sigma = \frac{1.561}{216.7}$$

$$= 72.03 \times 10^{-3}$$

46967 4.67173
47182
47173
2.335965
.33590

46967
216.73

± 338.3

47305.3
46628.7

3-26-59 Check out of counting channels for new series of experiments -

Channel	Function	Detector	Pre-amp	Remarks
1	Horizontal Traverse	U-235 min. fission counter	45B	1ft. S.S. extension
2	Normalizer Vertical Traverse	U-235 min. fission counter	349	2ft. S.S. extension
3	External Monitor	BF ₃ gas counter	44B	4ft S.S. extension
4		1" RCA	502	

During initial run - observed temperature drift on Log N & K-2, very marked. Cables had not been re-located after duct deflectors had been installed.

Solution concentration device seems to work satisfactorily.

3-30-59 Re-locate cable bundle which was dangling by side of deflector and sensitive to temperature change in air stream. Log N has some drift but in only one decade below 10^{-12} & 10^{-11} a. This is not cyclic as before, but more nearly normal.

3/30/59 K-2 Trip r source
 K-1 trip
 R-1 trip
 PM1 trip
 PM2 trip
 Log N respond

When source inserted in tray - instruments dropped, Log N by decade. Then K2 & Log N started in cycling.

Log N chamber placed under Sid. Jid on 4' ladder - Used another battery cable. Old one seemed to have loose connection on bread - -

Old lead - 3×10^{-12}
 New lead 1.8×10^{-11}

4/1/59

4/2/59 10³⁰ AM last. Check:
 K-1 trip Log N resp. trip
 K-2 trip PM-1 trip
 R-1 res PM-2 trip

4/3/59

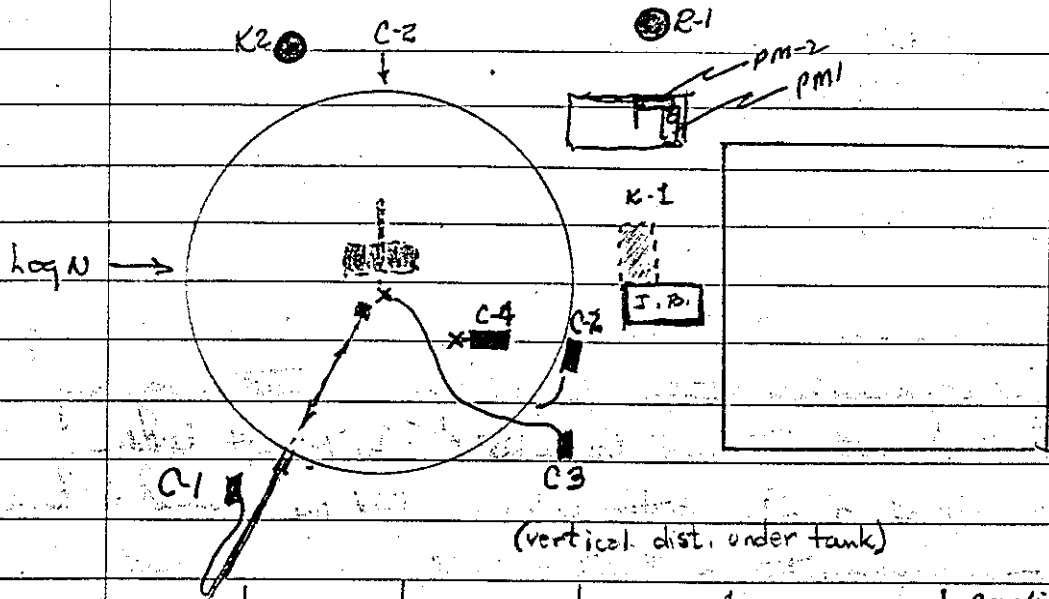
8¹⁵ AM

last Check.
 K-1 Trip Log N Trip
 K-2 " " PM-1 "
 R-1 " " PM-2 "

4-3-59

Instrument

Location: (after re-positioning Log N, PM-2, R-1, & "C-2")



Channel	Detector	Location	Pre-Amp	Amplifier	Amplifier Settings		
					Gain	Risetime	PDC
C-1	U-235 6' mic. fisson chr	In SID Horizontal Travers	AIC #5B	Y123801	16	0.8	15
C-2	BF ₃ proportional RCL # 1091	Under SID (18') 4ft above floor	AIC #	Y100303	4	0.8	30
C-3	U-235 6' mic fisson chr	In SID Vertical Travers	AIC #413	Y123806	16	0.8	30
C-4	U-235 6' mic fisson chr	In SID NORMALIZER	AIC #49	Y100363	16	0.8	30
K-1	BF ₃ chamber N-102	on GRATING UNDER TANKS (6')					
K-2	BF ₃ chamber N-101	on FLOOR BEHIND SID					
PM-1	Anthracene-931A	TABLE BETWEEN TANKS					
PM-2	Anthracene-5819	TABLE BETWEEN TANKS					
R-1	BF ₃ chamber E-10	on FLOOR NEAR TABLE					
R-2		OUT OF RACK - TO SHOP					
Log N	BF ₃ chamber E-112	UNDER SID 13' above floor (9')					
* C-2	pre-amp	L.V. power from	Y100363				
C-4	"	"	Y100303				

4-6
8:1

4-6

9:4

4-3-59

3:25

Calibrate Log N: ~~Set meter to 10⁻⁷~~Check Amp. Bal. for 10⁻¹³ on (Meter) RecorderCal 10⁻⁷ Set meter to 10⁻⁷; adj. Recorder to read 10⁻⁷Cal 10⁻¹¹ Adj. Bal. to read 10⁻¹¹re-check 10⁻⁷ & 10⁻¹¹ points.

OK

4-6-59:

8:15 AM

Calorimeter: Lamp burned out - some difficulty in mounting of new lamp - mount flange on 3 studs - solder lamp base to flange -

(To Replace) - unsolder lamp from flange - leave flange attached. J. E.

4-6-59:

9:45 AM

Log N Calibration: { Amplifier Bal = 1.15×10^{-13} (meter)AS IS readings } Set 10⁻⁷ = 118 (Recorder)(meter = 1.0×10^{-7})Set 10⁻¹¹ = .0114 (Recorder)(meter = 1.1×10^{-11})Meter & Recorder not together - Cal Recorder at 10⁻⁷ w meterRe-Calibrate: { amp bal - at 10⁻¹³
cal 10⁻¹¹ } OK
" 10⁻⁷

Some indication of drift in Calibrat Pat (Recorder)

Current Source Calibration:

INPUT	Recorder	INPUT	Recorder
10 ⁻¹²	= .004	10 ⁻⁹	= 3.9
10 ⁻¹¹	= .041	10 ⁻⁸	= 41
10 ⁻¹⁰	= .41	5 x 10 ⁻⁸	= 230

J. E.

4-6-59: 1:10 PM - COLORIMETER:

Recorder oscillates - period = about 1 min.
Changed photo cell ~~to~~ from sample pipe
to std bottle position. Some oscillations
present.

Turned off circulating pump - oscillations
still there.

observe Null indicator on Box = fluctuations
note chassis is shock sensitive. also

Shoob tubes in sockets for insured contact.
Changed photo cell back to ~~sample~~ sample pipe.

Frank's { Reduced sensitivity: 5 g sample = 25
20 g Sample = 5 J.F.E.

4-6-59: 2:45 PM - ~~MONOMETER~~ MONOMETER - Dancing - reduced gain - align cell. J.F.E.

4-7-59- 8:10 AM. Colorimeter: Recorder "hunts" on "standardize".
1 1/2 V cell checks OK, changed 1 1/2 cell for observation
Ellis

4-7-59 Inst Check

K-1	Tripp	Log 71	Tripp
K-2	"	PM - 1	"
R-1	"	PM - 2	"

4-7-59: 9:00 AM - Log N. Check Calibrations!
Log N. amplifier = OK. Touched up very slightly.
Recorder cal with meter on 10⁻⁷ = noted error. adjust. J.E.

4-7-59- 10:30 AM - Log N. Error again in Recorder vs meter.
Difficult to set. Changed divider networks to
single 1K helipot - observe - J.E.

4-9-59. 10:00 AM - Colorimeter - Some drift noticed - not too bad.
Removed triode from amplifier, (FRANK). Put in
5965. Now excessive drift.
11:15 AM - Drift less but still excessive. Put
original tube back in.

4-7-59: 1:04 PM - Photomultiplier - Set recorder Bal - (Frank).

4-7-59: Log N. Checks - 1:15 PM - all OK - J.E.

4-8-59: Log N. Checks - Calibrated amplifier (was very close)

8:30 AM NOTE: Recorder does not return to same place,
depending on direction (up or down scale).
increased gain of recorder. Panel meter zero
off - set this - agreement between meter &
Recorder now much better. J.E.

4-8-59: 8:45 PM 2 moved from position on table (approx 6ft from tanks, & 3 ft off floor) to a point further North East (10 ft from tanks and 8 ft above floor) (Franks) JE

4-8-59: Inst Checks: K₁, K₂, R₁, PM 2, PM 1, Log No. all respond. (Franks) JE

4-8-59: 2:30 PM - Calorimeter - bad noise - ground lug on filter section loose - Tightened - OK

4-9-59: 11:20 PM - Reported C₁ throwing in counts. Made observation - no "thrown in" counts seen except on C₄ when central switch thrown

4-9-59: 3:00 PM - No complaint of C₁ - C₄ Reported fluctuating: Can see no good cause - C₂ & C₄ preamps & Lin Amps cross connected - Tried un-cross connecting C₂ & C₄. Both seem to count OK. JE Made slight change in C₄ scaler discriminator setting.

4-12-59 Counter check

9:10 AM

Scalor Franks moved to his normal position

P6, 60W
1045 reg

	C ₁	C ₂	C ₃	C ₄
① Lin Amp Setting	16, 0.8, 15	4, 0.8, 30	16, 0.8, 30	16, 0.8, 30
② Noise PDL	2	5	3	9
③ Voltage Sensitivity at ①	0.005	.045	.011	.017
④ Voltage Sensitivity at pre-amp	.0007	.0027	.0006	.0024*
Pre-amp number	48B	502	44B	349
After switch JVC2-C4		did not reach		.00115
pre-amp gain				

11:13

Change C₂:
LA Gain 2, 0.8, 30

pulses sufficient to count.

*

after below switch pulse clear.

trace not clean - got varying amplitude for fixed signal. put pre-amp on C₄ LV C₂ pre-amp & C₂ LV

4-14-59 Check C-4:

Grounding pre-amps C1 & C4 out down on frame

Discriminator Settings:

	C1	C2	C3	C4
Scale	-7	+50	-7	+40
Amplifier	10	30	30	50
Gain (RT)	16(0.8)	4(0.8)	16(0.8)	16(0.8)

C2 under Well, no shield, with or without floor base.

- 4/15/59
- PM-1 trip
 - PM-2 trip
 - R-1 res
 - K-2 trip
 - K-1 trip
 - Log W - trip

Counters: seemed to give better data later in afternoon

Placed batteries close to pre-amps -
 C1 & C3 w 3' cable RG 62/U
 C4 w 6' cable RG 7/U

Improvement of data during day 4/14 may be result of instrument stabilization after tube change on C4.

DPC put C2 in howitz on platform under Well, looking toward Sid

4/15/59
11:40A

Counter rates spread still broad.

Pre-amps C1 & C4 some service required (also C3)
 Amp C1 & C3 some service required

3:50 PM
mine
59.8

Well log

drain bed

4:55 PM

@10"	C1	C2	C3	C4	(RT 0.8) small C's K1 10/10/10
		48,534		33,879	6.75 x 10 ⁻¹⁰
	29280	189 + 150	12960	132 + 87	6.75 x 10 ⁻¹⁰
	28300	188 + 174	13120	33,651	6.77 x 10 ⁻¹⁰
	27930	44,839	12810	131 + 115	6.68 x 10 ⁻¹⁰
	25170	186 + 223		33,341	6.70
	25110	48,733		130 + 61	6.76
	25170	189 + 49	13250	33,263	6.85 x 10 ⁻¹⁰
	24760	49,474	13370	129 + 239	6.90 x 10 ⁻¹⁰
	24830	49,864	13590	33,127	7.00 x 10 ⁻¹⁰
	24370	193 + 66	13790	131 + 191	7.06 x 10 ⁻¹⁰
	23980	49,864	14080	33,983	7.08 x 10 ⁻¹⁰
	23040	194 + 200	13890	132 + 191	7.09
	22770	50,478		34,398	7.10
	22430	197 + 46		134 + 94	7.11
	21120	198 + 99		34,825	7.11
	21750	50,891		136 + 59	7.11
		52,187		35,210	7.12
		198 + 203		137 + 138	
		51,402		35,445	
		200 + 202		138 + 117	
		50,893		35,558	
		198 + 205		138 + 230	
		51,130		35,490	
		199 + 186		138 + 162	
		51,471		35,506	
		201 + 15		138 + 178	
		51,834		35,532	
		202 + 127		138 + 194	
				35,968	
				140 + 128	

4-16-59

8:08 ⁷

Instrument check - ✓

8:35 ²

PDL 40 C1	C2 ³⁰	C3 ³⁰	C4 ⁴⁰	K1
12460	189 +112	7580	135 +119	6.87 x 10 ⁻¹⁰
32500	188 +0	7590	135 +215	6.88 x 10 ⁻¹⁰
13210	142 +95	7520	137 +96	6.91

Adjust PDL on C1 & C3 - pulse amplitude dropped slightly over night

PDL 30	C1 ⁶⁵	C3 ²⁵	Amplitude	6.95
45300	142 +254	18950	139 +112	6.96
44490	141 +6	18770	137 +73	6.96
45240	193 +140	-	138 +205	6.96
45050	193 +79	18930	139 +219	6.96
45340	194 +77	18940	137 +174	6.95
45060	192 +87	18980	136 +218	6.91
45120	190 +227	19140	137 +217	6.91
45280	188 +73	18910	138 +0	6.905
44940	190 +62	19090	137 +24	6.90

C3 for vertical traverse -

1/23/59 (2)
Vertical Traverse
C3, CE
counter up-o

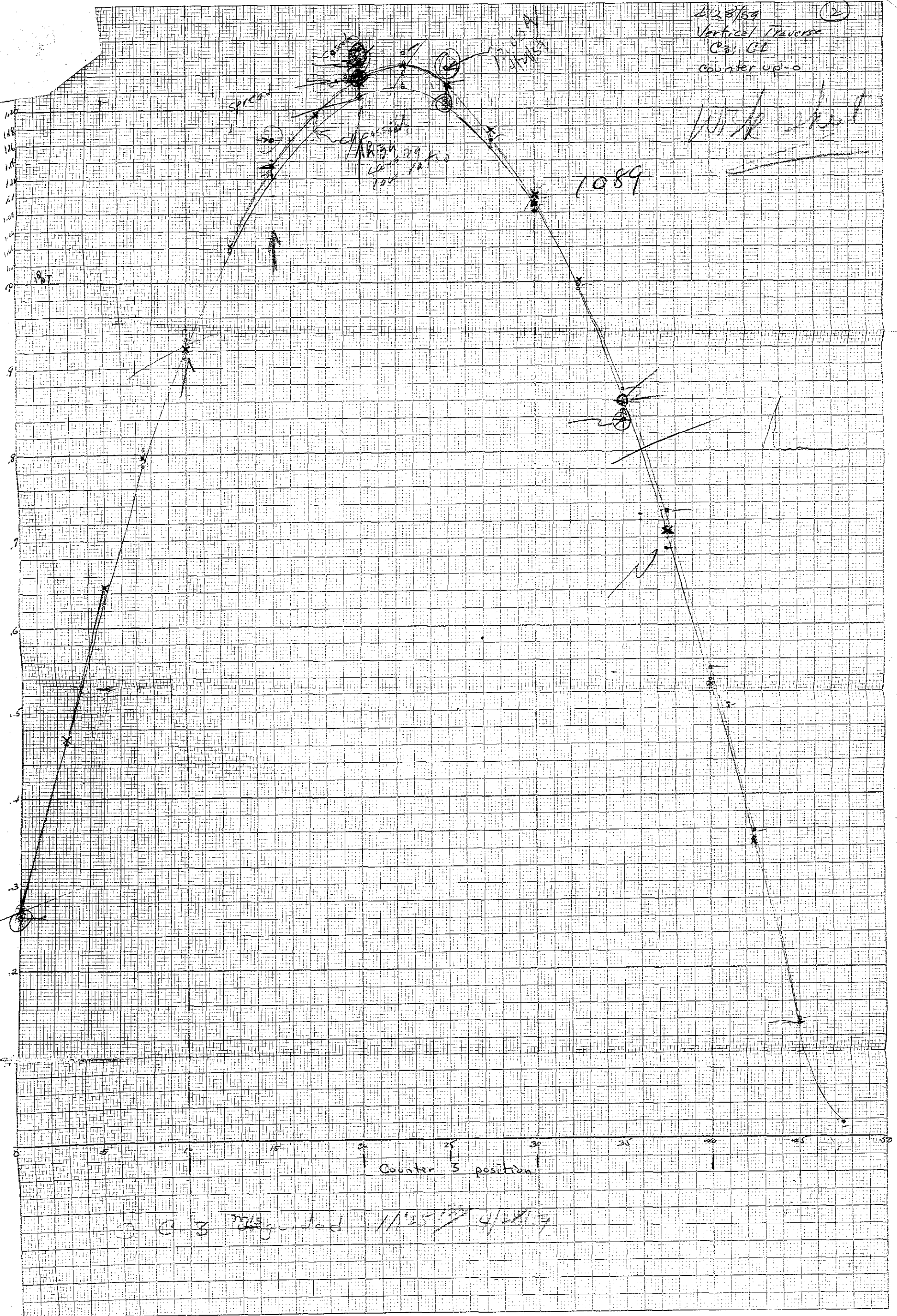
W.P. sheet

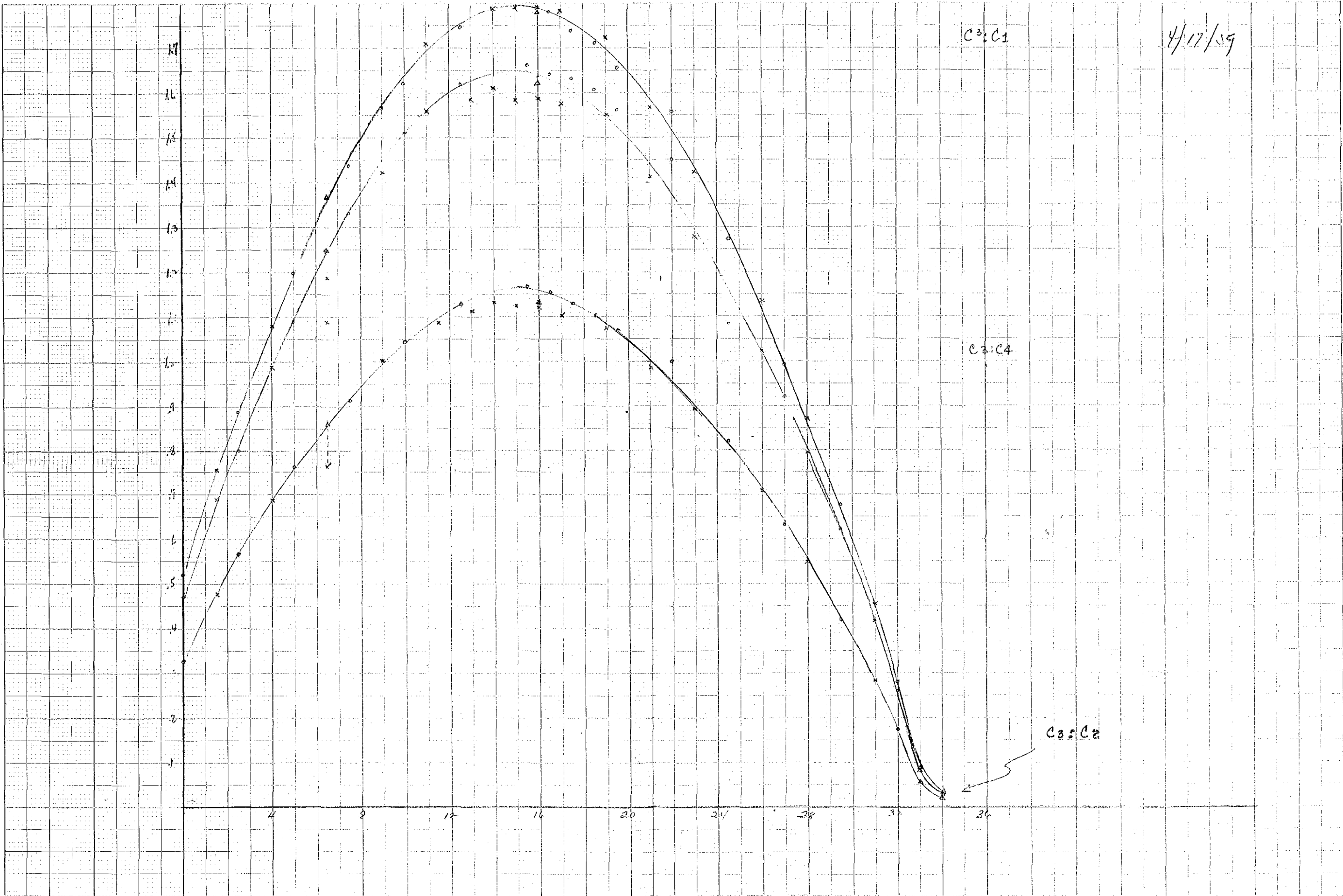
120
118
116
114
112
110
108
106
104
102
100

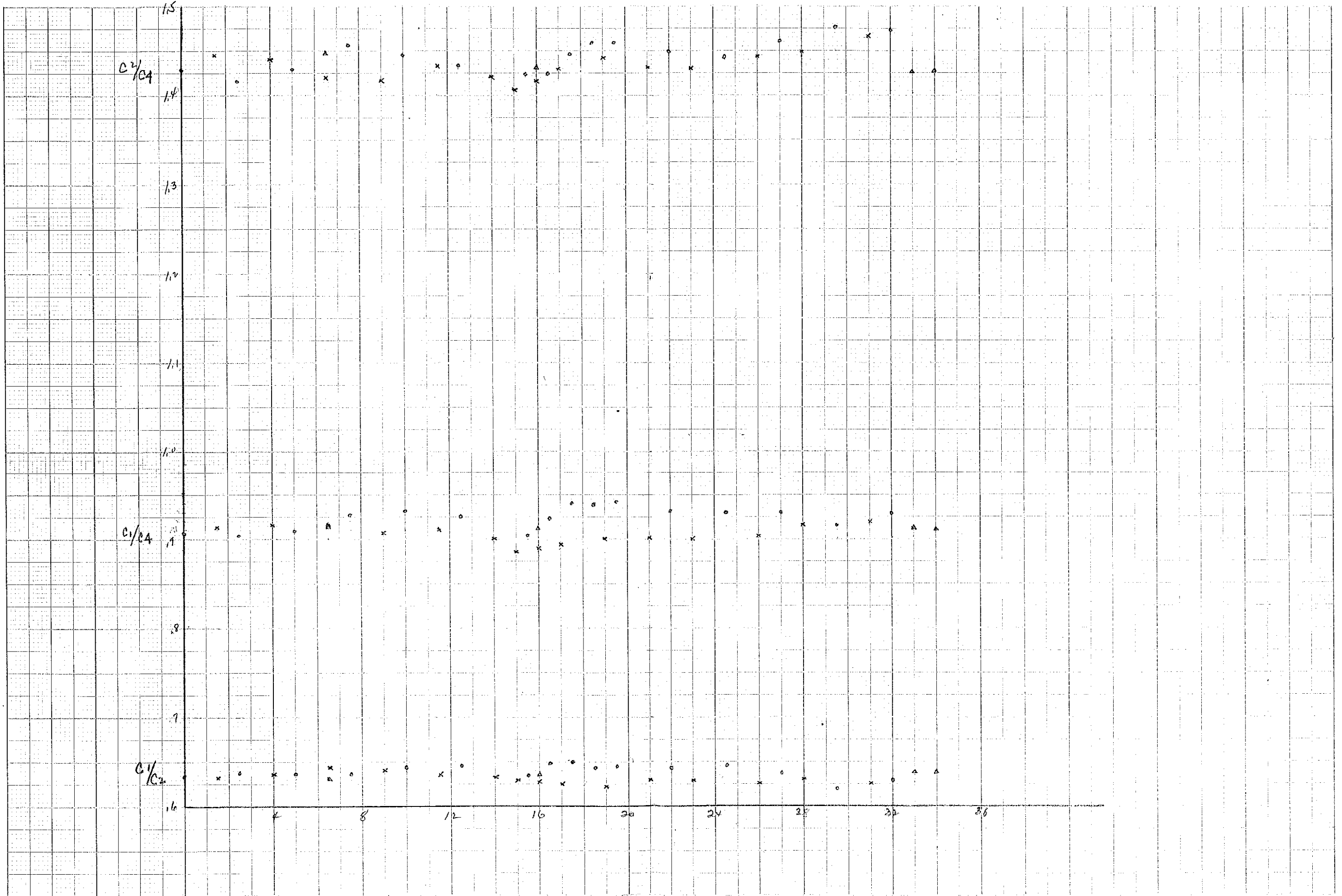
9
8
7
6
5
4
3
2

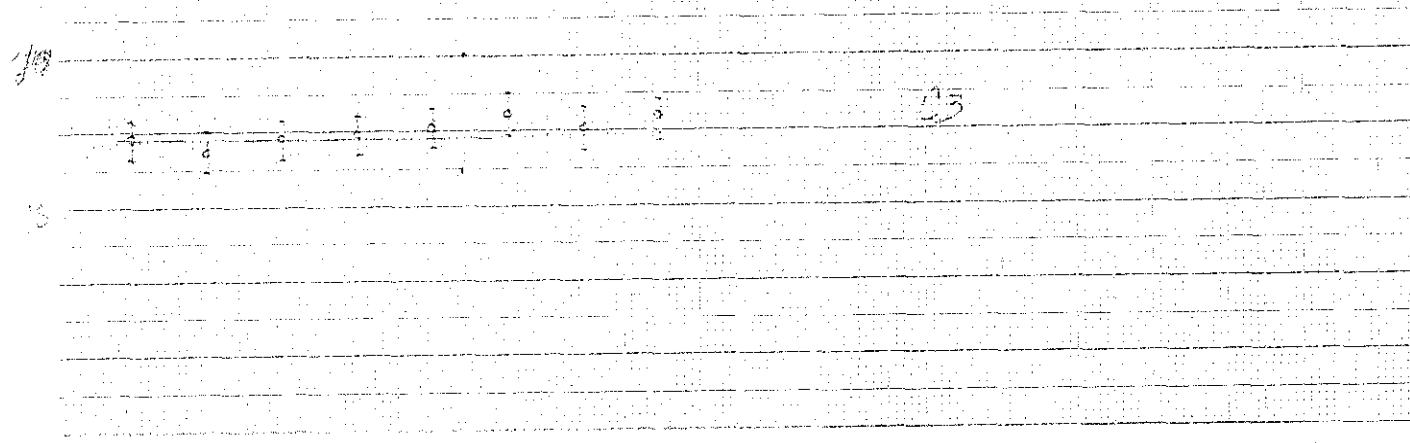
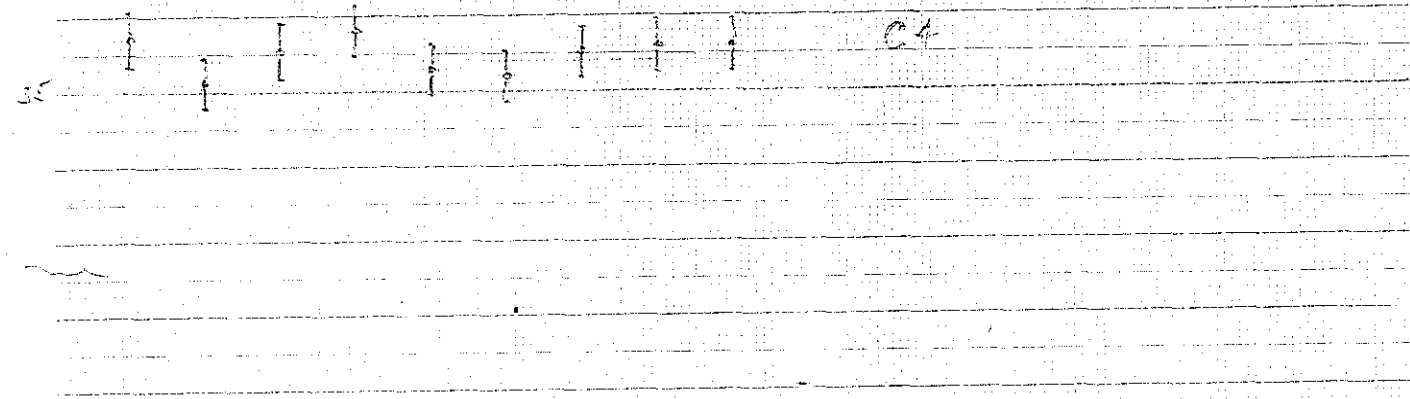
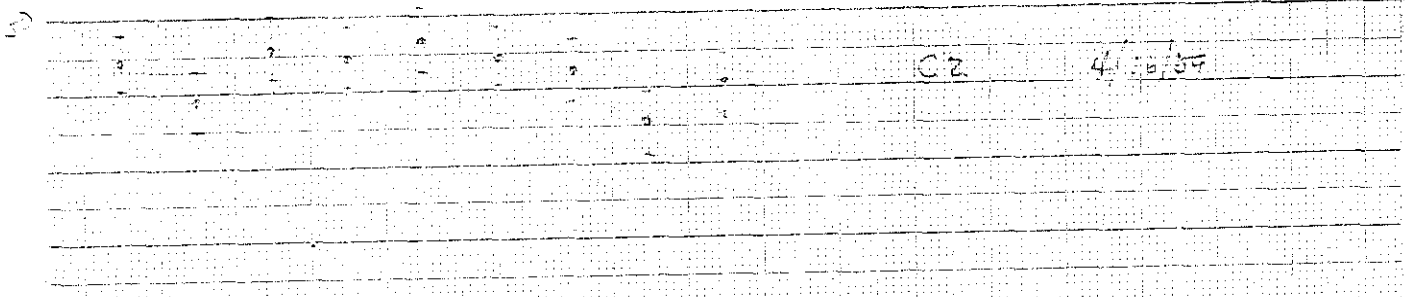
0 5 10 15 20 25 30 35 40 45 50
Counter 3 position

Q Q 3 305 11/25/59 4/2/59









4/16/59 Vertical Inverse (2 min)

	27"	Ext	Vent.	Non-	C ₁ /C ₄	C ₁ /C ₂	C ₂ /C ₄	C ₃ /C ₂	C ₃ /C ₄	C ₃ /C ₁
	C ₁	C ₂	C ₃	C ₄						
0	61170	96370	31810	67509	.906	.634	1.429	.3298	.4715	.520
2.5	61460	96350	54510	68045	.9035	.638	1.416	.5658	.801	.887
5	61170	96626	73190	67251	.9045	.637	1.429	.762	1.089	1.197
7.5	60040	94362	86240	64716	.9280	.636	1.457	.914	1.332	1.436
10	60480	93952	98150	64947	.9318	.643	1.446	1.045	1.511	1.622
12.5	60510	93645	105780	65357	.926	.646	1.433	1.129	1.619	1.745
15.5	60260	94860	110820	66680	.904	.635	1.423	1.167	1.661	1.839
16.5	62500	96390	111420	67763	.923	.648	1.423	1.154	1.644	1.781
17.5	63880	98253	111050	69968	.940	.650	1.446	1.130	1.634	1.739
18.5	63990	99380	109460	68122	.934	.643	1.459	1.101	1.606	1.710
19.5	64030	99780	106120	67994	.942	.645	1.459	1.069	1.561	1.659
22	63870	99200	99570	68531	.932	.643	1.449	1.003	1.452	1.558
24.5	64610	104280	82280	69427	.931	.645	1.444	.821	1.085	1.274
27	65220	102450	64650	68093	.931	.637	1.461	.636	.922	.991
29.5	62820	101350	42630	68668	.916	.620	1.471	.421	.621	.679
32	63080	100000	17680	67942	.929	.630	1.472	.176	.260	.2805
31	61260	97830	27860	66688	.919	.626	1.467	.2844	.418	.455
28	60680	96150	52790	66355	.915	.631	1.449	.549	.796	.870
26	59680	95390	67620	66125	.903	.626	1.443	.709	1.025	1.133
23	59510	94550	84590	66125	.900	.629	1.430	.894	1.279	1.422
21	59190	94054	92780	65638	.901	.629	1.432	.986	1.412	1.568
17	58340	93210	102670	65254	.894	.625	1.429	1.101	1.574	1.782
16	57620	91898	103630	64845	.889	.627	1.416	1.121	1.589	1.788
15	58220	92620	104220	65818	.885	.629	1.407	1.024	1.583	1.790
14	58930	93056	105410	65408	.901	.633	1.421	1.132	1.611	1.789
13 (2)	48990	94669	105320	66509	-	-	1.424	1.112	1.584	-
19	60360	96740	104020	67046	.900	.623	1.442	1.075	1.552	1.724
18.5	61890	97400	105780	67917	.911	.635	1.434	1.085	1.557	1.709
16.5	62220	97220	97530	6808	.907	.640	1.416	1.003	1.421	1.528
14.5	63510	98334	75360	68325	.916	.644	1.420	.765	1.087	1.187
13.5	61130	96128	65970	66739	.916	.636	1.440	.682	.989	1.080
12.5	60190	95263	45410	65864	.913	.632	1.448	.471	.689	.755
11.5	59780	94820	81700	65408	.914	.631	1.448	.862	1.249	1.267
10.5	60210	94592	107000	66022	.912	.631	1.432	1.031	1.622	1.779
9.5	61170	95590	5440	67021	.912	.634	1.426	1.059	.881	1.089
8.5	61420	96128	2030	67328	.912	.634	1.427	.821	.833	.832

57 = 6.20
92.

942
835
059
4.706
6.50
6.20
0.30
4.86
1.471
1.401
0.970

4/25/59 B1 & K2 jitting trace - found meter also jumpy

4/24/59 Checked connections in assembly room. Tightened a few. R1 behavior seems improved -

[Instruments scheduled for service - PM 1]

4-23-59 R2 in place: Responds. Check trip @ 150% F.S.

4-27-59 PM-1 not trip - Service - ok. (let warm up 1 day)
Log N calibrate

4/28/59 Counter check before traverse -

4/28/59 K-1 trip

K-2 trip

R-2 trip

PM-1 trip

PM-2 trip

Log N Responds

4/29/59 9:15 AM C1-C3 calibration check - OK

9:50 AM Log N calibrate very slight adj. ok

Dist Check - ok. (PM-1 sensitivity low)

10:10 AM C3 from ox. Unit head in regular C4 normalization position. C4 tube removed from balcony by West wall.

C1 trace OK. - (Range 1x4) amplified up to 215-3 cm. gross 2mm.

C3 counter high - C3 prep up to LA 4 & S63

LA4 gain 32 - Integral bias adj to 20

Pulses up to 3000. gross 1mm.

4/30/59 8:30 AM R1 returned to rack -

6:00 PM Log N Calibration - Set Meter Mechanical zero -> OK.
GE.

5-1-59 Instrument Check -

K1 - Zero Adjust - only slight - mark.	Level (45%) Start-up	2%
K2 - Zero Adjust - was 4% high - set and mark.	2.6 x 10 ⁻¹³	2%
R1 - Check start up level	2.6 x 10 ⁻¹²	2%
R2 - Check start up level	2.6 x 10 ⁻¹⁰	2%
PM2 - I _n 1.25 ; I _n > 10 . Bkg (No HV) Set recorder zero. Balance 45%		
Set HV 750. (40)		

→ PM1 - Meter .7 Cannot adjust to .6 Needs work

Counters - LA settings 16-0.8-18 4-0.8-65 16-0.8-15 32-0.8-20
Log N calibrates check OK.

→ 11:30 PM1 Back in rack following servicing -
(Meter hunt .24 . Set @ .6 . Plate Supply +150v)

5-4-59 - Log N - 8:30 AM - Calibrate all seems OK

5-4-59 - Log N - 1:45 PM - Log N Calibrations off -
Calibrated inst - returned to operate fraction -
inst responds with rapid, violent oscillations
of power & period meters - oscillations regularly
spaced - about 6 to 8 CPS. during which
time period meter swings from about 3 to 4.
removing input lead causes oscillation to cease -
Re connect input - response now OK -
Later - Keithley will not stay calibrated
occasionally shows rapid oscillations

Between 2: PM and 5 PM repeated calibration procedure.
Keithley Log N will not stay in calibration.
Temporarily installed ORNL Log N in adj. rack & Connected
to recorder - made no connection to period Scram circuit
from Log N. Also replaced battery in Recorder -

5/5/59 Counting Channels -

Noise on channels from register operation on scales
found to be due to shock transmitted through rack
to amplifier.
Mounted LA3 on sponge rubber. This greatly reduced
the disturbance

Mount CH4 on sponge rubber -
LA1 & LA2 need shock mounting. This not so easy
since there are no shelves in this rack -
For C1 channel internal semi, - shock-mounted
register module.

7:00 PM - Remove LCRM -
Calibrate - Re-install on unregulated power

7:38 PM

5-6-59

Pile on pas period - all seems well - Log N reaches 1
Bldg alarm sounds - No auto scram.
Manual scram executed - found PM 1 trip -
reduction of sensitivity by reduction of Voltage
had been neglected.

5-13-59 Vertical traverse preliminary

Series of 1-minute counts of check operating level-

A. Log N-003 (ORU) 3×10^{-10} ampsK-1 47% (3×10^{-10}) 1.41×10^{-9} amps

C-1	C-3	C-1
2560	27190	1062
2600	27210	1047
2480	27480	1008
2630	27900	1061

B. Log N-023 2.3×10^{-9} amp

21,290	228,380	1073
21,460	227,760	1062
21,420	227,680	1063

C1 detector in N tubes hole; C3 detector as vertical traverse probe

4:30 P C3 run out - Upper limit not having been set, cable pulled off rod & probe fell from $\approx 8'$ to bottom of tank - fisson probe badly bent

West and fisson counter status:

2 - 235 cts - contaminated & shaded

1 - " - bent - response check not made

5-15-59 8:30A Keithly by installed & CV power

Checked calibration -

Sid chamber & feeding recorder -

9:00A DWM comment - use Beckman IC-3 in work

for observation -

9:45A Put 6ft SS 235 from counter #15 in analyzer

hole & attach to C3 pre-amp -

C1 = 4ft 235 counter (5-1) 16, 0.8µs, 12.

C2 = 6ft 235 " (235-5) 0.98 mg UO₂ 49.7% 235.

Check bias point when critical

5/18/59 8:35 Note - IC-4 (from 112) in rack

Put E-111 chamber back in Well by cable run

Chamber in NW corner of room -

8:40 hr 10⁻¹⁰ - resid. 5x10⁻¹⁰ ch 10⁻⁸ 5x10⁻⁸ Divide Bias adj.

10⁻¹¹ & 10⁻⁸ ok

8:55 Keithly, had Sid 3.5x10⁻¹⁷

Imp Bal: 1.1x10⁻¹³ - adj

10:11 AM Log Channels -

Detector

Amplifier

Recorder

No

E-111

Keithly

Wheelco -

(NW corner 201)

near R1&R2

So

E-112 (has been used for period data) (floor 101 under) Sid

Beckman IC-4

Brown -

divider between Beckman & Brown is unit from 112

5-13-59 Vertical traverse preliminary
Series of 1-minute counts of check operating level-

A: Log N.003 (ORNL) 3×10^{-10} amps
K1 47% (2×10^{-10}) 1.41×10^{-10} amps

C-1	C-3	C% _{C1}
2560	27190	1062
2600	27210	1047
2480	27480	1008
2630	27900	1061

B: Log N.023 2.3×10^{-9} amp

21,290	228,380	1073
21,460	227,760	1062
21,420	227,680	1063

C1 detector in N stream hole ; C3 detector as vertical traverse probe.

4:30 P C3 run out - Upper limit not having been set, cable pulled off rod & probe fell from 28' to bottom of tank - Lower probe badly bent.

West end fission counter status:
2 - 235 cts - contaminated & shielded
1 - " bent - response check not made

5-15-59 8:30 A: Keithley hg installed & CV power checked calibration -
Set chamber & feeding recorder.

9:00 A DWM comment - use Beckman IC-3 in tank for observation -

9:45 A Put G11 SS 235 fission counter #15 in 2nd chamber. Note of activity by C3 probe -

C1 = 4ff 235 counter (S-1) 16, 0.57, 12
C3 = 6ff 235 " (235-S) 0.98 mg UO₂ 19, 146 235
Check bias point - ok. enclosure

5/18/59 8:35 Note - IC-4 (from 112) in rack.
Put E-111 chamber back on Well by cable run. Chamber in NW corner of room.

8:40 Warm 10" - remain .5 x 10⁻⁸ due 10⁻⁸ .5 x 10⁻⁸ Dose Rate adj: 10" & 10⁻⁸ ok

8:55 Keithley, had Sed - 3.5×10^{-12}
Dose Rate: 1.1×10^{-12} - adj

10:11 AM Log Channels -

No	Detector	Amplifier	Recorder
	E-111	Keithley	Wheelco -

S₂ E-112 (has been used for period data) (floor 101 under) Sid Beckman IC-4 Brown -
divider between Beckman & Brown is unit from 112

5-18-59 10:15 AM After preliminary calibration -
 N-K-W 10^{-12} a. normal drift (compensated)
 S-B-B $< 10^{-13}$ a, had been 4×10^{-13} @ 10:14 by
 w/s

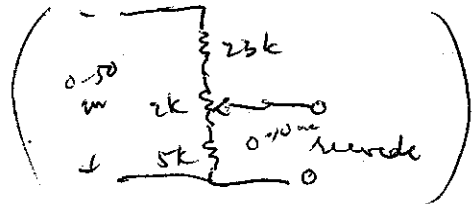
S-B-B -

N-K-W with 5mg on top of pig 2×10^{-12}
 S-B-B 5mg by top of chamber 1.5×10^{-10}
 Recorder seems sluggish

S-B-W - have to change T.C. input to wheels
 for proper deflection
 in sluggish response on recorder

N-K-B sluggish

Made jumper of 2-coaxial shielded with connectors to fit either
 Beckman or Keitly recorder outputs -
 In Brown rounded 10k helipot - abandoned
 original I.C. divider network



Recorder response improved
 B → Bm $10^{-8} = 10^{-8}$
 $10^{-11} = .88 \times 10^{-11}$

Beckman A wheels
 reverse input polarity wheel
 adj. records
 $10^{-8} Bk = 10^{-8} Bm$
 $10^{-11} Bk = .88 \times 10^{-11}$

5/18/59 12:49 PM Keitly → Brown

Reverse polarity @ Brown adj. sens. @

$K = 10^{-7}$ $Bm = 10^{-7}$

$K = 10^{-11}$ $Bm = 10^{-11}$

12:04 check Beckman with zero - Mike high - $Bm \rightarrow Bm$ $10^{-8} = 10^{-8}$
 $10^{-11} = 10^{-11}$
 12:24 pour H check zero still high -
 12:40 pour n -

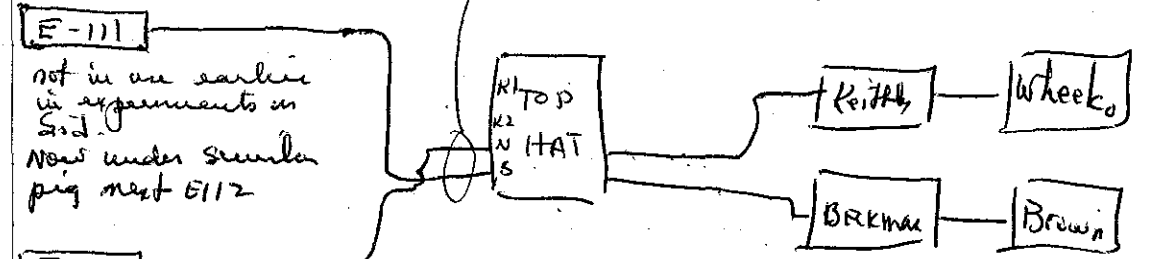
Re-calibrate

when recorder span is proper low cal pencils are
 slightly high. Question 10^{-11} internal calibration

3:15 PM

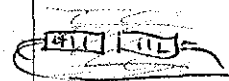
To get Keitly in same chamber swap leads @ Top Hat
 swap here - leads in 102 not
 long enough to feed N input to
 Beckman

"Neil"



"Sid"

under lead on floor 101
 throughout experiments



5/18/59 PM. Comparison between Keithley & Beckman on one possible period run.

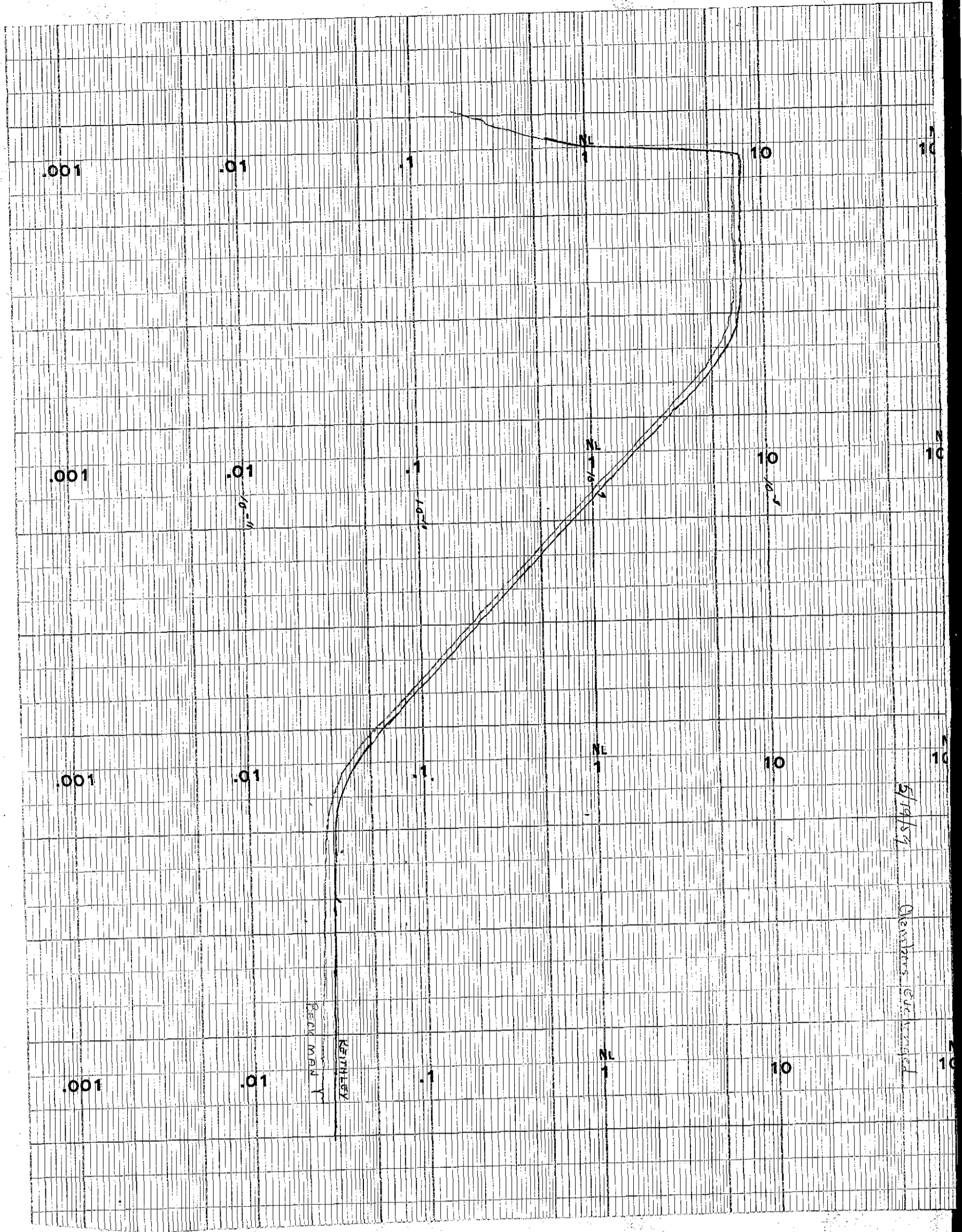
	K	B
Level Before Period	3.2×10^{-11}	1.4×10^{-12}
Level After Period	2.3×10^{-9}	1.5×10^{-10}

5/19/59 9:48 AM Repeat of run 5/18 -
 10:30 AM - Exchanged chamber leads for Keithley & Beckman log No's at top hat.
 Ran for period - both now respond about equally well - both agree ~~as~~ as to actual current signal - See chart -

Summary of three chart runs

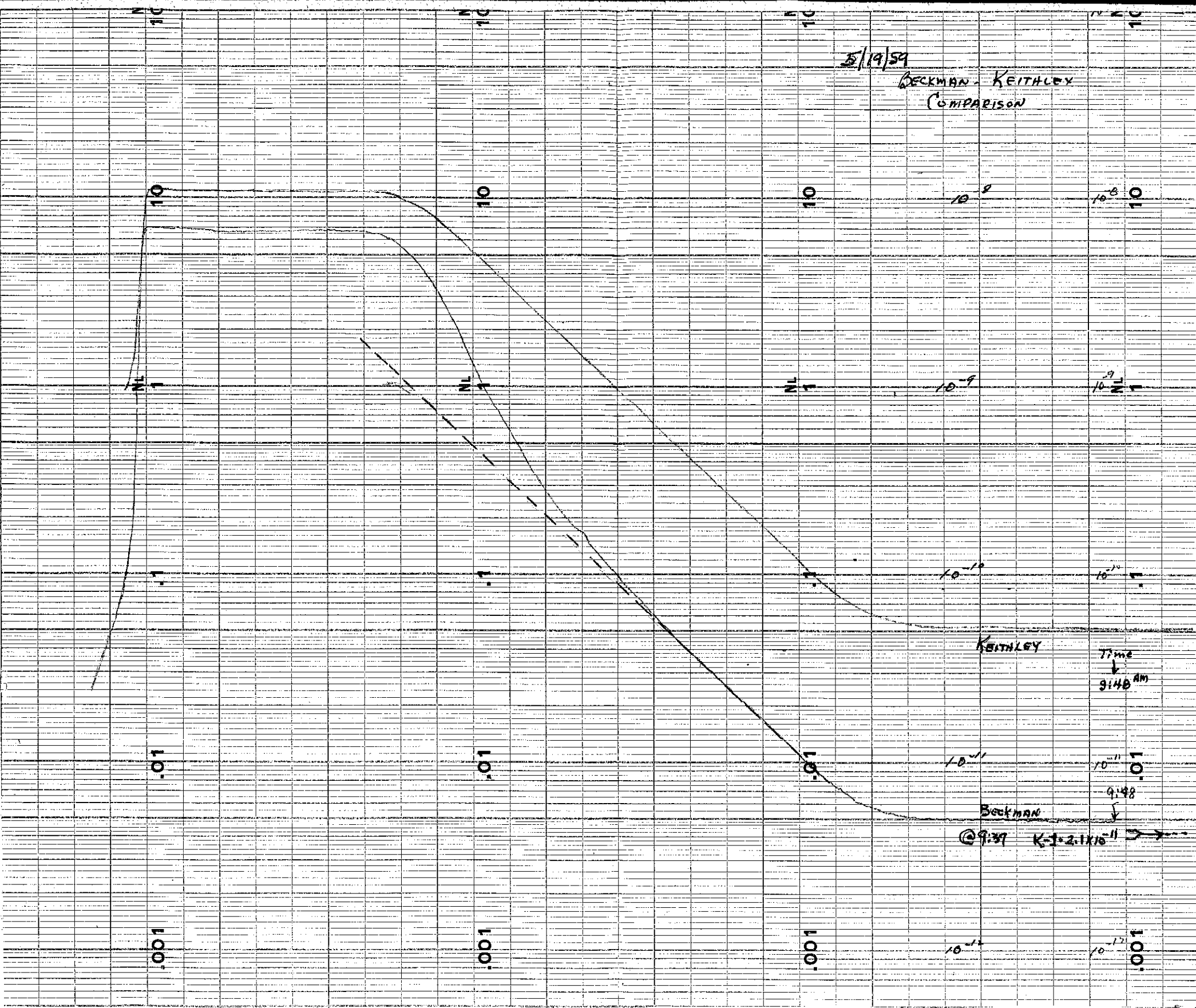
	Chamber		K/B
	{ E-112, Sid Cable, Well position Tophat }	{ E-111, Nail Cable, Sid position Tophat }	
	Keithley	Beckman	
5/18 PM Level-start	3.2×10^{-11}	1.4×10^{-12}	2285
Level-final	2.3×10^{-9}	1.5×10^{-10}	15.24
L_f/L_s	71.9	107	

5/19 9:48 AM Level-start	3.3×10^{-11}	5.0×10^{-12}	10.6
Level-final	1.08×10^{-8}	6.8×10^{-9}	259
L_f/L_s	203.7	1360	
Change cable connection at top hat			
	{ E-111, Nail cable Well position Tophat }	{ E-112, Sid cable Sid Position Tophat }	
10:30 AM Level-start	3.0×10^{-11}	2.6×10^{-11}	1.154
Level-final	7.5×10^{-9}	6.8×10^{-9}	1.103
L_f/L_s	250	261	



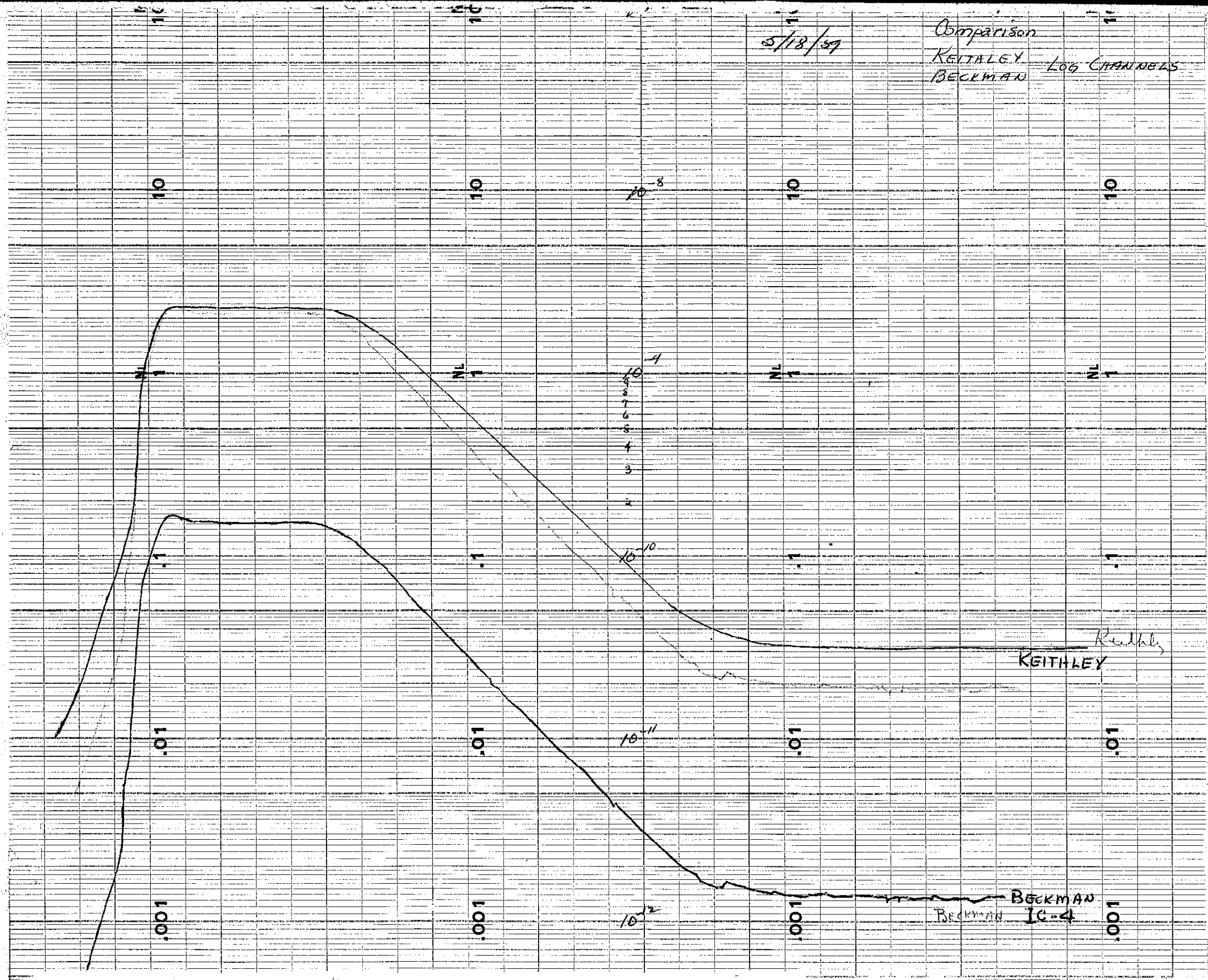
5/19/59

BECKMAN - KEITHLEY
COMPARISON



5/13/57

Comparison
KEITHLEY
BECKMAN LOG CHANNELS



5/20/59 ^{8:12A} Keithley calibration: Amp Bal OK, 10^{-11} 1.1×10^{-11} adj down
 10^{-7} 9.9×10^{-8} adj up
 Record 1.07×10^{-7} @ 10^{-7} adj pt

^{8:15} Beckman A. M. bias slight. In set
 10^{-8} 5.5×10^{-7} set. adj. record - was sl. high.
 10^{-11}

5-22-59 A.M. Keithley Calibrations - looks good - made very slight adjustment of calibration.
 A.M. Beckman Calibration - looks good also - made very slight adjustment of diode bias.
 -Ellis-

5-22-59 P.M. Keithley - request for calibration of log II -
 Check Keithley - Slightly off, entire scale seems shifted upward (not much).
 Very slight adjustment of "amp. Bal" (downward)
 brings all points back on line.

P.M. Beckman - OK - slight adj of diode bias - all OK
 Re checked Keithley. Checked 10^{-7} , then 10^{-11} , then back to operate position, at which time unit begins slow oscillation with period meter swinging from one extreme to the other. Oscillation continued until unit was switched back to 10^{-11} pos & back to op. again - then oscillation stopped, but all readings shifted down scale. .01 pos now reads .007

Keithley Continued;
 amplifier bal also found shifted down scale. (off scale neg). Re adjusting "amp. Bal" improves present situation greatly, but after this is done unit reverts to oscillation again. Finally ~~had~~ had success in getting instrument calibrated and back on operate without it going "nuts".

OBSERVATION: Both times (days) when this occurred, instrument was being calibrated while reactor was running power, and inst first went into oscillation when switched back to operate position while there was a considerable signal on the chamber cable.
 -Ellis-

5-25-59 Instrument Log-out for high level run

Detective
Location

C1 U-235 fission chamber

C3 U-235 fission chamber

K1

IN R1

201

(NO CHANGE)

~~Keethly log~~

ORNL log N - detects E-112

PM-1

PM-2

R 2 - on floor by wall E-100

IN

202

K 2 on floor by wall N-101

Keethly log - top of rack by 5' wall E-111

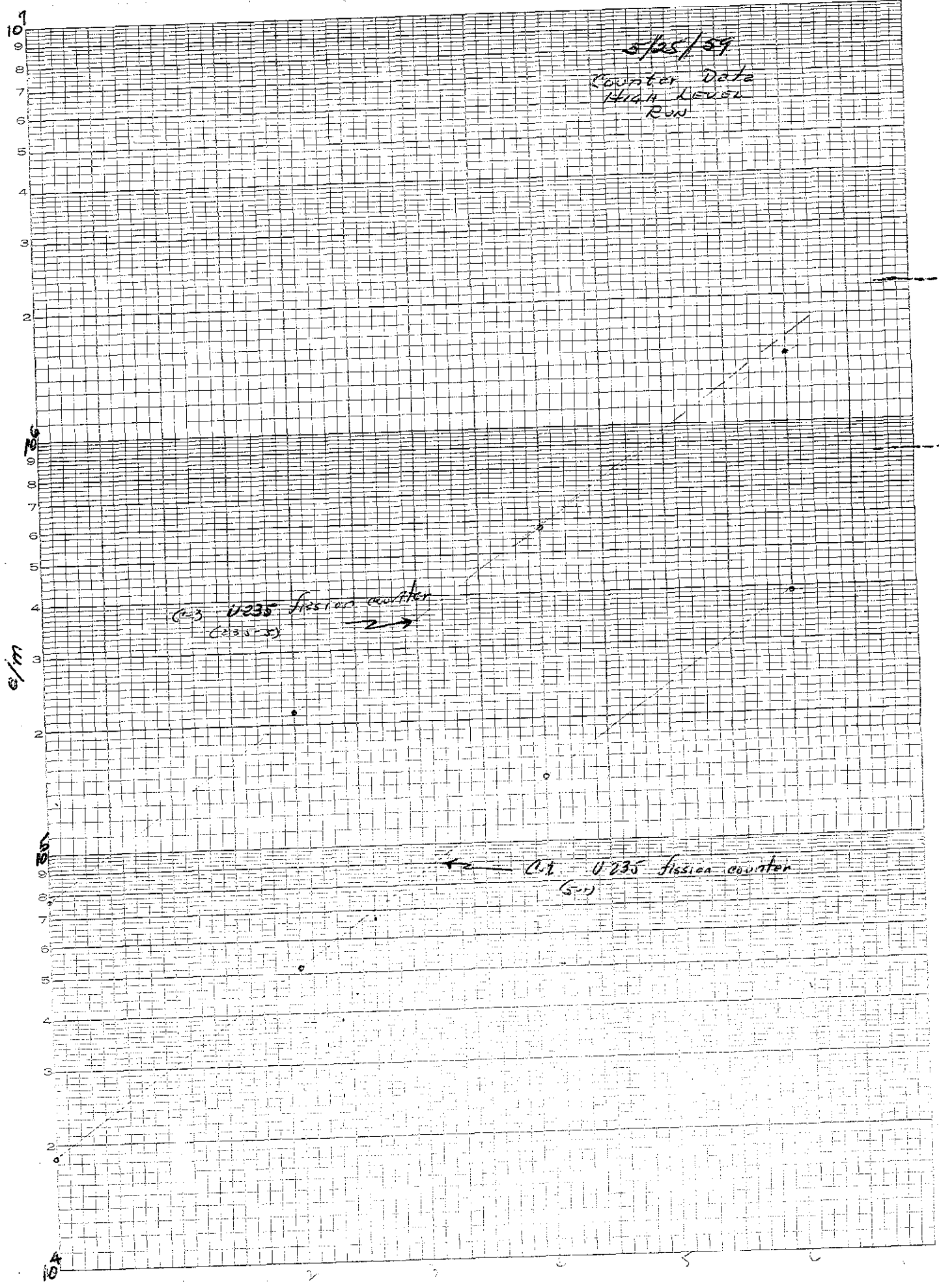
log N (ORNL) period regular $\pm 2.5 \times 10^{-8}$ days

5/26/59

Counter location:

C1: Horizontal traverse - 4' U235 probe (5-1)

C3: Normalizer 6' U235 probe (235-5)



6-2-53
1:05 PM

Counter 1 & 3

Sealer in work - 1 hour
Test 200,000
Flow

C1	C3	Clock	Multiplier
11794220	3590	60.0	1.5
11790370	3590	59.9	
11709950	3560	59.4	
11859320	3610	60.4	
11857390	3610	60.0	
11863200	3610	60.4	

Signal to upset line amp. C1 4123801

PDL 20

C1 (T)	C3(2)	Clock
11720180	3620	-
11638160	3610	60.0
11868140	3610	60.4
11862340	3610	60.4
11868800	3610	60.2

Keethley
log on ground up to level of 2x10⁸ a.
ORR
log on ground up to level of 7x10⁸ a.
No drops - on good periods
all way up to top.

Counter 3 - begins to show losses @ $\approx 1.5 \times 10^6$ c/m. Earlier
had shown losses at $\approx .500 \times 10^6$ c/m
improved by factor of 3.

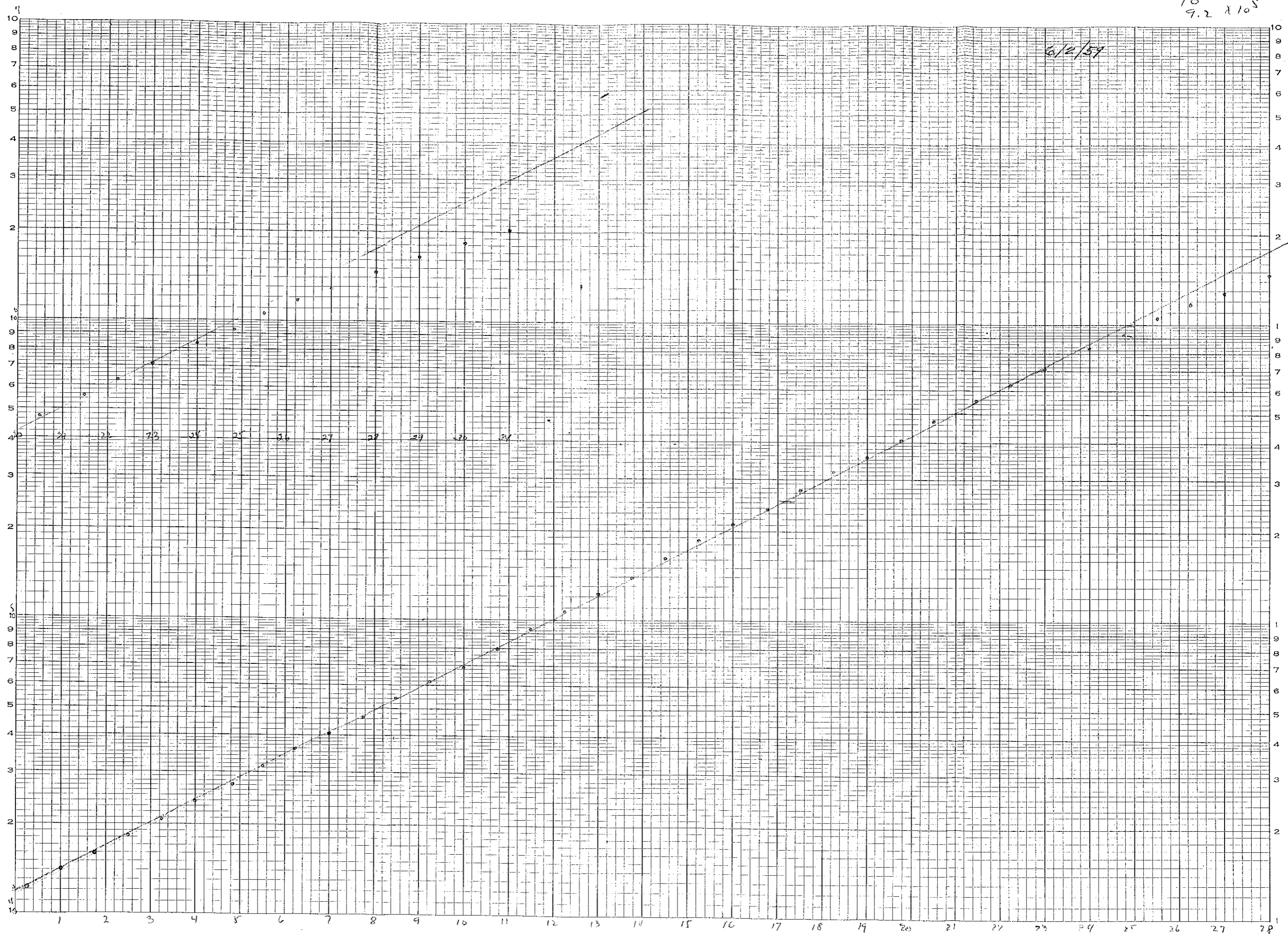
16,01370 PDL 10
16,01375 PDL 10

Time	C1	C3	30 sec. waiting time always
10:30		1,0560	2.5 3:09
10:45		1,2210	
11:00		1,4100	
11:15		1,5900	
11:30		1,8210	
11:45		2,0750	
12:00		2,3910	
12:15		2,7080	
12:30		3,1450	
12:45		3,5980	
13:00		4,0430	
13:15		4,6410	
13:30		5,4140	
13:45		6,1820	
14:00		6,9150	
14:15		7,9880	
14:30		9,2960	
14:45		10,6010	25:30 1054750
15:00		12,1950	26:15 1173830 ³⁵
15:15		13,9240	27:00 1285880
15:30		16,0560	28:00 1456710 ⁴⁶
15:45		18,5230	29:00 1636450
16:00		21,0400	30:00 1813010
16:15		23,8880	31:00 2012640 ⁷⁰
16:30		27,5570	
16:45		31,8870	
17:00		35,7100	
17:15		40,5490	
17:30		47,0660	
17:45		53,5410	
18:00		62,6590	
18:15		70,8970	
18:30		83,2970	
18:45		92,4170	

NO. 3400-1310 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC - 3 CYCLES X 140 DIVISIONS

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

counts / $\frac{1}{2}$ min



Record of West End Service Activities 6/29/59 - 7/20/59 JFE

Control ① 6/30 Unable to get control circuit for temporary dump
Nell value to operate properly. Per DFC ran 3 condenser
line from 202 to 201 from 110v ac to dump valve.
Plug into wall near gas cylinder & mark plug.

Control ② 7/2 Request for 110vac for TSK panel which will be
Nell cut off on "Seram". During process of tracing out
circuit discovered reason for above; Seram panel
not properly set - one switch overlooked.

Inst. ③ 7/8 Grilley requested 62" of R5620 jumper for counter:
General DFC request: (a) new RIDL counter.
Nell (b) fusion counter.

Inst. 7/9 DFC requests (a) K1 & K2 outputs exchanged.
General (b) Log N (ORNL) put into PM2 recorder.
Nell (c) PM2 output fed to present ORNL log ac.
(NO ACTION)

Inst. 7/9/59 Ready - workmen broke cable connection of
General Log & chamber - Repaired.

7/10/59 Request swap input leads for Log. Sid & Nell
input cables to be exchanged in order to let
Nell use ORNL & Sid use Keithley. Exchange
made at "top-hat" terminal.

Inst. -

Control -
Sid ✓

Control -
Nell ✓

- Sid fuel pump not operate - shut down &
began checking. Later, DFC discovers 4th
reset button not set - set same OK.

- Nell fuel pump (mixer) not run. Light on
as switch is thrown, Contactor in 101 not operate.
110vac on contactor coil. Both sides of coil "hot".
Found neutral dead from contactor is open.
Tried to locate hot & neutral tie point in 102.
Hot seems to be 25 or A5 (top terminal block)
unable to track down lost neutral - Ran
jumper from contact to ground on distribution
box nearby.

Keithley ✓
Log

Keithley ✓
Log 7/13

- Violent oscillation 10-12 cycles/min Period
meter FS. + f - Switched to 10" for few sec.
then back to operate - oscillation stops.
- Same as above - same remedy - calibrate.

Wheeler
Recorder -

- Log N recorder chart drive not operating.
Tried trouble to automatic standardize mechanism
which had failed & hung causing gears to
jam & stall motor. Disassembled some of mechanism

7/13

to in-pair. Cleaned, oiled, & replaced parts. ok.

Recorder ne

Pens stopped up - cleaned, etc -
Instructed DFC as to proper installation of
Ball Point pens.

PMZ 7/14

- PMZ reports sick - checked. If recorder balance
is set at Background, then switched to operate,
recorder goes off scale but meter shows little
of any deflection. During check out unit
suddenly begins working properly - ok?

R10L ok

- New R10L counter hooked up & checked with
signal generator. Some indication of discrepancy in
time of count & recycle function. This most
pronounced on 0.1 minute setting. Per cent error
on other scales not serious.

C1 /

- C1 not counting. After proper settings &
connections ok. C1 channel fed to R10L
scale #1

C3 /

- C3 no battery box. Took 135V box from rear
of instrument rack 202 & connected for C3. ok
This is R10L #2.

Keithley log /

- Sick oscillates & unstable. Can not stop
oscillations this time. Turned unit off &
switched dead at top hat to use ORNL logN.
Calibrate ORNL log - ok.

7/14/59

Inst. ne
General

DFC request feed ORNL log to present PMZ
Recorder (see 7/9, b)

Instead, put logN recorder to top of main
rack facing operator.

K2 /

Inst. ne
Genl

- K2 Sick. Big jump at odd times, otherwise ok.
- DFC request change recorder chart speed on
log N.

Counting /
Chamber

- Request for C4 in TSR rig. C4 said to be intact.
Does not work, however. Located chamber said to
belong to C4 under Nell. Anyway in 202, chamber
in 101.

System dead - Remove counts tube & see any for
check. Replace with another group of new 2" tubes.
Still dead. Turn out system - Not C4 at all, rather
is C2! C2 set up & in operating condition.

Inst. ne
Genl

- Remove logN chamber from under grates & install
as as to feed ORNL logN. Required changing leads
at "top hat" again.

Inst. 7/15/59
Genl

General check shows system as whole ok. 5:35 PM.
- C2 reported not working properly - not proper
response to source - DFC was checking
with counter bare.

Sid, control /
9:30

- Probe not operate properly - found shorted.
Dunked in soap, wet wash & all shorted out.
After cleaning showed 20 Myr-2 leakage ok

7/5/59
 11:20 Probe again - claimed not reproduce.
 12:30 Check - run up & down several times ok.
 Reproducing to about .003-005 in.
 3:00 Probe - No light this time - check - Jan 201,
 contact resistance with soap about 150 ka this
 too high - Remove probe. Lots of oil, grease, & end
 floaters on soap. Cleaned probe & put back.
 5:45 Probe worked ok. First time - then bad again.
 Trouble in glass coating tip of probe.

Nell, control ✓ 4:30 Tie in TSK rig to terminals on console:
 N (neutral) & P14 - for screen signal.
 C4 ✓ C4 set up in Nell use chamber formerly in C2
 (small RCL). Mounted in ~~west side hole~~ ^{steel tube}
 & taped in for protection of glass seal on end. Tube
 extends to 2" beyond end of chamber. Placed in
 west side hole. Using signal generator adjust
 for .004 volts input.
 Gain 16x1, RT 0.2 ps. PHS 27. (This amp
 is weak)

HW 1500.
 C2 ✓ 6:00 PM C2 set for .004v input. Gain 4, RT 0.2, PHS 20.
 HW 1600.

(C2 & C4 ok - in Nell
 C1 & C3 in Sid - fission counters).
 Counter Channels ✓ 9:05 PM Lumin source on automatic counter begins but
 relays fall out while lumin goes on. No counts.

7/15/59 - Resolved to use of manual operation to finish counter
 7/16/59 Lumin OK for use with C1 & C3 (??)

Fed C1 & C3 into ORNL decade scaler C1 & C3.
 Fed C2 & C4 to RIDL. This enable Gilly & Co.
 to run periods with BF₃ counter placed in Nell
 & still get sufficient counts from Sid at
 this distance.

7/20/59 Gilly reports counter not work. check >
 (Noted scope sweep short)
 Check pre amp connection - Gilly mention
 counter conduct of extension loose -
 Signal generator fed to pre amp 1 mv.
 No linear amp - output -



J.F.E.

7/21/59 (T) / Work on channel C1 - not counting - scrubble.
no detector - (Counter channel)
(Min. counter)

7/22/59 (W) - Re-activate Brush for red-drops.
JFE brought up last C.R.M. focused.
Arrest in red drop experiments in TSR.

7/23/59 (Th) More red-drops. Note instability in Brush
amplifier.
Check out heating system Nell.

7/24/59 (F) Heating system Nell further check.
Notebook work.

7/27/59 m. Check auto count.
Timer error on "count" cycle.
Brewer from 112.
In 202 - trouble starting up.
Log N filter on
Keithley went into oscillation again -
appeared to start at high power reading JFE cutoff -

7/28/59 (T) Auto count check. 600 - 150 kc, 15 kc
Celebrate LCRM to signal with GA.
C1 233 cts, C3 235 cts fresh; Auto count.
Keithley log on with period circuit out (on "chuck 00")
In middle of afternoon K Log power source began oscillate -

7/29/59 (W) Further check of RIDL auto count system in shop -
(refer to RIDL ^{counter} notes)

7/30/59 (Th) RIDL check out - on operating system source in 202.
Keithley log on for part of run -
Feed switch, fuel - Panel 2 on console - fuel conduct.

7/31/59 R1, K2, Keithley Log need attention

8-3-59 K2, in shop - Service.

8-4-59 K2 in road check operation -

Keithley log to shop

8-14-59 Keithley log in rack.

8-26-59 R1-R2 repaired out.

Recorder: v. Replace both
1.5V batteries.

5. Purple pen amplifier -

Replace 2-12AX7, 1-12AU7

8-10-59 8:15A

DFC reports that run into instrument trouble Friday 8-7: K1 severe jumping - recorder full scale kicks every 30 sec (approx).
PM2 some noise on it.

LCRM & log OK - these naturally hard to level with (R2 & R2 available & operable - Operators close out to move closer to subj.)

Instrument Checks

No jumps this morning.

Note - recorder battery needs replacement - PM2 chart drive seems to be heavy at times.

Swap K2 & K1 leads at top hut.

Comparison between K1 & K2 response with some checks indicate K1 sensitivity way off.

R1 & K1 to stop for service.

More R2 chambers closer to Nello -

Instrument check for response R2, K2, PM1, PM2, log U OK. (LCRM operating)

8:00 PM - { New battery K-1 recorder
Replace K-1 recorder tubes

K1 back in 202 for observation -

Sensitivity much improved. equal to that of K2.

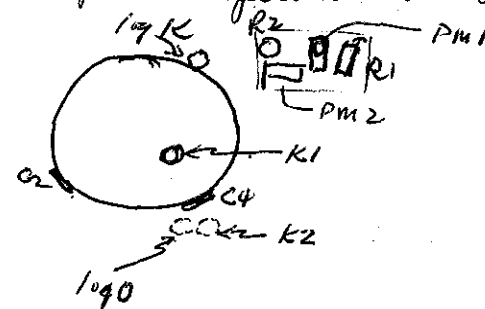
Check trip points of R2 & K1 & K2

R2: Trip point between 120-140% full scale panel meter
K1: 115-118%
K2: 115-112%

9/4/59 9:21A/ PM2 Bkg Zero - Pa = 373

9-16/58 Check of vacuum amplifiers & HVPS for counter channels.

9/2/59 Instrument set up for pellet experiments - Sid



Component	Model / Description	Gain	Other Info
C1	-	-	-
C2	1" BF ₃ chr - PA 344	-	-
C3	-	-	-
C4	1" BF ₃ chr - PA 302	46%	3x10 ⁻¹²
K1	✓ BF ₃ N102a	10%	3x10 ⁻¹²
K2	✓ BF ₃ N101	10%	3x10 ⁻¹²
UK	✓ BF ₃ E-III	115%	10 ⁻¹¹
LD	✓ BF ₃ E-III	2x	10 ⁻¹¹
R1	A(r)	10%	x1-6
R2	BF ₃ E-100	10%	x1-6
PM1	931A Auth	.6	-
PM2	5819 - Arch	300 (200)	NW1000 Bkg = 60-70% I _{h3} I _h = 10 I _h = 91 FS. operati = 210µa - safe at 1000V source @ 21" (Test = 36%) = 210µa @ 49 = 270µa 58% = 330µa -

Hand not tripped at 58%

Set PM2 trip down - at 47% = 270 µa no trip.
Set to burst 300µa 57% (I_h = 8.8)

9-30-59:

8:27 Instrument Check. J.B. ^{SPN} Schmitt -

Bly - Sing in Pb. R1/R2: Short input. R1 meter reading 10% on 1mwfs. - set to 1%
 R2 meter reading 1% on 1mwfs. - OK.
 Open input: R1 3%
 R2 3%

R1 1.1×10^{-12} ; zero check - OK

R2 0.2×10^{-12} ; zero check - very slightly high.

log K 3×10^{-12}

log X 2×10^{-11}

PM 1: 1100v, I = .59

PM 2: 1000v, I₁ = 1.22, I₂ = 9.9; I = 2.92

HV off; Pkg 30 - Set to 1.5

HV on 1.5

log K - Change halter from 600 to 1200 - no change in bkgr level.

Jan 5-12 Am 201 - To K-1 J.B. Schmitt

HV	Pkg	A
500		6.6×10^{-10}
600		6.8×10^{-10}
700		7.1×10^{-10}
800		7.2×10^{-10}
900		7.3×10^{-10}
1000		7.4×10^{-10}
1100		7.45×10^{-10}
1200		7.5×10^{-10}
1300		7.55×10^{-10}



9-30-59

10:22

P.S. C3 - M226 in same position

HV	A	position B	"log K" in package
270	6.1×10^{-10}		
300	6.25×10^{-10}	5.8×10^{-11}	drift 7.8 2.8×10^{-12}
350	6.4×10^{-10}		
400	6.55×10^{-10}	6.1×10^{-11}	1.8×10^{-12}
450	6.70×10^{-10}		
500	6.80×10^{-10}		1.5×10^{-12}
600	7.0×10^{-10}	6.45×10^{-11}	2.5×10^{-12}
700	7.1×10^{-10}		2.1×10^{-12}
800	7.25×10^{-10}	6.7×10^{-11}	1.8×10^{-12}
900	7.35×10^{-10}		1.7×10^{-12}
1000	7.4×10^{-10}	6.9×10^{-11}	2.8×10^{-12}
1100	7.5×10^{-10}		
1200	7.55×10^{-10}	6.95×10^{-11}	2.1×10^{-12}
1300	7.6×10^{-10}		
1400	7.65×10^{-10}	7.1×10^{-11}	2.0×10^{-12}

"Background" here on records same at 600v as at 1400v

10:15 PM - NEU60 - set up in 201 - C3 -

10-12-59 K2 had tripped over weekend - on 10×10^{-13} a-scale.
Set-up E-100 from R-2 to K-1 R1 chamber again dead

10-14-59 Magnet Supply - Set -
magnet not holding. stepped up voltage -
after first run (at 10:15) safety valve full.
Selenium Rectifier burned out -
Ran leads to magnet from rectifier mounted
in Well Control Panel.
Using S-rectifier Output 3v dc
holds magnet.

10-30-59 Log K - on period.  Same as at left (3)

11-3-59 Set up to check effect of varying HV on I.C. when
operating at high-level -
HV. In PM-1 supplied from spare unit brought in from 210
set at ~ 1000 v.

I.C. power from Hamman HVPS ("PM-1")

Set HV at 1400v. for start.
with level is fixed - will reduce HV step-wise & record
currents.

11/3/59 Chamber HV. I.C. Keithly log - current.

1400	1.8×10^{-7} a	170	R2 665 mv (73%)
1200		162	(72%)
1000		156	(71.6)
900		154	(71.5)
800		148	(71.4)
700		140	(71.0)
600		130	(70.8)
500		121	(70.9)
475		118	(70.8)

11:03 Set PDL C3 @ 38 for 20 (HV = 1530)

11/4/59 9×10^{-12} above 10^{-8} log trace slope decrease - IC saturation?

levelling - Record instrument readings.

	INST	1.8×10^{-7}		
K log - RECORDER	170	162		
head reading - K1	(10×10^{-10})	4.8×10^{-10}	4.8×10^{-10}	4.7×10^{-10}
K2	(3×10^{-7})	1.75×10^{-7}	1.75×10^{-7}	1.73×10^{-7}
R2	(1000 mvfs)	665 mv	655	635
PM2 -		75 pa	75	75 pa

at little $> 10^{-7}$ a. all inst. indicate slowing down of rate.
linear until seen to read straight line or even drop down. (3)

9:38 slow R2 see 73%

Remove HV 9.52" current drop $< 10^{-8}$ a.

level off at log $f \approx 1.0$

Log	1.41	1.40	Ratio $\frac{1}{2}$
K1	1.3×10^{-11}	1.22×10^{-11}	
K2	2.07	2.03×10^{-9}	
R2		15 mv	
PM2		11.6 mv	

1-19-60: Activity nil in recent months in this area.
 Instruments have been on - not checked.
 Instrument Check & Inventory -

3:30 p Kei Fly log - no power, fuse out. Replaced fuse
 New fuse blew in ≈ 15 seconds. Needs service
 ORNL log OK - Signal lead at K log (Well) to
 ORNL inst. (Needed extension). ORNL output to
 Wheeler recorder.

On table between Sid & Nell {
 Pm-2: Set zero - OK.
 Pm-1: Put detets on Hammer Power Supply. OK.
 B1: OFC has head in Well OK.
 K2: Head on catwalk Sid - OK.
 R1: Respond -
 R2: Respond -

Recorders: Wheeler - new batteries
 2-pen Brown - new batteries

1/14/60 Counters -
 Three of regular pre-amps: 349, 502, 4513
 presently in use South Inst.
 Only one - 44B - remaining
 Borrowed 694, similar to 44B, from South Inst.
 Old type - seem to work - use "C4"
 This gives total of 3 pre-amps -

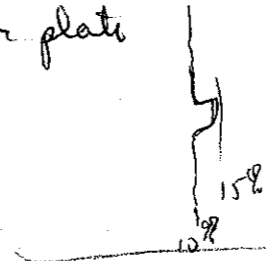
(m4 - panel 1 operates DC surter
 water feed - series switch at Well
 drain, fuel - wired for NO. valve)

Channels:	1	2	4
Detector	1" PF ₃ (W. Tube)	1/2" PF ₃ (W. Tube)	1" PF ₃ (Under)
Pre-Amp.	44B	Old type	694 (S)
Amplifier	123801	100303	100363
St. V.P.S.	123871 (C1)	123872 (C3)	SC 89637
Scaler	89641	120247 (C3)	89637 (C3)

After servicing LA 2 & getting correct cable tie-in,
 Checked for response to neutron. OK.

Removed K-log for bench work 2/10.

Reported disturbance on Pm-2 trace when move chair
 across floor plate



Look into this.

1/19/60: K-log in rack -

Temperature recorder: Securing at some points.
 Corrected by setting so that arm on gear
 above switch, selector, lines with mark at #1
 Record when arm at "hold" point.

→○

1-19-60: Relocate I.C. for K-1 by Sid -
 a. Suspended in pipe under Well #2' under Well.
 air current. Temperature drift
 b. Set on plastic sheet supported by I-beam & pipe

1-21-60 K-log - jumpy operation reported observed - 11110 A/
 set local - then operate. get temporarily rid of jumps

1-22-60 9:55 A - K-log pumps - has been at 15 mm.
 Kicks negative (3 sec period) reach 8 seconds - then reverses
 flip period to ∞ - Kicks about every 3-4 seconds
 operational level $\approx 10^{-11}$
 set to 10^{-11} unable to eliminate - Kicks - power off

1-28-60 K2 reports tapping - 10×10^{-12} range speed of time 5%
 OEN log N - bumps

1-29-60 High Level Run - HP -

Instruments:

C1 - PM-NE400 @ 20' above @ SW corner superstructure

C2 - 1/2" BF₃ in N side no paraffin

C4 - 1" BF₃ on platform under Sid @ 13 1/2'

K2 K1 (A) E10 (18 1/2') on floor near water window (B) 202 (27') on floor by wall window

K1 K2 outside Well on floor 3" paraffin at wall tank. (W 3 1/2') NW corner N101

R1 R1 NW corner 201 behind small Pb shield - (4' 10")

R2 on platform under Sid @ 13 1/2' N102

OEN Log (A) 2' on 201 floor - 3/2" from W. wall room - near Sid - (B) 202 (27') E100

PM-1 (2' 14") on step behind Sid - near log.

PM-2: (20') 23' South of K-1.

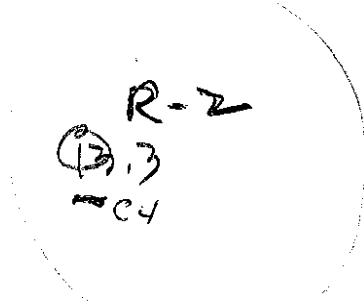
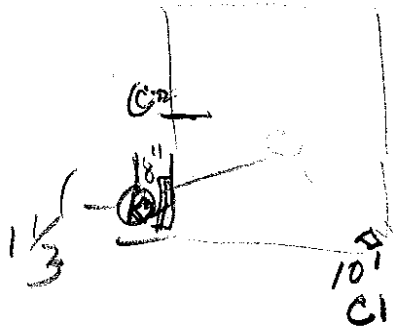
PM-in 900v PDL 70 G2 - 0.12 μ RT - 1m - 1,067,100 c/m
 2:27 - 1.5×10^{-11} 745,220 c/m
 2:40 - 990,880
 3:10 - 2.5×10^{-10} K1 245,430
 3:19 1/2m 377,640

Situation:
 When I.C. instrument increased, this unit dropped in rate -
 when I.C. instrument dropped, this increased - ??
 Operation as indicated above @ 900v - PDL 70 -

	K-1 (E-10)	K-2 (N-101)	R1 (Arg on) (20m)	R2 (N-102)	Log (E-111)	PM1	PM2	C-1 (PM)
Crit.	2.5×10^{-11} (264)	5.8×10^{-11} (274)	-	2.5mv (214)	6.5×10^{-11} (200)	HV 8015	HV=900	6292 + NE400 PDL 30. HV1100 8900 c/m HV=995 VOLT 30 c/m
	$22\% (3 \times 10^{-9})$ 6.6×10^{-9} RM 2.62	$16\% (10 \times 10^{-8})$ 1.6×10^{-8}	$12.5\% (10mv)$ 1.25mv	530mv	1.3×10^{-8}	700v- 25%		
(E112)	1×10^{-12}	8.7×10^{-7} (27% - 3x10 ⁶)	195mv		201 2.1×10^{-10}	HV 2,25	2500v	HV=700v 10 ⁵ c/m
2:10 PM	2.7×10^{-10}							
3:00	2.0×10^{-10}	6.7×10^{-7}	140mv		202 1.7×10^{-10}			
					201 9.2×10^{-7}			
	IC-1*	IC-2*	IC-3*	IC-4*	* Background corrected - cf 6/58 IC2 = 1.9×10^{-12} a. IC3 = 3.2×10^{-12} a.			
SOUTH WING	2.1×10^{-13}	1.4×10^{-13}	2×10^{-13}	4.5×10^{-13}				
EAST WING	A $15:10/58$ 6×10^{-13}	D $55:10/58$ 4×10^{-13}	C 6.5×10^{-11} 1.2×10^{-12}					
	measured with current source cf 6/58: A: 2.8×10^{-11} a. D: 3.5×10^{-11} a.							

ORI $\frac{1}{8}$ " $\frac{1}{2}$ "

201 layout
Instrument



R1 $4\frac{1}{16}$ "



1.3
0.001

$$\begin{array}{r} 1.32 \times 10^{-2} \\ 1.32 \times 10^{-2} \\ \hline 2.64 \times 10^{-2} \end{array}$$

2-4-60 Set-up for foot exposure -
 { C1: PM-4 detector (6292+NS400) PA 694(S) -
 { C2: U235 #2 detector Old PA -
 { C4: U235 (S-1) U'Al detector PA 694(S)
 C2 did not count -

3-8-60: Counter check requested - OFC - C4 working -
 Check components -
 Replace miniature counters with larger 1B's etc.
 C2 - 1/2" in N tube w/ Lucite -
 C4 - 1" in W tube w/o Lucite -

HV-2: Iris NVC1 - when turn on HV - needle
 "dance" about zero then
 goes off -

Plugged HV cable in C4 (201) OK.

HV4: Use NVC3 - OK.

Scaler C2 - Blow fuse. Y89641

Check reading of GAS7
 replace 1 GAS5 & GAS7 -

When turned power on notes noise under chassis.
 CUT OFF before blowing fuse.

3/8 Replace chassis with Y89642 from shop 216

Put in strips that had been in S-2

114-12 input OK scale 16 #8 dete (not transfer on)
 replaced w/ 114-8 OK for scale of 16

On scale 64 only register thru 16 - no 32 & no register

115-2 Replace 12A07 - V104 on OK

3/22/60 - KR reports that K2 has had "trip" history - Several
 runs of late has tripped over night & sometimes during
 day -

2nd P - check in 202 - K2 fuggin

Range 3x10⁻¹² same as K1 range little or no signal
 on K1

K2 meter jumping - Deflection amplitude 85% while
 that of K1 only 2%.

(cut gas) Range 10x10⁻¹² up to 3%.

3/23/60 K2: Swap signal leads @ instruments K1 & K2
 Jumpy indications still on K2 meter - Trouble not
 in Detector - Battery Supply combination -

3/28/60 K2 in reach. Reading 2x10⁻¹¹ (K1 2.1x10⁻¹³)
 Swap again K2 < 1x10⁻¹³ K1 1.5x10⁻¹¹

K2 (w/K1 head) [10x10⁻¹³] 0-1x10⁻¹³
 K1 (w/K2 head) [10x10⁻¹¹] 1.2x10⁻¹¹ @ 84B

3/29/60 Exchange detectors to right position

3/30/60 K1 no trip

4-1-60

-K2 seems OK. - no trip.
 DFC request check of counting channels -
 [C2 linear amplifier in shop for service
 C3 linear amplifier in shop for use as test
 for miniature counter check.]
 Still a shortage of pre-amplifiers -

No counts -

Re-installed timer panel -

C2 - Old pre-amp & 1/2" BF₃ counter -
 Linear amp 1 → Scaler 2 - HV - 1.

No signal - found there was no power on
 pre-amp.

Chose to use C1 pre-amp AIC-44B.

Brought to N side of bench. Attached to counter
 Now this channel working well -

HV = 1500v Amplifier: 44-B + 123801
 Gain 8, Rise Time 0.2
 P.O.L. = 20

Check of C4 - showed bad detector RCL 1097

→ Replaced with RCL #1682
 Gain = 4; RT 0.2
 P.O.L. = 20

4/6/60

B-A - 134 scalars of 630 timer installed -

Background Counts

C 1. { HV = 1500
 { setup as 4-1

52.8 4m

50.4

48.7

49.0

10 minute counts

Exp. room shut-down

C 4 { HV = 1500
 { setup as 4-1

63.5 4m

69.4

68.7

68.2

Remove Rate meter for bench check -

5-28-60 SX2 in PM2 HVPS replaced

5-6-60 Re - made case

B-A timer made case ✓

Prepare for counting experiments -

5-9-60 Cal. log N

5-11-60 RIDL scalars to 202. Check counters -

5-13-60 Repair Power Supply for trip circuit of R2.

Normal Power Shut-down Cut-off, at close of day.

Power was off at 9:13 for ~ 13 hrs. on Saturday -

5-14-60,

8:24 Check instruments:

Counting Channels.

a. H.V.P.S. [Sc] OK ; Y123871 (1) ✓

Y123872 (3) ✓

b. Scalers - Binary : Y89642 (2) 2min, 600, X16 448 +16

Y89637 (4) 2min, 600, X16 449 to

Part : Y123798 1min, 600 3601

Y123799 1min, 600 3600

2min	2min
112 + 18	28 + 13
112 + 19	28 + 13
7201	7201
7200	7200

8:37 Energize RIDL ~~count~~ scalars.

5/16/60

8:40 HV for three counting channels set.

C1 = 1500 RIDC 1 8,02,20
 C3 = 1900 B-A 798 8,02,20
 C4 = 1500 RIDC 2 4,02,20

Measure count with experimental source "W"

C1	C3	C4
128	276	223
123	251	114
131	262	95
127	229	111
131	557 (11)	112

K1: Check zero: 3×10^{-12} 0.6×10^{-12} (21%) Reverse 21% ✓
 K2: Check zero: 3×10^{-12} 1.25×10^{-11} (8%) " 8% in

PM1: HV on, @ 5ma (920v) 58 set to 6 ma (freq level)

PM2: HV on, @ 750v 40
 Adjust zero: Adj- 15% Bal. Pot 328 $I_c = 1.2, I_h = 9.6$ ma

R1 - OUT

R2 - Set at 10% on 1mv range 0.1mv, with input shorted

Log N - Adj - OK.

9:37 Brought in Power Supply for R2 Trip Ckt.

Set trip point R2. 100mv 15% , trips on 10mv range $\times 150\%$
 OK 100mv 15% , no trips $\times 130\%$

Instrumentation Needs -

- { C2 - pre-amp of amp.
- { R1 - check out
- { K log - service

5-18-60

C2 - back in operation

PA: 20102 G 8

1" Res #1087, HV 2200v [10' R611/6], LA Y100303 RT 0.2

PDL 20

Background:

C1	C2	C3	C4
33	36	189	62
37	39	168	68
47	40	172	56
40	34	190	66

See 8:52 AM

12:55

PM1 Bypassed - reported jumpy panel meters -
 @ .6 had jumped to .54 - now fluctuating between .6 & .62

fluctuation present w/o HV.

Check tubes - replace 5V3 - rectifier

5-23-60

Prepares for traverses with U²³⁵ - U²³⁸ counters,

Detector	C1	C2	C3	C4
U ²³⁵ : 5-1	135V	2200V	135V	1500V
PA	44B	20102	20101	694
LA	Y123801	Y100303	Y123800	Y100363
LA Settings	16; 0.8; 50	8; 0.8; 20	16; 0.8; 10	4; 0.2; 20
Log N = 0.08	64,778 64,711 65,546	390,807 587,261 593,818	33 32 31	679,228 675,881 684,290
Log N = 0.04	33,782	297,092 295,057	15 13	337,479
Log N = 0.2	162,748 158,899	1,414,574 1,478,689	81 103	1,694,281 1,649,947
Dump	3600 3597 3597	633 141 83	0 2 0	772 450 400

5-23-60 Note on "Dump" 60 cycle counts of C1.
 ± 50 volt signal on output - Check

5-24-60 { CTR.
 S-1 & pre-amp connected to LA-2-
 (HV off C2 - Disconnect sig HV @ 2 station 201)
 Before doing above took Bkg. counts - NOTED
 ABSENCE OF 600 SDU signal - ripple now ± 0.5V p-p.

BACKGROUND:

C1	C2	C3	C4
16; 0.8; 50	8; 0.8; 20	16; 0.8; 10	4; 0.2; 20
0	49	0	61
0	37	0	67
0	50	0	60
0	42	1	57
0	47	0	68
<hr/>			↓
16; 0.8; 15			62
1			50
1			53
1			52
1			60
0			46
	<hr/>		↓
	5-1		20 readings
	16; 0.8; 15		59-90
	20 readings		○

5-24-60	CENT S-1 C2	EXT 8-2 C3	EXT 10F3 C4	Log
	7544	40	135,476	} 0.011
2/4 7.04 x 10 ⁻²	88.6%	14	126,048	

107
 1 71165L
 2 988929L
 153

C2(1) @ 15' IND=14.0

1 231040L
 2 960345L

1 226423L

2 940972L

1 3320L
 2 17220L
 1 5546L
 2 897305L
 1 206776L
 2 873313L

Log	C2	C4
0.09	75,800	1,040,000
0.05	38,800	551,000
(8.18) 0.011	8,870	126,000
	1.18	1.95
	4.37	4.37
	(8.53)	(8.05)
	1.89	1.89

ratio of levels

7.09
05

7.04×10^{-2}

$\times 10^3$

1 38840 L
2 550797 L
100

7.09×10^{-2}

1 40361 L
2 569503 L
154

7.13×10^{-2}

1 42378 L
2 594454 L
73

7.08×10^{-2}

1 43680 L
2 616410 L
87

7.13×10^{-2}

1 45045 L
2 631870 L
69

7.15 0.09

1 76527 L
2 1070288 L
151

7.37

1 77828 L
2 1057751 L
150

7.29

* 1 75780 L
2 1039086 L
129

7.29

1 74381 L
2 1019438 L
128

7.27

1 72347 L
2 994336 L
121

7.25

1 70441 L
2 971808 L
107

1 71165 L
2 988929 L
153

C2 (1) @ 15" IND=14.0

1 231040 L

2 960345 L

1 226423 L

2 940972 L

1 221355 L

2 917220 L

1 215546 L

2 897305 L

1 206776 L

2 873313 L

5-25-60 LA 123801 Returns to rank (rearranged 5/28/60)

5-27-60 8:20 AM R-1 - In rank - Set trip at between 130-150% full scale with input shorted set zero that meter reads $\frac{58}{100}$ on low scale.

Open input - reads 9% on low scale -

R1 Recorder hanging, ~~output~~ pen not following output of "amplifier". Check slide wire -

11:30 - No counts on U^{238} counting channel -
 Scope attached - get background noise only
 U^{238} counter mounted in reactor
 U^{235} " outside -
 U^{235} counter OK. Mounted outside of tank.
 Common power supply for counter voltages

5-21-60:

Investigate failure to count on channel C2. U^{238} 8-2.
 No H.V. at connector for probe. HV OK @ battery

C2

OK @ Pre-amp
 Loose (open) lead in adaptor-connector on Pre-amp. input.
 Replaced. - Set Amp: Gain 8, RT 08, PDL 20

R-1

During instrument check, R-1 not trip on 3×10^{-12} range with source in contact (Previous distance @ 6 inches)
 Check battery for R-1 ion chamber - Dead - replace.

PM-2

During run not records below zero for low level signal.
 11:34: Set zero. Recorder balance set @ 339 (+)

R-1

RECORDER PEN (blue) for R-1 hangs - will not zero when input to recorder is shorted.

~~5-25-60 LA Y123801 in rack removed 5/28/60~~

6-6-60 K-2 had tripped on panel - over weekend
Range 3×10^{-12} .

6-22-60 Wire new Chempump for DFC -

6-23-60 Check Chempump - Repair Hall source device -

6-24-60 Counters for DFC

On 5/20/60 (p. 129)	HV	LA	Gain, etc
C ₂ : 1" BF ₃ 1087	2200V	Y100303	8, 0.8, 20
C ₄ 3/4" BF ₃ 1682	1500V	Y100363	4, 0.2, 20

As setup	DET	HV	LA	S ₀	Loc	
{	C ₂	1" BF ₃ 1087	2200V	Y100303 (8, 0.8, 20)	BA-123799	above Ne
	C ₃	1" BF ₃ 1097	1900V	Y123800 (8, 0.2, 20)	AIC 89637	steps by Ne
	C ₄	3/4" BF ₃ 1682	1500V	Y100363 (4, 0.2, 20)	BA-123798	

PA 2 = 9213 20102

PA 3 = 9213 20101

PA 4 = 694

Settings for detector as on 5-11-60 County channel
Folder

Repair C₃ linear amplifier - enter LA 3 book -

6-28-60 DFC called re K2 - High background 10×10^{-12} a. scale needed
(K1 on 3×10^{-12})

K1: $.85 \times 10^{-12}$ a

K2: $2-3 \times 10^{-12}$ a (big fluctuation)

Swap input & amps. -

K1: $.75 \times 10^{-12}$ a (3×10^{-12})

K2: $.8 \times 10^{-12}$ a (3×10^{-12})

More noise on K2 -

Back to proper instruments

K1: $.8 \times 10^{-12}$

K2: $.1 \times 10^{-12}$

8-25-60 Observed Dist. Sup -

Note of R₁ unable to zero = R₁ records
{ K by out of source has been for long time.

Revised rate meter -

7-18-60

BOTTLE EXP.

Instrument locations -

COUNTERS	C ₁	C ₂	C ₃
DET.	2" BF ₃ 1773	3/4" cr 2" BF ₃	2" BF ₃
P-A	44B	20101	694
LA	123801	100363	123800
G ₂ m	8	8	8
RT	0.2	0.2	0.2
PDL	20	20	20
HV	1450	1500	1450
Sens.	4mv	NO SECS. CHECK *	NO SECS CHECK *
LOCATION:	3" paraffin can on top north of assembly	HOWITZER ON FLOOR 2' N of assembly	3" paraffin can in 2' S of assembly

Chambers

- K1 on floor base of Lid.
- K2 on Lid at walk.
- Log on floor base of Lid
- PM2 on top had
- PM1 on table between Lid & Wall.

Drip Check:

{	K1	10x10 ⁻¹⁴	Drip
	K2	10x10 ⁻¹²	Drip
	PM2	1100v	Drip
	PM1	0.6 HVeg.	Drip

(K1-K2 see new seal check.)

7-19-60

Further check of counter for

CHANNEL	1	2	3
DETECTOR	BF ₃ - 2" - RCL #1773 (S)	BF ₃ - 2" - RCL #1771 (S)	BF ₃ - 3/4" - RCL #1681
P-A	44B	20101	694 (S)
LA	123801	100363 (4)	123800
G ₁ Gain	3	32	16
B.T.	0.2	0.2	0.2
PDL	20	18	15
Input Sens.	4mv short cable	0.2mv info. with cable	0.2mv long cable
HVPS	BA 123871	AK Sec. 4942 1500	BA 123872
HV	1450	1500	1500v
LOCATION	3" paraffin can - in air - North of assembly	3" paraffin can - in air - South of assembly	Howitzer on stand off floor - SW of assembly
SCALER	BA 123799	RIDL 1-2	BA 123798

PM-2 number of inst. drift up scale. about 10% check.

Recorder Battery Check: Replaced the following:

KCKM (Revised distributed in spec)

PM-2

K-2 (This was not marked, throwing + spikes whenever standardizing)

PM-2 Zero - was 341 set to 338

MANOMETER

With fluid at fixed level, indications were good. Replaced all tubes, gages, tubes & set null.

7-20-60: Check - RIDL - print out of location

Recorder - R1, 2 - Blue Pen now seems to be responding?
Both red & blue cartridges zero when input checked
Refer unit, 5/21/60 - Blue pen not zero when input checked
Clean pens & start Recorder

7-26-60: Purple pen (R1) - not responding to scale changes?

9-6-60: R1-2 Recorder batteries low - Replaced.
R1 (purple) not responding to scale changes or signal. Now reading zero. R1 unit not able to zero.

9-8-60: Reinstalled rate meter & hands in 201 & 202 -
Check cal. & zero - Set HV @ 860V.
Suggest leave E-A on -

PM2: Reset PM2 I_H to 10 ma. Was off scale.

R1 Unable to zero. Remove -

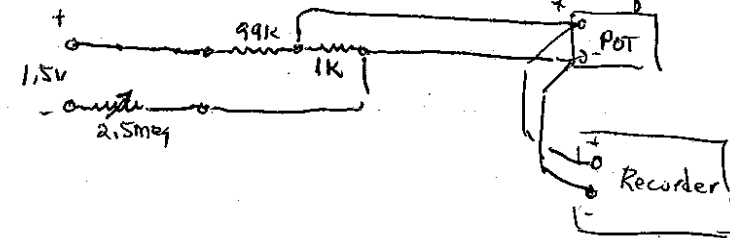
9-29-60: Set channel C-1 for use with 2' BF₃ or Str.

Gen 8, RT 0.2, PDC 20 -
HVPS BA 318 In C1 blew fuse when turned on HV. -
~~Use HV4 (Serial 487637) changed HV circuit at top hat.~~
Use HV (Serial 89642).
Marked amplifier & supplies used -
Checked 3 channels for operation OK.

10-11-60: Call for check ORNL Log N - Y90068 -
no response -
Unable to bring up to zero in any position of switch -
Remove -
Try Y99087 (from shelf 209)

11-16-60: Remove Kullby 410 Y124029 for check

11-17-60: Check K1 Recorder & R1 section of Recorder.



A. with test signal on recorder input terminals seems OK

Test	Records
3mv	3mv
5mv	5mv
7mv	7mv
9.5mv	9.5mv

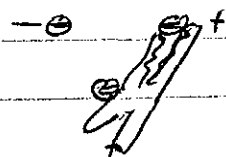
Batt 125v

OK with Batt. signal & input board
B- SIGNAL FROM K2 channel to this recorder - OS + (3.5 mV/kV)

Batt K2 - 115

C - SIGNAL FROM K1 channel to K2 (Good) recorder - OK, (41.0 mV)
this recorder OS + -

re-check with test signal at board input OK.
DID NOTE THAT WHEN GND + lead to screen get off-scale + indicate



Try this on K2 recorder this with test signal
WHEN SHORT input lead at K2 recorder no visible except
slight hum + slight back to regular reading.

K2 - NOT ACT W/ WITH TEST SIGNAL DOES KICK OS + WITH
GOOD SIGNAL FROM CHANNEL OUTPUT

OS + when + GND ; OS - when - ground

Purple pen input of double pen recorder - R1-R2 -
with Test Signal - Check - OK

OK with signal from red pen channel.

10:26 - attach purple (K1) leads to red pen input.

Attach connectors to K1 out at output panel,
removing K1 recorder lead at output panel.

12:45 P. R1 purple pen (K1) now unimpaired by scale changes.
No response to Test Signal, - tick

Tube check 2 12AX7's slightly off. Not expect this as cause

11/17/60

2:15 P New tubes in Brown amp of purple pen no improvement - -

1-18-61: PM2 was tripped on low $I_L = .7$ m $I_H = 5.6$ mA -
Check tubes 12AU7 & 12BH7 replaced
Readjust zero - set $I_H @ 10$ & $I_L @ 113$

Trip Panel R-2 & K-1 trip & not reset w/o signal

K1 compare w/ K2 trip values.

K2 - cathode voltage (bias, E_B)

$E_B = 0$ v when front panel control full CW.

$E_B = 8.6$ v when front panel control full CCW

= drops to 6.7 v when punch reset

Try at $E_B = 7.2$ reset @ 113 -

K1.

Removed Trip Panel -

At least one Leach 327 relay in screen string
shot. One badly burned - This is R2 relay -
To shop for further work.
Leach relays for R2 & K1 coil open -

1-23-61 a. PM2 a trip light not lighting when relay operated
b. PM2 spikes on recorder trace -

1-27-61: D.F.C.: Reports 2X2 in HV.P.S. - glowing -
 Replace 2X2A - leave Bunch on @ 1200V on 2X2A -
 Check for spots

2-9-61: R1 back in rack.
 Trip level R1 hand to adjust

2-13-61: Log N. check with period simulator - seems to operate
 with period simulator satisfactorily. No need to replace.

2-1-61: Relay burn out seen point - replaced the six
 original relays. (see file)

3-14-61: R2 - pen at zero not responding to instrument
 output changes.
 (chart drive off to re-fill inkwell of R-1.
 When Chart Drive on, R2 pen operated!) ←

3-16-61: Check out channel C3 for miniature counter.
 1mv input, 60 v.: GAIN 64 $\frac{8\mu s RT}{2\mu s RT} \times \frac{29}{7}$ frequency at 5X
 1mv - Gain RT PDL RT PD -
 64 0.2 18 0.8 64
 32 9 31.7
 16 2.5 15

	Gain	RT	PDL	RT	PDL
3-16-61: 0.5 mv	64	0.2	9	0.8	33
	32		3		16
	16		1		7.5

0.5 mv = 2 cm on Hi amp - 1X2 - scope X100030.

Detector on - noise @ PDL = 4 Gain 32 RT 0.8 No PULSES -
 no pulses with 135V - source in place
 with NIKC HVPE get normal pulses at 1600V.
 Integrat has source at 1600V.

BF₃ counter.

3-17-61 - Set up for vertical traverse.

3-20-61 - No counts on traversing channel - pulses low -
 Check sensitivity -
 0.5 mv = 6 cm.
 Take check pre-amp 576V - output bad. replace
 0.5 mv = 2.3 cm.

Steady drift down in count rate
 2:00 NO counts - even at gain of 64 on amp.

new 219 pre-amp (from 112)
 Gain 32 - 0.8 RT - pulses -
 with new pre-amp - gain 16 - RT 0.8 - PDL = 10
 normal pulses = 2 lines (scope 1X2)
 set up point at PDL of 8 - using rotometer recorder -

3-21-61 Change per folder K-1
→ Pan-Rz cleaned & filled

3-21-61 Reported printer on counter system missing characters in 5th digit.
Service operation does not require printer feature, attach counters to BFA scalers - timer arrangement.
(Fixed timer - 5896 to get with stop)

3-22-61 Set channel K-2 for U-233 detector.
PDL may need finer adj. set at G16, RT 0.8, PDL 20
(PDL was at 8 for min. P₀ counter.)

Opp. point for 233 counter

PDL	ct.	Gain 16, 0.8 ps RT, -	ct.	Number 53,500
8	11700	11837	54079	
9	7550	7589	53746	
10	4660	4742	54418	
11	3220	3402	54843	
12	2529	2577	54249	
13	2000	2300	53901	
14	2016	2103	54423	
15	2158	2171	53814	
16	2181	2148	53788	
17	2164	2075	53782	
18	1964	1966	53504	
19				
20	1949	2012	53870	

3-21-61 C-1 1" BF₃
Check op. pt
(G 8, RT 0.2, PDL 20)
HV = 1500V (AIC SC)
Pulses saturate -
flat response full range
PDL @ gain 8.
leave as is.

C₃ 2" BF₃

check op. point
RT 0.2, G 32, good pulse
@ 1450V - run bias M230 outside
3" paraffin
Time: 1 hr

10	23,226	23,020
15	23,208	22,906
20	22,539	22,742
25	21,469	21,440
30	19,544	19,725
35	17,264	17,390
40	14,603	14,685
45	11,781	11,878
50	9,102	9,292
55	6,201	6,212
60	4,163	4,103
70	1,133	1,185

9:22 set gain 8 RT 0.8
PDL 20

pulses almost saturate -

need to look into wide change in gain between 0.8 & 1.0
settings on C₂.

3-28-61 Made extender for K-1 in 201
 Small minibox with HV-type receptacles
 in each end. 20' length. K-1 wire to
 - Check to see response of channel with extra cable.

4-24-61 Several units screened over weekend
 PM-2 - ^{low} strip not reset. I_p low reset low.

4-28-61 Noted I_p at 5.6 ma - should be 10 ma.

5-21-61 PM-1: Meter seems too nervous. Jitter at 1.6 ma \pm .01 ma.
 HV @ 50%. Turn off HV - no change.
 Remove segment - less jitter.
 Note changes on meter follow apparent line voltage
 changes as evidenced by change in tone of relays
 and other equipment.
 Replaced tubes 5K5 & 5092.

PM-2 Low try at 2.5 - Reset to 1.3 ma & reset gear.
 Bias setting 203.

log N - ORNL at level in 1st decade - fluctuations
 \pm 10 sec periods. Not one 4 sec period.
 check calibrate position for fluctuations - smooth.
 battery checks OK. ?

6-1-61: Linear BA not timing. - Repaired

6-9-61: Scale - Y89637 AIC Binary. Not scaling.
 This discovered when set up to monitor stacking
 in 201. NO SCALING WITH 600 TEST.
 REMOVED STRIP 114-1 & PUT IN 114-3
 FROM OTHER BINARY IN 202. OK.
 R1-R2 recorder had been left on & paper run out,
 allowing pens to scratch roller.
 Cleaned & sanded roller. Replaced pens.
 Removed LA-4 Y100363 to shop for routine check of
 pen-ropes (refer file on LA.)

6-26-61: Keithly Log Sect. brought into 202 for check out.
 Had been in operation on bench in 210 for 1 week OK.
 (see file)

7-7-61: Adj K. log (any bias drift)
 K-1 battery

7-20-61: Linear hangs in .09 min - Repair -
 Check counters for multiplication

7-24-61: Keithly log Sect. - (one month)

Mondy
7-31-61

2³⁰ pm. PMZ Reports going up scale -
When got to 202 noted that Recorder OK on Bkg & Tnp
Ranges; but, on operate range, Recorder pen
runs up scale.

THERE WAS NO UP SCALE DEFLECTION OF
INSTRUMENT PANEL METER. Check into this

TUES
8-1-61

9:55 PMZ - HV - low -
Replace 2X2A - power supply -

8-2-61

Set up 3rd counter channel for multiplication in reg.

Sensor - P-A - LA SC HV
BF₃ 768 ; 349 ; Y-100363 ; Y123798(D) ; NICK 1090 -

Set HV @ 1600-

Ran integral bias source up to 1600v

OK

gan 32, RT 0.8, HV = 1600

8-2-61

Records Battery check LCRM OK
PM - replace
R1-2 replace
K1 OK
K2 OK
Log OK

8-4-61

Pull PM-2 channel - 7:58 AM
Back 3:35 PM

8-9-61

1:50 PM Counter - C-1 scale sour - 2nd decade not giving
✓ paper file

8-14-61

Set up printer scales in 202 -
Inven from 112. SW 584
Printer Y129873
Scale SW 67, SW 65

2/20

Set C = 0.1 R = 0.1 Source in Room
(using C1 & C2 1" & 2" BF₃ dis)
some decades missing proper print - work on this

check 100Ks 1m etc OK

8-17-61

Photo #3 BNL in 202 -

9:00#

8-18-61

High Level Run -

8-23-61 Printer System - repair files

Manometer = replace lany and tubes -

9-18-61 R2 40M2 Tripped over weekend -

R2 not re-set = re-adjusted trip point

9-22-61

R2 not trip - set trip point down to trip 150% not trip 120%
R1 High zero

9-25-61

P₁ count channel setup -

CA - PA ; LA ; Dead Scale ; INPS ± 50000.

9-26-61

Check out P₁ channelMonitors w/ 543 scope -
NI = 16000 - LA Gain 32, AT 0.2, PDL 15 -

C1 & C2 on printer

Printer channels - printer 67ff for 8 on 4th digit - ??For Cal covered sun had to chip spring off from
P₁ counter shell

10-6-61 PM1 - Not long. No. supply limited. Replace 2K2.
 Selwyn M-1 Sid. various small checks operation

10-12-61: Selwyn M-1 Sid. long. check -
 pull m1 null & put in m-1 Sid.

10-15-61: K2. Drop on relay ckt. during range change?
 Setting > 100% lbs. on range - cause unknown.

Replace Batteries on 2-pen recorder R1 & R2

10-20-61: K2 Trip.

10-23-61: Reported trip from K2 again. Ray mention. made that
 recorder had sharp rise in connector w/ trip.
 Put in new K40 - unit #180 - she had been in
 operation in 210 as standby instrument.

11-28-61 R-1 - No zero. possible - J. shop -

12-16-61 R-1 unit returned to service -

Recorder batteries replaced. OK.

Note - unable to get recorder for R-2 (Blue pen) -
 when meter on instrument at zero, recorder 10%.

Replace 2-12AX7's on Brown amplifier for R-2
 channel. - OK.

R1 & R2 OK.

Check K1 & K2 - OK.

K2 seems to have more drift than K1.

K1: 38-40% (3×10^{-13} lbs.)

K2: 22-27 (10×10^{-13} lbs.) JM

1-12-62
 K1 adj. after put in place around array.
 Was reading negative on 3×10^{-12} on scale.
 Responds to source.
 Check cable at detector - re-arrange . 1130
 R2 - trace seemed instable - X1 range someone
 K1 - up scale drift slight 1145 seems to ^{be} settled down.

3-A-62 Instrument set up for Experiments in Sect.

Counting channels: - EP pulser & GR attenuator - $\left\{ \begin{array}{l} 1000 \text{ cps} \\ 1 \mu\text{s} \text{ wide} \end{array} \right.$

C1: { PA-44B input ".4x10 MV" | .2x10 MV
 CH-123801 GAIN: 8, RT 0.2, PH 33 | 16

scaler 122799 22293 4M ← NEEDS CHECK

scale 122798 60051, 60038, 60032

STASH rate meter ch. output of LHI

C2 { PH 349 16,0.2 1000T | .2x10 MV | 4x10
 LD 100303 PH 26 | 47

Mid R1.
 pulser in room
 w/ M228

C1 - 2" BF₃ detector (1773) HV = 1500
 C2 - 1" BF₃ detector (1682) HV = 1500

C1
 8, 0.2, 20
 221,304
 221,718
 221,861
 222,409
 221,699

C2
 8, 0.2, 30
 45,324
 45,326
 45,326
 45,364
 45,472

Obj. 214
 266
 150
 207

44
 48
 35
 29

Detectors in Tank

98 16
 179 14
 111 14

- 3-22-62: Insert chamber in remounted tubes near array.
- Check magnet supply - using one from Nell to hold safety - (Bad supply not in charge)
- Had to insert fuses in solenoid-reflector lines for Nell to reset vacuum
 - Replaced AT57 indicator in Nell magnet supply circuit.
 - Install "popper". 206 Battery from 215 (no longer use there) Y100310 Set in operation - OK with signal directly on input strips.
 - Clocks not operable on ATC timer.
 - Log N battery low - Log N sluggish
 - K1 No response to source.
 - K2 must have K2 records - not expanding.

- K1: Battery low - replaced - STILL NO RESPONSE -
- SWAP SIGNAL AT INST IN 302.
- K1 INST OK on K2 chamber
- K2 INST NO GOOD on K1 chamber -
- DID GET OCCASIONAL OFF-SCALE INDICATION
- (CHECK CABLE -
- SIGNAL CABLE: center lead had been pulled back in AW connector -
- re-joined inner pair of lightest clamp

- Log N Check +1200 v ok on Log N -
- Recorder battery replaced -
- K2: check recorder response -
- note range from minus negative adjust zero if all is well - 8
- Set gain on K1 & K2 at $\approx 5\%$ on 1 mV range -
- Revise recording pen K1 & K2.

4-3-62 Check on trip points of safety channels.

	SCALE	INST MTR	RECORDER	TRIP MTR	RELAY TRIP
R1	AKG 10×10^{-13}	0. 57% 2. 50%	57% 55%	50% 49%	---
R2	10×10^{-13}	55%	53%	45%	---
R1	1mV	15%	16%	---	---
R2	1mV	15%	16%	---	---

* adjust R1 recorder pot. to get recorder reading same as INST. MTR.

RM-2 Balg. adjust: With MV off adjust for zero signal output.

Balance pot - 460.

900volts - 15% (AKG)

Change ZXZA gain

	SCALE	INST MTR	RECORDER	TRIP MTR	RELAY
R-1	scale: 100 mV	15	16	---	---
	10 mV	05.	05.	---	trip
	100 mV	13	14	---	+
	10 mV	---	---	---	trip
	100 mV	11	12	---	---
	10 mV	---	---	---	trip
	100 mV	13	14	---	---
	10	(130)	(130)	---	---
	100 mV	14	15	---	---
	10	(140)	(140)	---	---
	100 mV	15	16	---	---
	10	(150)	(150)	---	trip

R-2

	SCALE	INST. MTR.	RECORDER	TRIP MTR	RELAY TRIP
	100	10	11	---	---
	10	100	100	---	---
	100	11	12	---	---
	10	(110)	(110)	---	---
	100	12	13	---	---
	10	(120)	(120)	---	---
	100	13	14	---	---
	10	(130)	(130)	---	---
	100	14	15	---	---
	10	(140)	(140)	---	---
	100	15	16	---	---
	10	(150)	(150)	---	+
	adj. for 100% drop				
	100	13	14	---	---
	10	130	130	---	---
	100	14	15	---	---
	10	(140)	(150)	---	---
	100	15	16	---	---
	10	(150)	(160)	---	trip

R1 & R2 set to trip @ 150% fs.

Typ Panel Check

4/3/62

K1 In. E-10 @ 650V in 202-

SCALE	INST	MTR	REC.	TRIP MTR	RELAY
3×10^{-11}	14×10^{-12}	(47%)	(47%)	(42%)	-
10×10^{-12}	-	-	-	OS.	Trip
3×10^{-11}	11×10^{-12}	(37%)	(37%)	(33%)	-
10×10^{-12}	OS.	OS.	OS.	96	Trip
3×10^{-11}	11.5×10^{-12}	(38%)	(38%)	(34%)	-
10×10^{-12}	OS.	OS.	OS.	(100) just trips	-
3×10^{-11}	12×10^{-12}	(39%)	(40)	(36)	-
10×10^{-12}	OS.	OS.	OS.	-	-
3×10^{-11}	12×10^{-12}	(39%)	40	(36)	-
10×10^{-12}	-	-	-	(Points to 102%) TRIPS	TRIPS

K1 set at 2 (120% fs.)

3×10^{-11}	12×10^{-12}	(40)	(42)	(33)	[100]	-
10×10^{-12}	OS.	OS.	OS.	96	-	-
3×10^{-11}	15×10^{-12}	(43%)	(44)	(36)	-	-
10×10^{-12}	-	-	-	-	T	-

ADD RELAY

3×10^{-11}	12.5×10^{-12}	(42)	(43)	(35)	-	-
10×10^{-12}	-	-	-	-	T	-

ADD RELAY TO GET (130% Trip) if set 120%

R1

Pm-2

Lo Level Trips

900V HV

Check Lo Level Trip & reset circuits -

	IL	IL #	IL #	IL #
IL	108	1107	1107	1107
Re	2.0	2.0	2.0	2.0

ALL NO LIGHT
CHECK
RELAY.

Set 1.15m Trip 450ma 90% recorder on TEST
(8.8ma Hi current) (900V HV)

R1

4-16-62

Log Count Rate Recorder - ~~Some~~ replace battery

After battery replacement, adjust "span" on instrument panel.

Available count channel; Scale 7 not operable

on Scale Y100310. Try another X64 plug in. Still not scaling properly on X64 & X257.

Alternate scale Y89637 has been fine - not operable.

Y100310 ok on X16 but rate too high.

replacement strips no help.

7:50am Scale Y100310 OK - after good replacement wanted (Model 115 #5)

Decade timer - hard to start cycle - - fixed.

4-30-62 PM-2; Unable to reset.

Observe: Low trip current: .7 ma / 1.2 ma

level: neg

High trip current: 5 ma / 10 ma.

Replace: 5V4; OD3 overloaded, replace OD3 ok.

K2 reported noisy. Interchanged signal leads with K1 to see if noise in detector & HV or amplifier.

5-7-62 PM-2: Call to 202 to check spikes in channel. Maybe in recorder only. - battery indication low. Replace battery - let run to see if any spikes appear - OK.

5-18-62 Log N = Reported instability in trace - Put on "low cal" to see if trace noisy. (Observe K1 & K2 both show trace similar to log N) wonder if there really is trouble.)

Trace of low-cal & hi-cal both seem normal. Reported +400.0 period on lo-cal. Not see it now.

Recorder - R1 & R2 batteries low - Replace

R2: Note meter off scale negative. Unable to bring needle on scale with zero adj. Checked battery low. Replaced

5/18/62

K2 - Reported spikes present on trace - No evidence in afternoon run.

5-23-62

Request for 3rd counting channel - Seals in rack:

Y100310 - Timer connection not match.

(Originally in use in 215) Otherwise, operable

Y89637 - No strips & some question as to chassis components

Remove Y89637 & install Y89642.

→ Need detector & maybe New Z¹ tube #1939 assigned - May be able to use L.A. Y100363 in rack, if not Y123800 is in 210 & working.

Try PA 502 & LA 100363 with CTR 1939 ^{Source} & M228

No signal -

No BT on PA.

No BT on LA replace 5V4

get BT get pulser, but clipped @ 25V

Pulled Y100363 LA for service

Installed Y123800 OK.

5-23-62 Counting Channels

	Detector	Amp.	Scale	HV.
C1	2" #1773	44B + 123801	(8, 0.2, 30)	1500v (B/A 123871)
C2	1" #1682	349 + 100303	(8, 0.2, 30)	1500v "
C4	2" #1939	502 + 123800	(16, 0.2, 30)	1600v BIC Scaler ⁵⁰²

Microflex timer not work - Check -
 Mechanical
 Reset rocker arm not returning to
 "start" position - lubricated contact lever.
 O.K.

5-23-62, K2 SN180 wiring.
 Put in SN178 from 210 -
 Still got offscale noise -
 Check cable. lead pulled back at chamber.
 SN-180 back in rack -
 40 ft lead for run from to 2 detector to
 top lat.

6-1-62: Request fission counter channel for experiment
^{U233} counter from 209 -
 Channels C1 & C2 have counters under tank &
 pre-amps taped.
 Channel C4, with 2" counter under tank, has
 pre-amp 502 on top of Sid.
 Replace 502 p-a with 45B to fit rack clamp.
^{U233} chr → 45B p-a → 123800.LA → GA123798 (C2)
 HV = Battery box - #1350 -

Motor drive for fission counter -
 M-3 Sid - Selsyn not operating.
 Note gear off transmission
 selsyn.
 Repaired. - OK

Note R1 & R2 trip - unable to reset.
 Power supplies off -

Fission Ch - recommend removal to
 check POC settings for bkg. -

Not sensitive enough for use -
 Suggest BF₃ Ch.

6-5-62 Check out BF₃ Ch.
 6-5-62 Repair R1 & R2 trip power supplies (Tube Change)
 Set B+ at 200v for each channel

6-5-62 Set hyp points @ $120-160\%$ fs.

6-14-62 PM1 - Replace 2K2A
K1 - Adj recorder deflection, was too high

8-6-62 K1 - adj recorder deflection - had trip on meter while recorder @ 50%

9-14-62 Rearrange instrument panel for operation in Sid.
Check counters -
Timer not operating - when push start, scales start but no time lapse indicator.

9-17-62 Counter Channels -
P2 (normalizer) gain shift over weekend
Trouble in gain control ~~is~~

9-18-62 Request for modification & service check -
1 - Addition of second manometer and possibly probe sensor.
2 - New thermocouple installation.
a - Solution well.
b - Run 201
c - In solution.
3. Temperature Records installation.

9-18-62

4. Measure Ocean Tides
 - a - Signal to Trip
 - b - Signal to alarm or trip (with) to alarm.
5. Check controls on outside tank.

3. Set recorder in rack 202: 16 point, calibrated for Type K - Chromel-Alumel - Thermocouples.

9-19-62

Discussed thermocouple use.

Type T (installed) give 4.28 mv/100°C

Type J (Iron-Cast) " 2.52 mv/100°C

Type K (Ch-Al) " 2.410 mv/100°C

Stores catalog shows only 0-100°C scales available is for Type J (I.C.) - Thought about wiring in some J.C. thermocouples.

1:00 P

Revive K3 is decision - - then can use Type T thermocouples on hand.

9-21-62

Were two manometers in location on Sid.

Request for 3rd plane manometer on 174 position.

Outside tank control - New battery - Rough check seems to indicate operation.

9-25-62 PM2: Trip high required $10V$ of 1300v. (1200 rated max)
 Replace 12AV7 (date pulled checked OK)

9-26-62 PM2: Not hi-trip @ 1200v - need to trip @ $<1200v$ -
 Set trip @ 1250v. Need to check head.

Traversing counter - seems a. if spurious counts coming in? Not apparent on scope - or in background.

Check w/summing

	C _N	C _T	C _N /C _T
.1m.	1898	2095	1.103
	1752	2381	1.359
	1879	2404	1.280
	1912	2054	1.075
	1891	1775	.938
	1834	1437	.782
	1845	1287	.697

Remove signal from LA 123800 & feed $1/123801$ {60V on beam}
 Set gain 32, 0.18ps RT. POC 8. {5V/10V bias port}

Output RA to Scale 123778.

C _N	C _T	C _N /C _T
1726	26430	15.31
1780	26797	15.04
1743	26413	15.16
1694	26242	15.49
1584	25862	16.32
1757	26272	14.95

9-27-62: C₁ - evidence of spurious counts -
 counting @ 2200cpm - sharp rise to 1000cpm -
 no further evidence.

K2: spike on recorder - also in instrument
 sweep signal leads to instrument
 - spike appears on K1. Trouble in 201 -
 need to check cabling.

10-11-62 Further check of K-3 temperature reader -
 Using Cu-Co T.C.s

6 T.C. are pulled from 202 to 201

Selector switch at rack above K3 -

Check operation with short T.C. on position 20 in Rm 202
 T.C. immersed in water in drawer with thermometer.

	K3	T _{Ch}	T _F
12:20	.000925	23.38	23.3

12:20P Check counts for 201 from 202 - TC 11-16 = STATION 1-6 OK

T.C. in 4-6 position in 201, made up this date.

	12:25	19.6°	sprayed with	1:05 in water	2:15
MV	4	.775	clear fog	.907	2293 (878)
	5	.7883		.909	2296 (878)
	6	.776		.908	2295 (878)
	in air			T _c 22.9°	22.5

11-12-62 Reprint PM-1 Red lite not come on when signal drops below trip level. Check -

11-

INSTRUMENT CHECK

Date 11-14 1962 Time 3:30 Source No. 8

1
2

PM 2

11-14-62 K1 Trip check 10^3 detector in 200 gamma source with source set-hand at 1.3×10^{-11} range 3×10^{-11} fs. change range to 10×10^{-12} fs, reading on this range is 2130% fs. (Trip) Not trip @ 110%

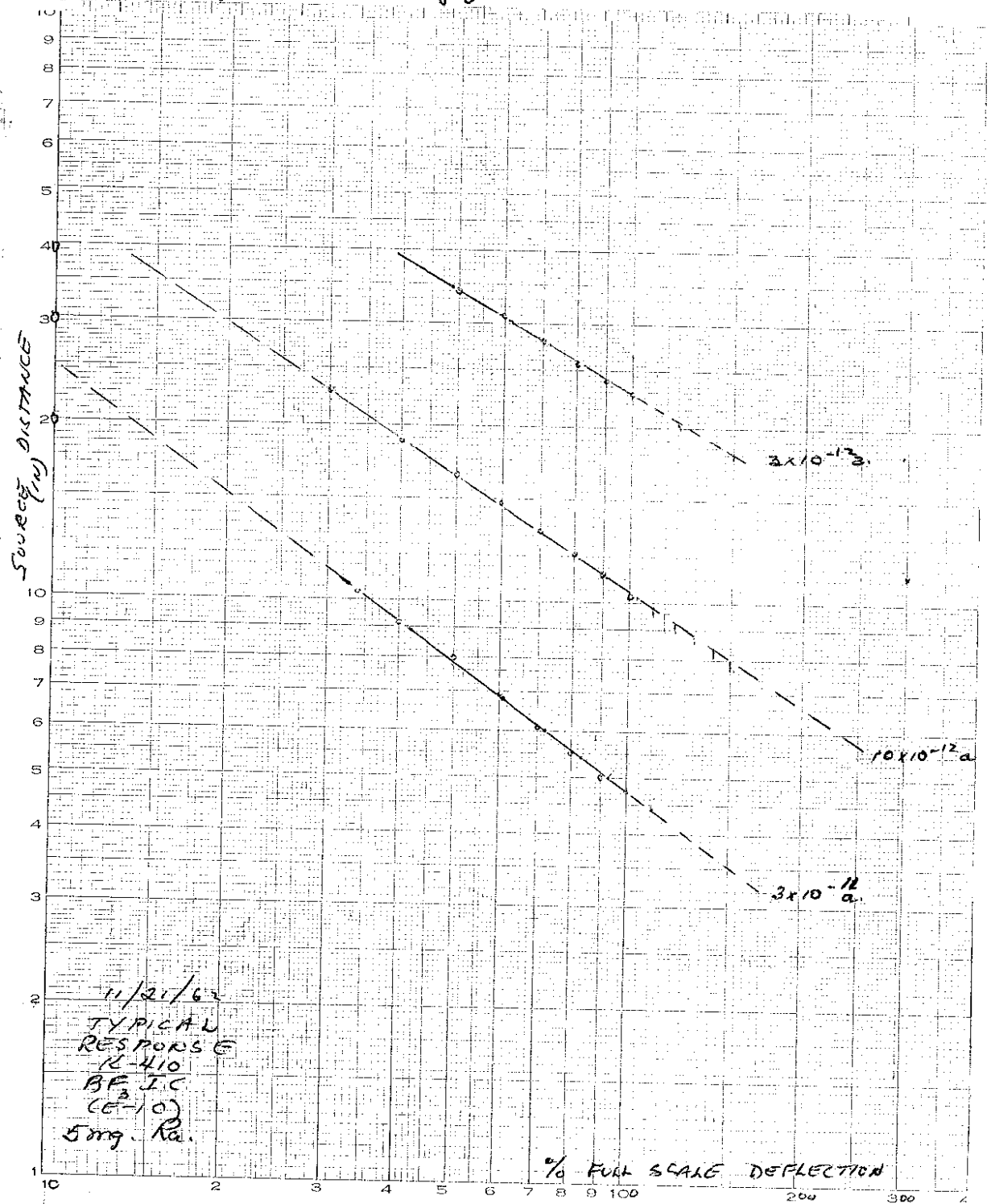
3:55 K2 Trip check -
 Range 3×10^{-11} Reading 1.4×10^{-11} a.
 10×10^{-11} 140% Trip
 3×10^{-11} 1.2×10^{-11} a.
 10×10^{-12} 120% Trip

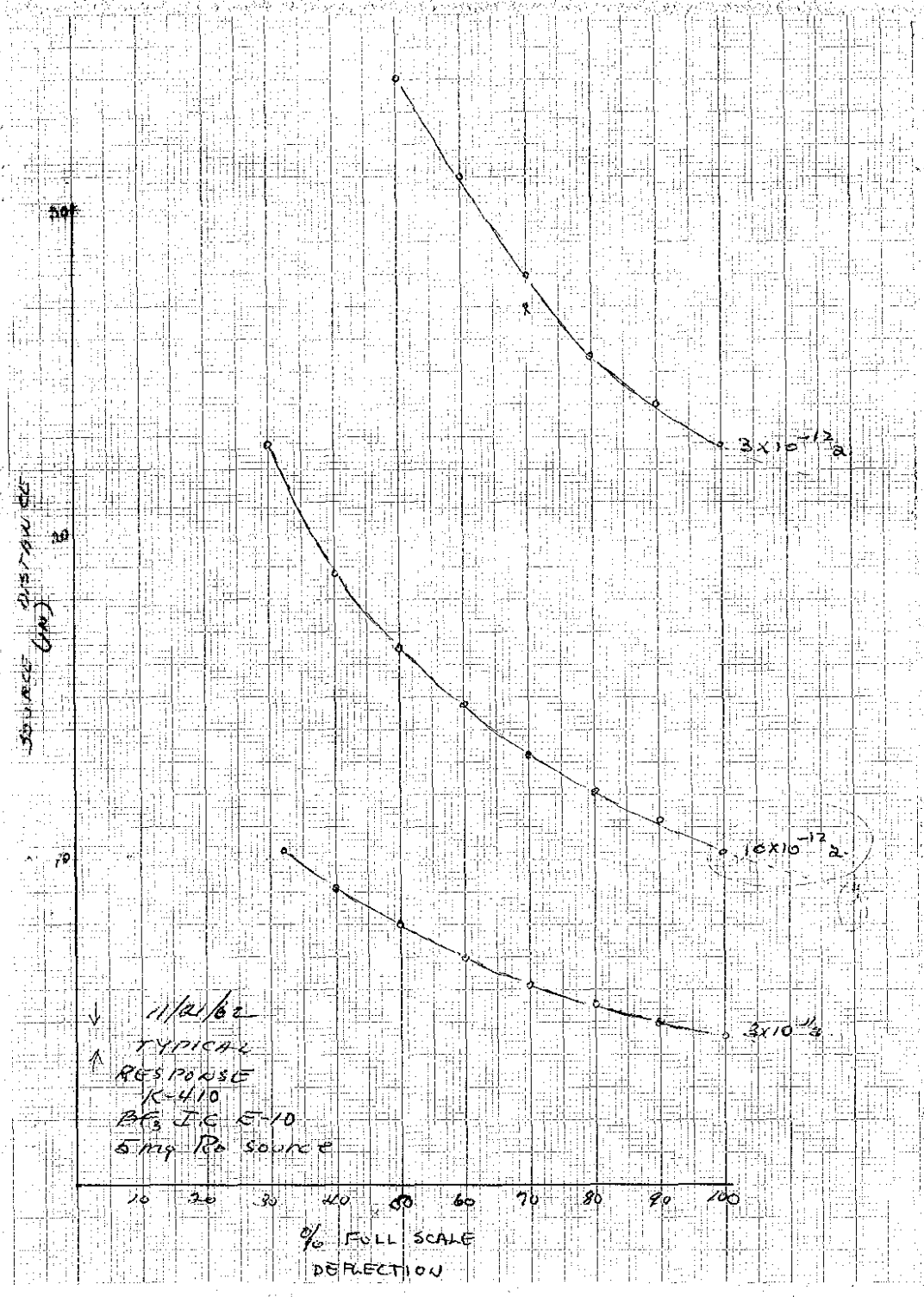
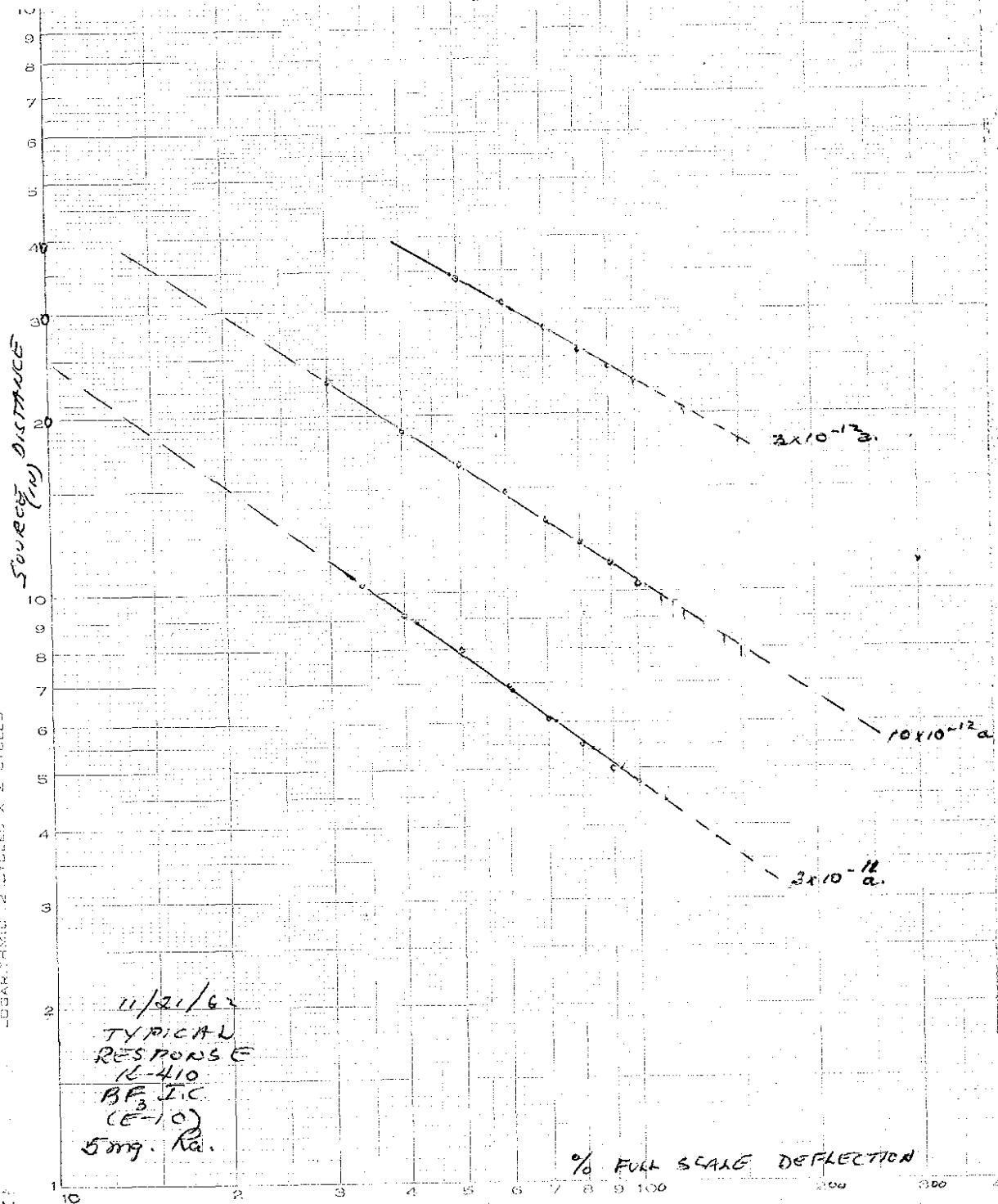
OK.

E1 Trip check
 Range 100mv Reading 12mv
 Range 10mv 120% Trip
 Not trip @ 110%

11-21-62

Check typical sensitivity of level channel.





11/26/62 K1 hi trip & lo trip. Needs adjustments

12-5-62 PM-1 regulator shipped
M1 manometer not following; loose shaft in rear of motor. (Noted selsyn not following motor rotation & chain not moving)

When reached to check if gear loose, pulled shaft out.
Removed to shop & re-solder.

After repair, re-mounted on manometer.

→ This answer to trouble that has been evident on M-1 - failure to follow level on readout.

12-19-62 PM2. NOT able to trip. Max Hd 1160.
Replace 2X24.

1/2/63 During check of operation of Beckman log (Y119817) [Installed by JFE], notes cycling of instrument. Off scale req. to 0.0005 & down, one cycle every 5 1/2 div. Suspect temperature cycling. After 4 cycles, set demand up from 75 3/4° to 78°, trace rose to 4 x 10⁻¹³ & fluctuated about that level - not dropping, as per previous pattern (@ 75 3/4°) - until reduced to original setting of demand. Did not hold elevated demand more than two cycles.

Check K-1 on 10 x 10⁻¹³ range to see if it showed effect. No indication of temperature disturbance there. Reading 4-5 x 10⁻¹³

consistently.

1-2-62: Check chassis sensitivity of PM-1 & PM-2 w/ JFE signal generator.

PM 2: I_L = 1.2 ma, I_H = 9.7 ma

Level: 0 @ balance setting 7 431 (panel meter used only)

Level - Signal

10 μa .006 - 10V

20 μa .012

40 .025

80 .051

100 .063

150 .095

200 .127 I_L = 1.15 I_H = 9.2

250 .159

300 .190 1.1

350 .223 1.1

400 .252

450 .290

500 .321 1.07 110 trip I_H 8.3 ma.

With reader set points range full scale to be = 2.5 μa.

Lo. trip level. (7.05 μa) - mark adj for 1.16 setting

High level. 2.350 μa

High trip @ .465 (x 50V) .5 ma.

1-4-63

Check log No. Second look at temperature effect on Beckman in 202-4119817.

(DWM - had noted cycling with source and level 10^{-12} - 10^{-11} a.)
on 1-3-63.

① 8:40 AM Still cycling as 1-2-63. see fig 1

In 202 change input leads to log N - Beckman now has cable & detector that were feeding ORN2 log N.

② Cycling on Beckman w/ ORN2 chamber [E-11] less drastic

Fig 3: BVL with K1 channel IC.

4 BVL with K2 channel IC - air duct near IC blocked

5 BVL with K2 " " air duct open

1/4/63

Fig 6 BVL with K2 IC RM10% air duct blocked
7 BVL with K2 IC " " " "

comparison of traces with source.

①

4/4/63
Typical cycling
BVL + IC-3 (Rm 201)

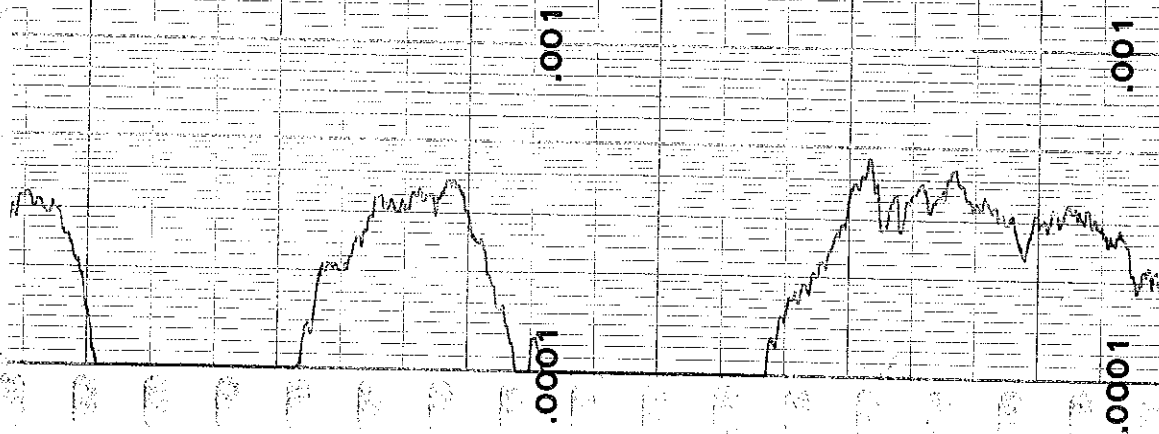


PLATE 460 PRINTED IN U.S.A.

4/4/63

DETECTOR R-111
(ORNL log channel)

BVL
[cable change in Rm 201]

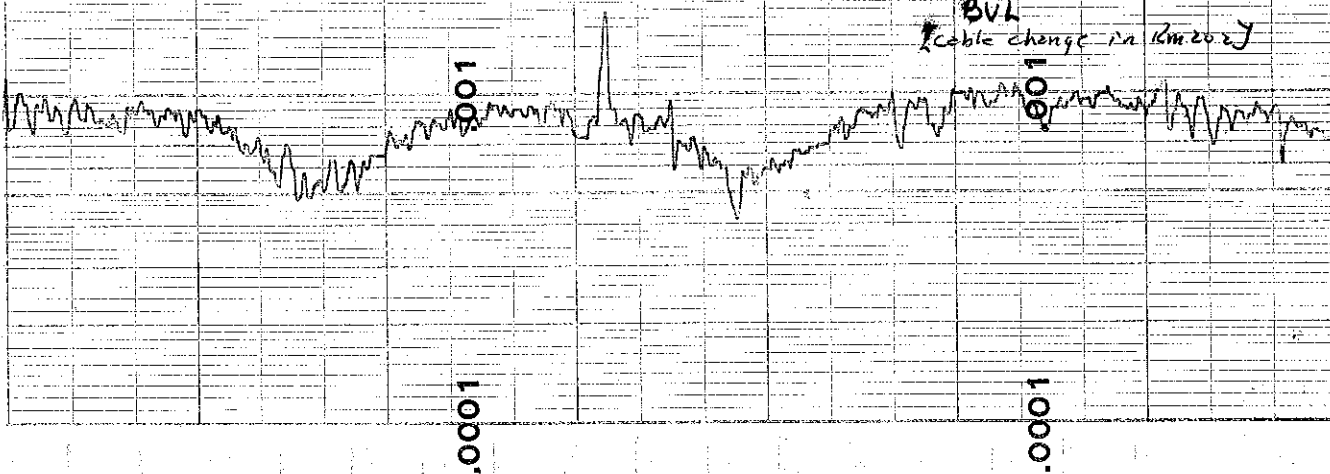
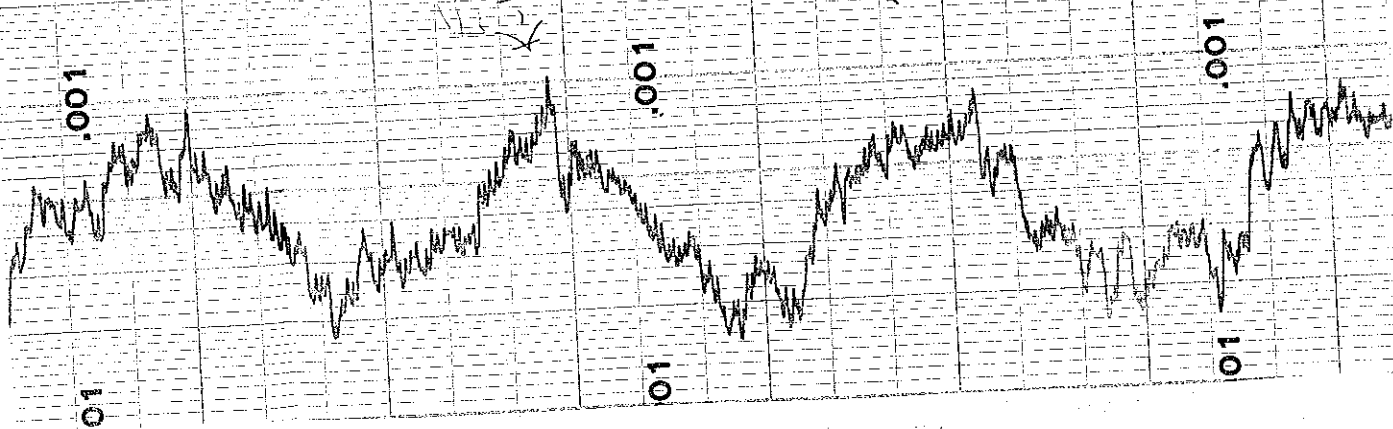


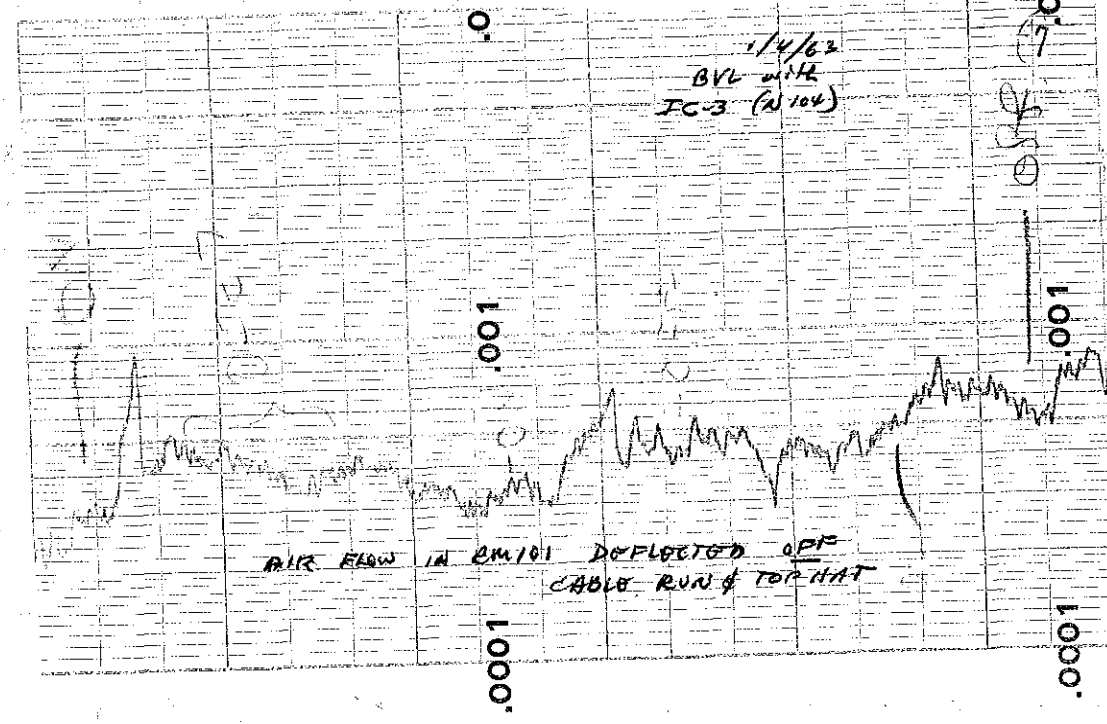
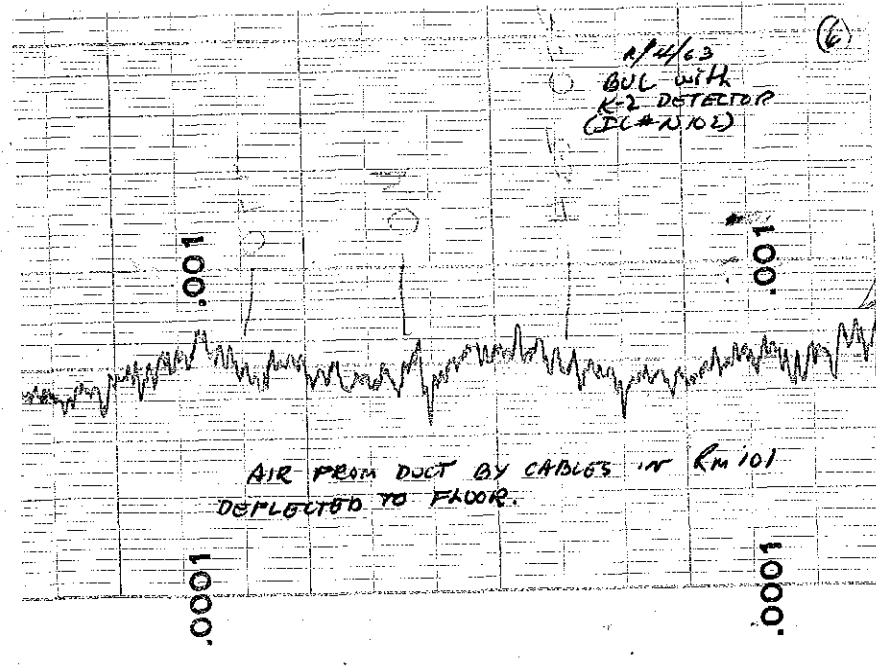
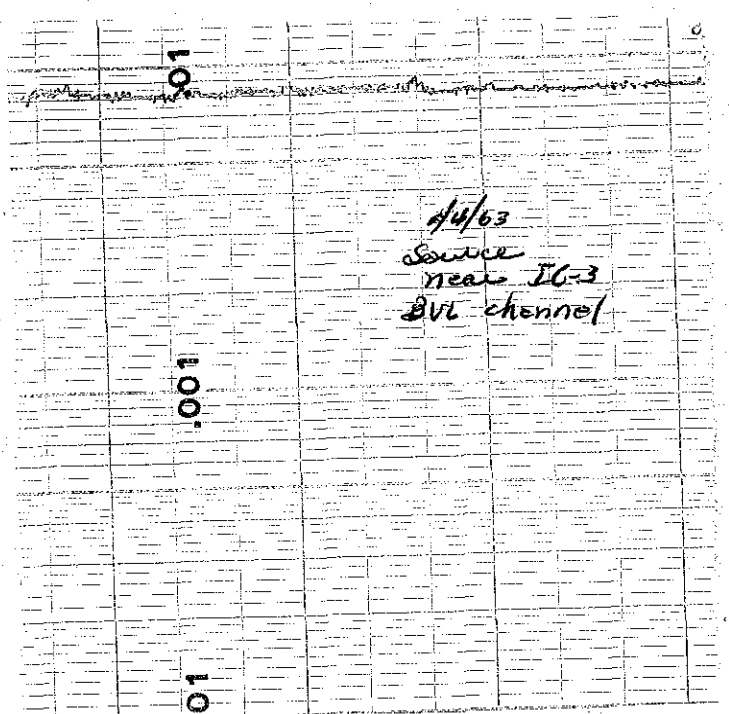
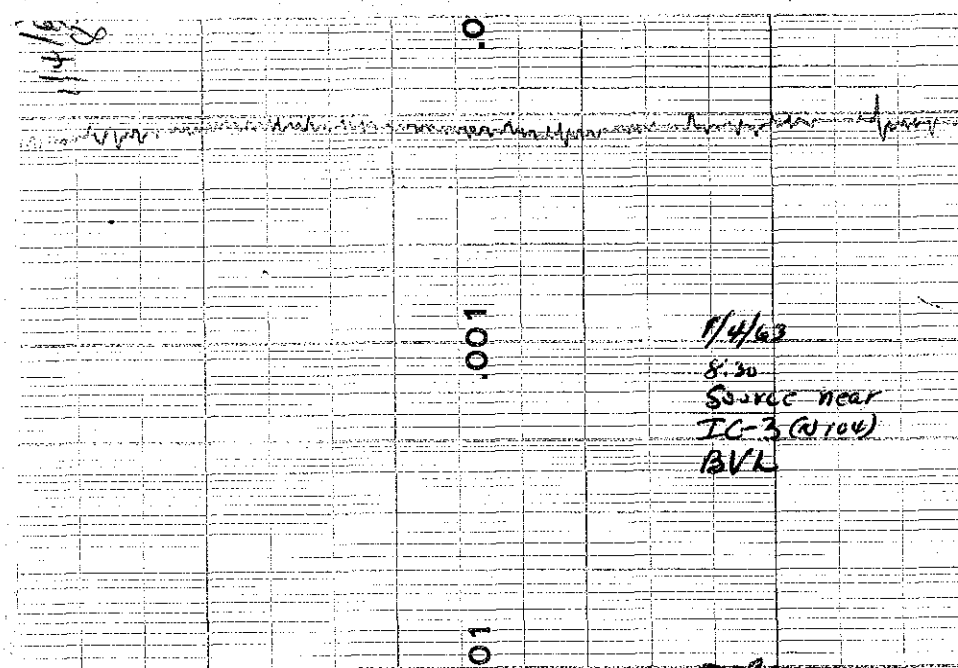
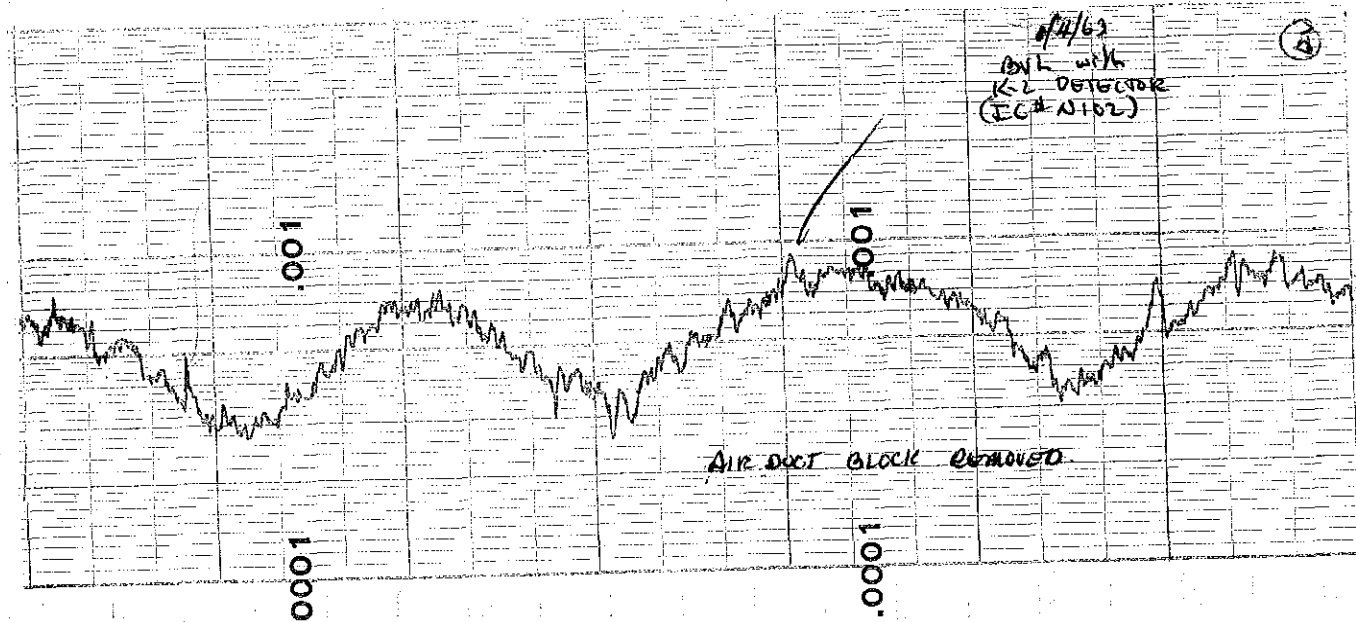
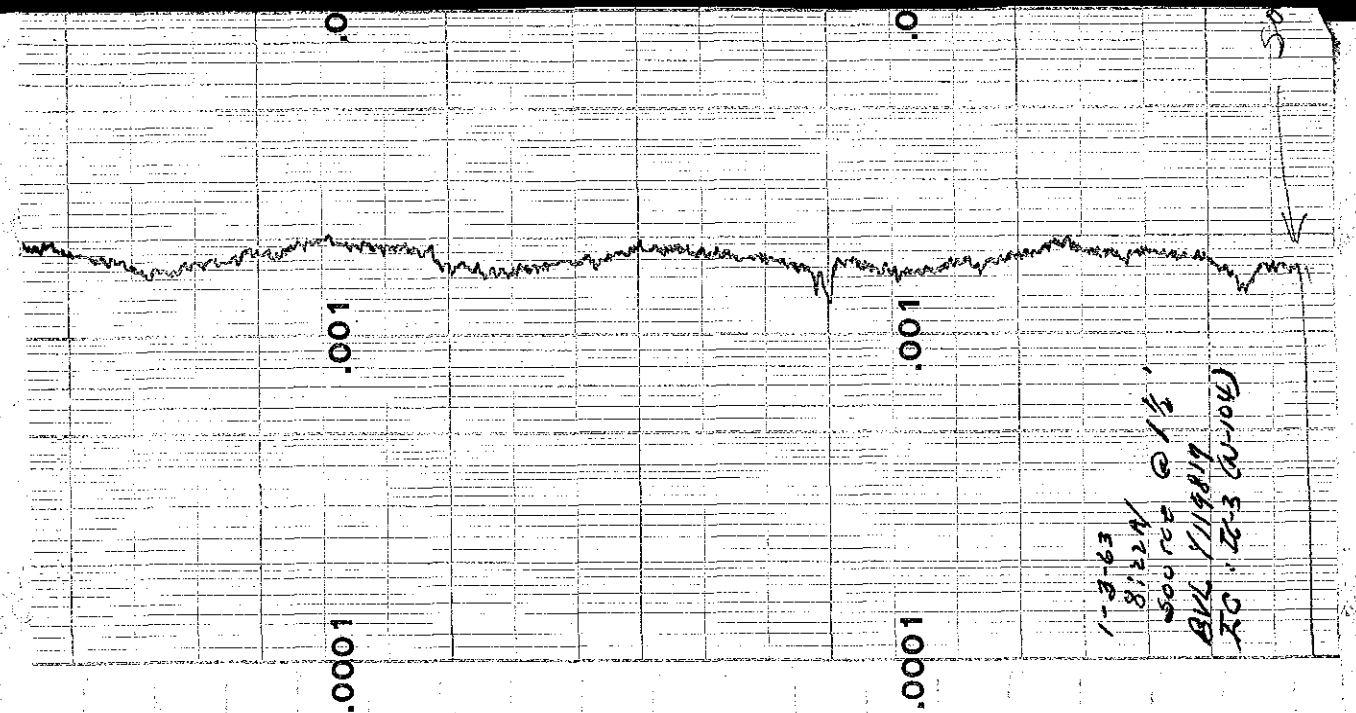
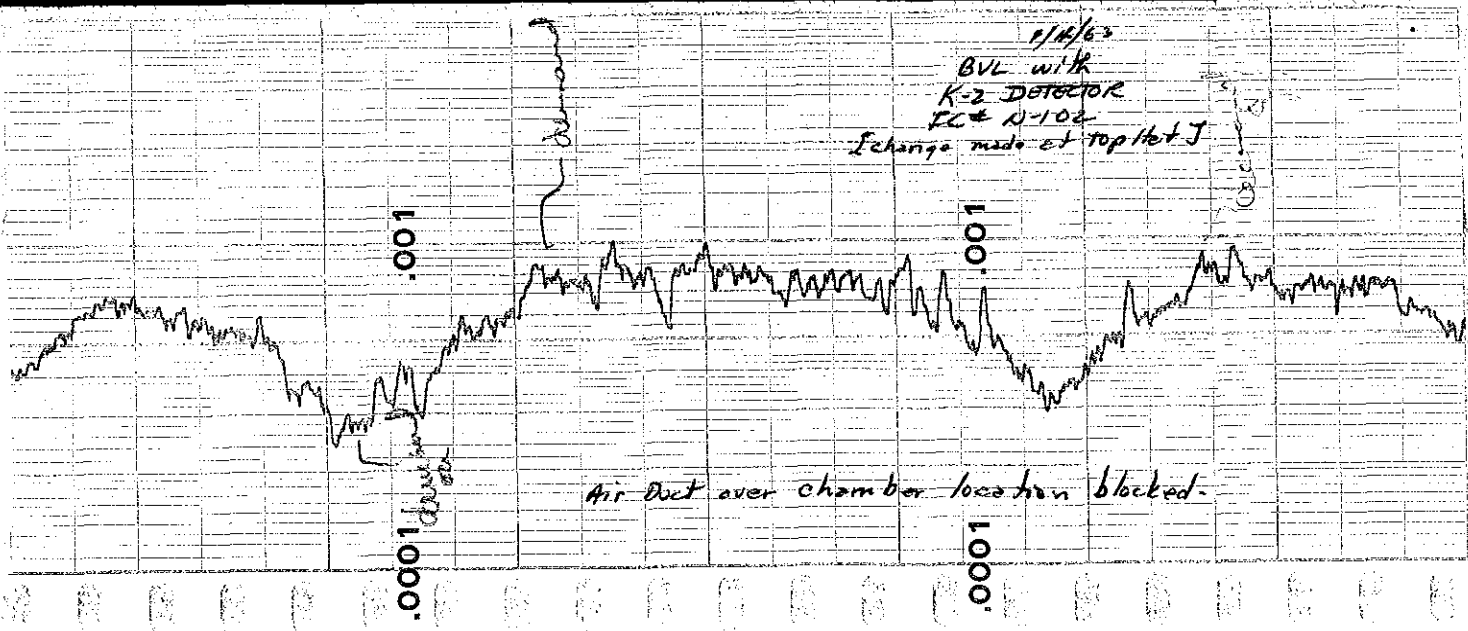
PLATE 460 PRINTED IN U.S.A.

4/4/63

BVL with
R-112 DETECTOR
(K-1 channel)

[cable change at Top Hat, Rm 201]





1-11-63 Adj - gas on BVL panel meter.

{ Swm was unable to get gas-gas equilibrium
between records of BVL - BVL=0 Res = .00017
Shorting up just previous gas.

1-22-63 K-2 : no response to source of noise. -

Swapped cables at instruments in 202.

Indication of a trouble in 202, Test Cell.

Battery box hot - cable not shorted, must be
in battery box. Replaced battery & reinstalled
in 202. Source response O.K. Still noisy.

Brought in unit from 210. - 7124629.

R: Noisy. Check battery 150/600.

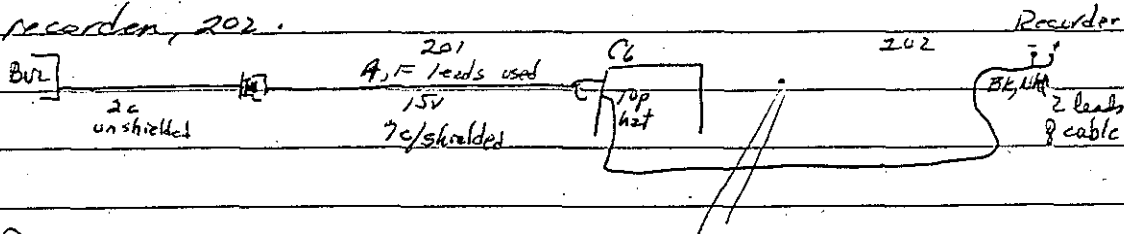
Put in fresh box.

OK

1-25-63 Counters set for diamon - see counter file.

Antenna in factory - in shop - see file.

1-29-63 - BVL now installed (1-25) in 201. Output cable run to recorder, 202.



Response to changes at BVL suggest on Recorder -

BVL Readings	Recorder
10^{-8} (D.B. 10^{-8})	1.3×10^{-8}
10^{-11} (cal)	2.8×10^{-11}
10^{-12} adj. D.B. 10^{-11}	3.0×10^{-12}
10^{-13}	3.0×10^{-13}
Grounding BVL 10^{-13}	2×10^{-13} from 2.0
Recorder on Reg Power 10^{-13}	1.3×10^{-13} from 2×10^{-13}
10^{-12}	10^{-12}
10^{-11}	10^{-11}
10^{-10}	10^{-10}
10^{-9}	10^{-9}
10^{-8}	10^{-8}
10^{-7}	10^{-7}

	10^{-8}	10^{-9}	10^{-10}	10^{-11}	10^{-12}	10^{-13}
Down BVL	10^{-8}	10^{-9}	10^{-10}	10^{-11}	10^{-12}	10^{-13}
Re	1.1×10^{-8}	1.2×10^{-9}	1.15	1.2	1.2	1.28
Up BVL	10^{-12}	10^{-11}	10^{-10}	10^{-9}	10^{-8}	10^{-7}
Re	.96	.98	.90	.90	.95	.95

Note: Bend at set-print

1-29-63 OVM mention band & suggests amplifier fault.
No change with replacement set of tubes from second amplifier.


1-31-63. Further check of response of BVL system with recorder remote to amplifier.

Installed 2 conductor shielded cable in place of cable run via TOP HAT.

Band present still, recorder in regulated power.

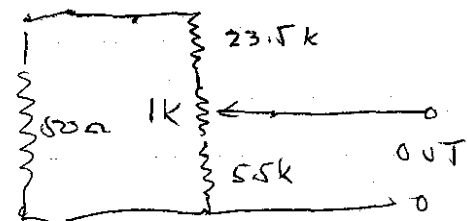
Band was pronounced & response much more sluggish with recorder in unregulated power (grounded to Bldg grd).
Grounding signal cable @ recorder (Reg power) not improves

Check Recorder Response-

With battery (1.5V) and divider, 

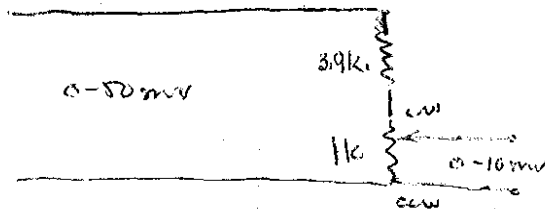
on BVL input checked ~~response~~ response - Pen very sensitive, hunting at each position. Band essentially zero.

2-1-63 Modified BVL output circuit to provide full 50mv @ 50-2 to recorder - Attenuator on BVL was as follows:



2-1-63 This seems to improve response.

2-4-63 Install divider in recorder.



2-20-63 Calibrate recorder open to BVL OK.

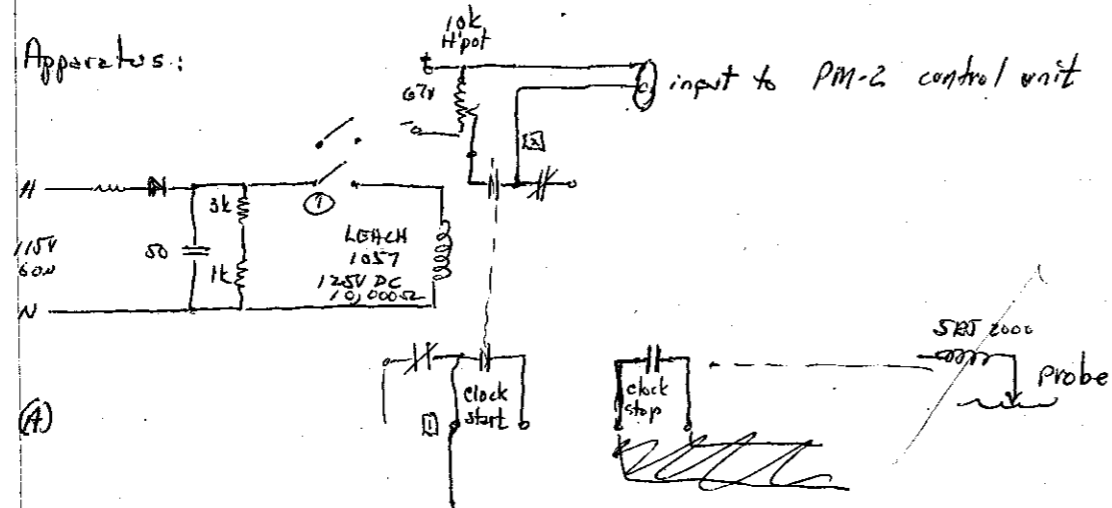
2-20-63 CRM re-activated to monitor level in 201 & 202. refer to CRM file.

2-25-63. Set-up for safety systems timing measurements.

Proposed measurements

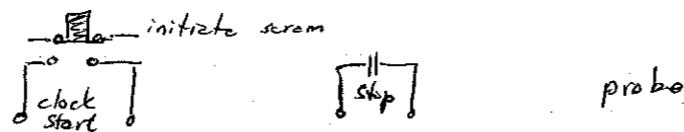
- A. System check, using PM-2 channel.
- B. Scram time, starting with manual scram.
- C. Valve operating time.

Apparatus:

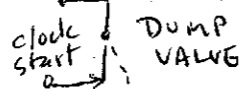


(A)

(B)



(C)



PM-2 Channel Trip Levels

Low Trip Current 1.08 ma (I_H)

Set @ 1.15 Trips @ 1.4 - 1.45 Volts on input.
 ($I_H = 9.75 \text{ ma}$) This = 300 μa on output meter
 = 8.8 ma I_H

Set for 10v input signals ($I_H = 4 \text{ ma}$)

Run tests with 30" vessel measuring fuel dump times.
 (refer Safety Tests - West Site)

2/26/63 More Time Tests -

PM-2 Time Constant (refer PM-2 file)

More fuel dump times (refer Safety Tests - West)

3/1/63 - Time Tests with Visicorder

- | | | | |
|---|---------------|----------------|----------------------------|
| 1 | Time Mark | 110v 60w | Channel 1 |
| 2 | High Signal | 820v PM2 INPUT | Channel 8 |
| 3 | SC6-SC8 | 110v 60w | Channel 5 (need added Rsc) |
| 4 | K8a release | R1a 110 | 2 |
| 5 | K8b release | R2a 110 | 3 |
| 6 | RV Valve Dump | PRV-30 110 | 7 |
| 7 | Probe - | 512 | 6 |

Motor Fuel
Fuel Reset

3/1/63	10.150		
	1.555	11.915 / 11.925	30" reactor
	10.25	11.915	" "
	1.555	11.935	" "
	10.32	11.935	" "
	11	11	" "
	10.40	11	" "
	10.52	11	" "

refer to Safety Tests file

3-4/8-63 RKReady performing time tests. Data in experiment notebook.

3/7/63 Ran time check with Visicorder.

3/19/63 Kerlby log in Rack, Connect recorder to output of Period Meter to period out. Input from I.C. E-III which has been used in ORL log channel.

4-4-63 Experimental Set-up in Nell for new series (P/W)

Counting Channels (2) checked out. OK.

Refer to files counting channel

LA 123801

LA 100 303

	C1 2" BF ₃ - RCL 1439	C2 2" BF ₃ - RCL 1773
Detector*	1" BF ₃ - RCL 1681	
PA	44A	349
LA	123801	100303
GAIN	4 8	16
RT	0.2	0.2
PH	15	25
Sensitivity	4 mV x 2	2 mV
HVPS	123871	123872
HV	1500	1500
SCALER	123799	123798

4-10-63 * Replace C1 detector with 2" BF₃ RCL 1439

Set gain @ 8

RT 0.2

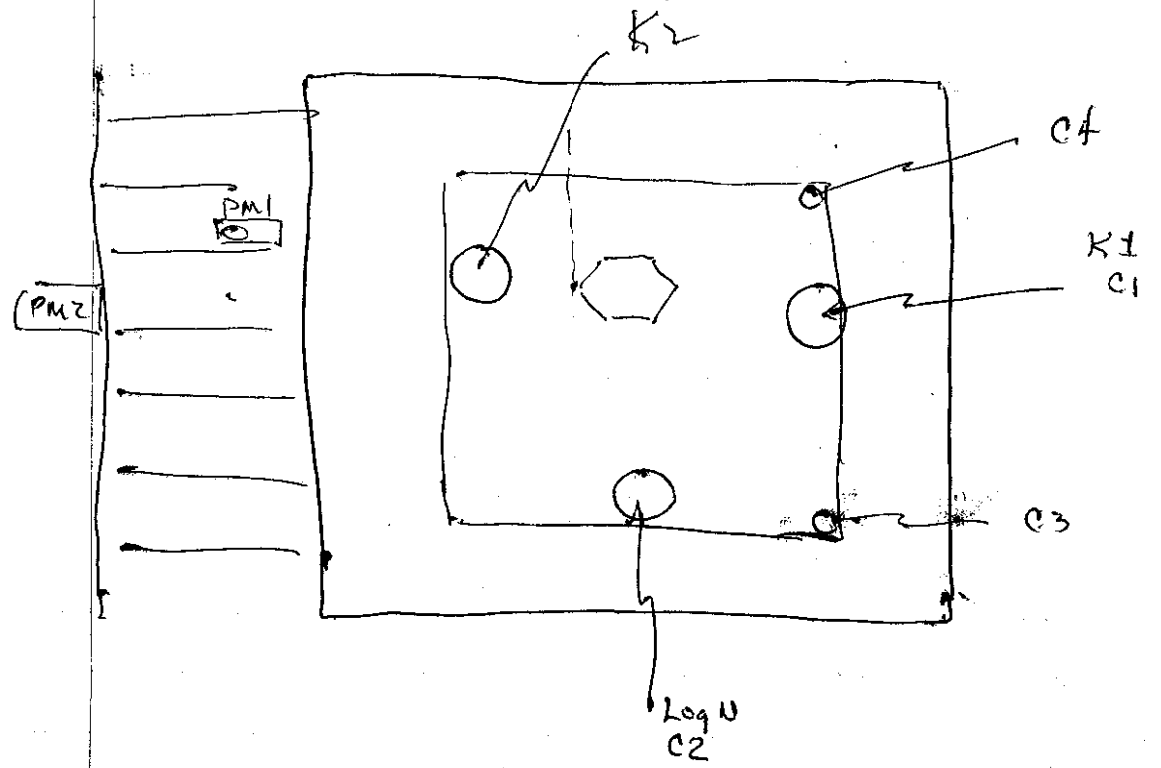
PH 15

Sensitivity 2 mV.

HV = 1500

4-10-63 Scale trouble 123799 (refer to country channel file)

4-16-63 Four country channels activated (full complement)
(Refer country channel file for arrangement)



4-24-63. Rept Log U (K420) misbehaving. -
During exp. (filling water around elements - just above jets), level dropped a little more than a decade sharply. Level maintained at reduced reading.

→ Check: Observe req. period.
Check cable connections in test cell.
After returned to control room, reading of Log U back to normal & period indicator normal.

4-25-63. 8:20 AM Same trouble reported on Log U.
{ Level 3.6×10^{-13} instead of expected 3×10^{-11}
{ Period - 20 sec instead of ∞ .
Feed current signal to input of amplifier. Normal.
Trouble in test cell.

Pulled chamber, notes not insulated from ground.
→ Taped top & bottom of chamber to insulate. Insulated in standpipe. OK.

5-6-63 Begin setup for temperature coefficient exp. in Well. Heater control circuit needs to be installed. Various controls from 112. Board mounted on wall of 202 near console. Power cable to be run through 3" pipe by console.

5-7-63 Modification of Well panel by Hank in 201.
 → Removed old Cannon β_2 -conductivity receptacles.
 → Installed Amphemet receptacles matching those in Sid. control wiring of a South wing.

5-8-63 Check out motor on M-3, Well.

K-1: Battery box fell, pulling cable out of connector.
 Repaired cable.

Battery low, < 400v. Replaced both units.

(Had been in use 1 year)

[K-1 had been acting peculiar recently]

5-22-63 Counting channel check. ^{sum of AIC sensors} had been turned off several weeks - refer (Counting Channel File)

6-18-63 PM-1: Power Supply + Replace 2X2 A.

6-19-63 PM-1: Replace head with 6292-15 + No. 1.
 Taps @ .6.
 No bly norri up to .8 OK.

6-26-63 Experiment with counting channels C1, 2, & 4.

6-28-63 Check response of channels with same M-226 @ 21m. Counters in Ion. Chamber shield can.

7-5-63 New Pentec-Stokes in chamber, surrounded BF₃ filled, & mounted in water-proof housing with 30 ft of HV & signal cables received.

Compared with NSPA-OKKX ~~count~~ chamber.

R-5		N-102
+600v		+600v
K1		K2
6×10^{-13}	Bkg	6×10^{-13}
$.9 \times 10^{-10}$	M-227	$.8 \times 10^{-10}$

This is just preliminary check to see if one gets a response. Needs to be checked & compared with existing chambers to see if additional units may be suitable.

7-9-63 - Work on counting channels. Refer to counting channel file.

7-15-63 Set up in Hall with P-W elements to check period on new R-S ion chamber.

Arrangement of instruments

Reference
LB 5297
#P 183

- R1: J.C. B-112 600 V.
- R2: J.C. B-111 (has been hog sensor) 1200 V.
- R3: new R-S chamber 600 V.

	Screen	PA	Amp	Setting	HV	Scale
C1	RCA 2" 1939 + 44B + 123801 (16, 0.2, 20)			1500V	+ SN65	
C2	RCA 2" 1773 + 344 + 100303 (16, 0.2, 15)			1500	+ 123744	
C3	1" 1681 + 45B + 123800 (16, 0.2, 20)			1500	+ SN 67	
C4	1" 1096 + 502 + 100363 (30, 0.2, 20)			1750	+ 123748	

7-15-63

Critical

C₁

C₂

C₃

C₄

2588	987	7761	14287
2549	922	7772	14518
(R) 15x10 ¹¹ 2588	(R) 3x10 ¹¹ 885	7606	14215
2546	957	7666	13751
2:34 PM pos per. (+) (No. 1) 2198°	895 ^x	7362 ^a	13311 ^a
3071	1124	9935	18083
3950	1455	13167	23442
5326	1935	17812	31055
6671	2762	23417	40992
8585	3549	31142	54380
12800	4747	41077	72451
16195	6084	54572	95633
22257	8221	72553	127021
26330	10864	96231	168194
35257	14177	126794	220492
42709	18734	166424	294506
64701	24892	220724	391071
75977	32816	290585	516017
96336	43568	381811	668123
128547	57846	500261	838882
169952	76758	655462	973141
240670	102002	854172	970968
307030	135400	1100439	737061
400455	179632	1410579	375640
541086	238971	1791292	118771
671727	317146	2255718	11107
864350	415216	2787528	

+ period, 1

<u>C₁</u>	<u>C₂</u>	<u>C₃</u>
1101620	533962	3395412
1385557	655024	4068358
1721540	734320	4750920
2092812	692283	5343934
2474656	496962	5759054
2813726	248348	5912308

K1 3×10^{-7}
K2 10×10^{-7}

10³
6x10²

MJ: N15
5297 185

7-16-63

Set up to check Rhoetto with new amplifier -

disturbance: ~~intermittent table~~

Country Channels:

	<u>C₁</u> NETUBE RCL 1939 (2")	<u>C₂</u> NETUBE RCL 1773 (6")	<u>C₃</u> NETUBE (over C1) RCL 1681 (1")	<u>C₄</u> NETUBE (over C2) RCL 1096 (1")
Summ:	44B	349	45B	502
Peakup:	123801	100303	123800	100363
Setting:	16,0,2,20	16,0,2,15	16,0,2,20	32,0,2,20
HV:	1500	1500	1500	1750
Scaler:	SN65	123799	SN67	123798

K₁: I.C. E112 Pipe on floor to N of table, up 31' from bottom
 K₂: I.C. E111 Pipe on table NE of On bottom
 log: RS On 2" Pb brick E center
 Rhoetto: I.L. E-10 Pipe S center. On bottom.

Crit: K1: 3.25×10^{-10}
 at lower edge of Rhoetto range K2: 0.78×10^{-9}
 log: 3.0×10^{-10}
 Rk: 5.15×10^{-9}

0.1 m, 0.4 m.
 C₁: 4647, 4710, 4682
 C₂: 2090, 2149, 2128
 C₃: 17232, 17381, 17196
 C₄: 52068, 53941, 53924

Run 1
for period

<u>C₁</u>	<u>C₂</u>	<u>C₃</u>	<u>C₄</u>
9546	3749	31333	98924
11206	4544	39667	123258
12714	5637	49152	149252
16103	7049	61258	175457
19298	8854	75634	194555
24758	11102	93654	192650
30265	13845	115946	158481

Rhette check

7-16-67

After morning run, #1. Allowed to "cool" & calculated values. Moved counter 3 & 4 further away. (on top of unstrut corner brackets). Moved Rhette I.C. further away. (on floor of tank & side)

Afternoon - ran two periods. Before runs checked counters.

1:35

C ₁	C ₂	C ₃	C ₄	Log	Rh.
154	166	616	1870	1.8 x 10 ⁻¹¹	—

Count rate of C₄ too high for use. Out of HV - & used only 3 counters.

Raw data in folder dated & labeled "reactivity data".

Reactivity Values in Cents

Run	C ₁	C ₂	C ₃	C ₄	Log	Rhette
1 +	7.35	7.86	7.56	saturates	7.8 ^{2.6 x 10⁻⁹}	7.24
2 +	8.21	8.21	8.12	-	8.25 ^{2.1 x 10⁻⁸}	7.909; 7.867; 7.628
3 -	4.44	4.5	4.28	-	4.25 ^{1.5 x 10⁻¹⁰}	3.998; 4.06; 4.176

* on log trace observed "hump" @ 6 x 10⁻⁷

7-18-67



More Rhette checks: Counters moved C₁ & C₃ in NE corner of TANK C₂ & C₄ in SE corner of TANK

Raw data in folder. Will summarize here

Reactivity Values (cents)

Run	C ₁	C ₂	C ₃	C ₄	Log	Rhette
1 +	6.73	6.81	6.84	7.0	6.76	6.368; 6.512
2 +	4.32	4.32	4.40	4.44	4.41	3.947; 4.169
3 -	7.71	7.67	7.69	7.71	7.66	7.165; 7.255
4 +	5.52	5.56	5.73	5.76	5.56	5.167; 5.400
5 -	8.1	8.05	8.18	8.28	8.18	7.616; 7.766
6 +	8.01	8.13	8.19	8.24	7.56	7.393; 7.604
7 -	7.43	7.49	7.52	7.64	7.86	7.326; 7.126
8 -	5.52	5.58	5.80	5.81	5.98	5.239; 5.441

for 4-8 counts & level range = 1, 2, 3 for 4-8

Rhette chamber moved closer to assembly - Stand paper in table in tank.

9 +	10.2	10.2	10.2	10.2	10.3	8.97
10 -	4.26	4.37	4.42	4.46	3.72	3.904
11 +	10.5	10.6	10.7	10.5	10.3	9.82
12 -	5.52	5.63	5.70	5.49	4.82	4.759

This followed soon after total pos. period in which Rhette over-driven by 2.1 x 10⁻⁷

levels on instruments & 1 decade lower in Run 9-12 than Run 1-8. difficult to trace curves under these conditions.

8/3-13/63 Vacation

8-12-63 C4 trouble. In linear amplified.
Use C1 emp. temporarily.

Two 2" counters got wet SW 1939 & SW 1773.

8-13-63 One 1" counter " SW 1096.

8-15-63 Ion chamber for K2 channel wet.
Drained, dried, cleaned, & dried.

8-16-63 Re-installed I.C.
Rigged thumping device for liquid level indicator.

JRE

8-19-63 Reported scram without instrument scram.
I heard noise, probably through intercom, as if
relays were chattering wildly followed by scram.

Found solenoid valve on SW Dump Well burned out.

8-20-63 Request counting channels to double check period
measurements.

[C₁, C₂, & C₃ as on p. 190.]
C₁ 1.0 m; Recycle 0.5 m;
Background.

C4 h.A. out for service.

	C ₁	C ₂	C ₃
	368	270	40
	407	276	21
	389	280	26
	371	261	33
	376	269	42
	370	232	49
	398	296	20
	403	280	24
	401	291	28
	388	272	37

8-27-63

Rhett's chamber

In preparing to use Rhett's in operation, began to connect signal cables to Ion Chamber in tank. Noted that chamber was wet.

Removed chamber for drying - "E-10"

Calibration of PM-2 for determination of gamma levels in test cell.

Radiological Health Handbook, 1952:

- a. $1 \mu\text{m} \equiv 1 \text{ curie for } \text{Ra}^{226}$
- b. ~~$1 \text{ curie} \equiv 1 \mu\text{m}$~~
 $9.04 \text{ r/hr @ 1 ft. for 1 curie.}$

With the assumptions above,

$1 \text{ mc} \equiv 9.04 \text{ mrh @ 1 ft.}$

Radium source used was 10.05 mg. or 10.05 mc.

Source of 10.05 mc	$\equiv 90.852 \text{ mrh @ 1 ft.}$	12"
	$\equiv 40.379$	1 1/2 ft 18"
	$\equiv 32.706$	1 2/3 ft 20"
	$\equiv 22.713$	2 ft 24"
	$\equiv 14.536$	2 1/2 ft 30"
	$\equiv 10.095$	3 ft 36"
	$\equiv 8.176$	3 1/3 ft 40"

At 900 v on PM-2, noted recorder readings on "operate" range. (Instrument zeroed just before taking readings)

SOURCE	DISTANCE	Recorder R.F.S.	mrh
10.05 Mg.	20"	64	32.7
Ra	24"	45	22.7
	30"	28	14.5
	36"	18.5	10.1
	40"	15.5	8.2

NOTE RECORDER READINGS APPROX 2X mrh gamma reading.

8-28-63

Sid Panel 3 - remove "Ted Pump" ammeter, connected between Terminal 8 of left terminal single block.

8-30-63

Put new batteries in box, ^{which had} supplying Rhett's. New chamber, marked "IC-3" (on loan from South End), put under end of tank. This is filled with normal BF₃. Power on pre-amp.

Replace unit P.B. Search unit SW65.

O.A.2 indicates overload at lower level than before. ?

9-6-63: log N trace noise other normal, particularly in sub-range
0.1 - 1
Checked battery ~~of~~ lead connectors in 201.
H.V. connectors not tight - probably not cause of trouble.

C1 reported may be faulty. On low end of slow period noted readings out of line - several readings lower than previous. Count rate \approx 20000 cpm.

9-11-63: C1. Reported faulty - Not accounting -

No account from pre-amp in 201 (SUX15)
Signal from C2 pre-amps thru LA-1 is Amp good.
Check RA. all seemed normal -
Check HV to Sensor ✓

After taking these measurements, returned to control room & noted normal pulse on amplifier output.

Could wipe out signal by moving cables.

Replace with LA Y100363 (C4) & its SUX22 pre-amp.
Signal & L.V. on C4 jumper cable.
H.V. from C-1 HV cable -

Still may be some trouble. Need to watch -

9-18-63 RKR requests additional log channel.
Brought in Beckman V6 4-119816, modified as shown
in Inst file & entry herein on 2/1/63.

11:00 Installed BV6 in 201. Initial adjustments in
span & amp. bias required. Seemed to be narrow in span. ^{2nd day/3rd day}
After a hour span up to normal.

Had to replace batteries & tubes in recorder.
Recorder at first off-scale + - Batteries very low.
Recorder sluggish.

{	12AX7	Blocky	66/80	Replaced
	"	"	35/67	"
	12AV7	"	Good but low	"
	"	"	"	"

2:00 Channel calibrated 10^{-4} & 10^{-8} OK. from BV6.
Ready for use.

9-26-63: { Rhoette wheeled in & set up -
 whole system ready @ 8:45
 Sensor: BF₃ ion chamber N-102 - ORNB -
 under tank east of center -

{ Counter 2 sensor moved from being in line with N
 edge of tank - on floor - oriented E-W TO
 N-S orientation
 E of tank on floor is 6 inches.

Chamber & position not sensitive enough -
 at 6×10^{-9} on K log, 3×10^{-9} KI,
 reading on Rhoette was $< 10^{-9}$. This is a factor of 10
 under desirable top of range - $10^{-8} \approx 50$ v on OAG I

10:00 Swap signal leads KI & Rhoette, leaving chambers in location.
 KI now getting signal from I.C. N-102 NS, E of CTR.
 Rhoette " " " " I.C. E-112 EW, S of CTR
 Raised E-112 by placing paraffin block & lucite strips
 under to get I.C. closer to tank.
 Top of I.C. now $\frac{3}{4}$ " below brace.

12:17 Remove IC N-102 -
 Lower IC E-112 & remove paraffin & lucite
 Relocate C2 sensor -

9-26-63 Calibration of safety channels -
 (Signal generator on input to main chassis)

KI	SIGNAL	KI RANGE	KI METER	EXT MTR	RECORDER
	3×10^{-12}	10×10^{-12}	2.8×10^{-12}	24%	35
	4×10^{-12}	"	3.9×10^{-12}	36%	37
	5×10^{-12}	"	4.3×10^{-12}	38	38
	6×10^{-12}	"	4.4×10^{-12}	66	58
			7.5	68	72

Adjust KI recorder to read equivalent of KI meter

	"	"	7.3	67	73
2:20	10^{-11}	3×10^{-11}	40% (1.2×10^{-11})	36	40.5% rec. OK
2:35	10^{-11}	"	35% (1.05×10^{-11})	31	35%
	"	10×10^{-12}	97% (9.7×10^{-12})	90	99% no trip
	"	3×10^{-11}			
	1.25×10^{-11}	3×10^{-11}	40% (1.2×10^{-11})	36%	41%
		10×10^{-12}	0.5	Trip	0.5

VT, trip circuit before meter trip:

	1.15×10^{-11}	3×10^{-11}	37% (1.1×10^{-11})	33%	37%
shift range to	10×10^{-12}		100% (1.1×10^{-11})	93%	5% no trip
	3×10^{-11}		58% (1.15×10^{-11})	34%	58.5%

VT & METER TRIP TOGETHER - SET METER TO $> 100\%$

UT TRIP at $\approx 98\%$ on EXT METER. ADD FAST TRIP LEVEL.

TRIP LEVEL at 135% fs 1.35×10^{-11} on 3×10^{-11} range, switch to 10×10^{-12}
 125% fs NO TRIP

check contact make on slow rise

at 3×10^{-11} 100% (3×10^{-11}) 92%

increase level slowly - meter contact makes trips @ 8.32×10^{-11} .

9-26-63 set @ $3.4 \times 10^{-11} / 10 \times 10^{-11}$ switch to 3×10^{-11} BOTH TRIPS

METER TRIP 0.5.

$3.4 \times 10^{-11} / 10 \times 10^{-11}$ NO V.T. TRIP - ON 3×10^{-11}
 $3.5 \times 10^{-11} / 10 \times 10^{-11}$ NO VT TRIP ON 3×10^{-11}

ALTERNATE: SET INST. RANGE; INCREASE SIGNAL TO TRIP RANGE;
 REDUCE SENS. & read signal level.

SIG GEN
 10^{-10} fs.

RANGE 3×10^{-11} TRIP SIGNAL
 3.4×10^{-11}
 3.5×10^{-11}
 3.8×10^{-11}
 3.9×10^{-11}
 3.8×10^{-11}
 3.6×10^{-11}

SIG GEN
 10^{-9} fs.

RANGE 10×10^{-11} TRIP SIGNAL
 1.28×10^{-10}
 1.25×10^{-10}
 1.35×10^{-10}
 1.30×10^{-10}
 1.27×10^{-10}
 3×10^{-10}
 3.8×10^{-10}
 3.9×10^{-10}
 3.5×10^{-10}
 3.6×10^{-10}

SIG. GEN
 10^{-8} fs

WHEN METER TRIP SET AT 100% ITS TRIP ACTIVATES

V.T. TRIP. METER SET 0.5. $> 100\%$

SIG. GEN
 10^{-7}

RANGE 3×10^{-9} TRIP SIGNAL
 1.37×10^{-9}
 1.46×10^{-9}
 1.48×10^{-9}
 1.49×10^{-9}
 1.49×10^{-9}
 3×10^{-9}
 3.6×10^{-9} MUST
 4.5×10^{-9}
 4.4×10^{-9}
 4.15×10^{-9}
 3.8×10^{-9}
 3.6×10^{-9}

RANGE 10×10^{-9} TRIP SIGNAL
 1.35×10^{-8}
 1.27×10^{-8}
 1.35×10^{-8}
 1.30×10^{-8}
 1.32×10^{-8}

RANGE 3×10^{-8} TRIP SIGNAL
 3.7×10^{-8}
 3.6×10^{-8}
 3.85×10^{-8}
 3.6×10^{-8}

ERR.

K 2

4.05×10^{-10}

Adj. recorder to read 81% with K2 panel meter (slightly higher reading in recorder desired)

When panel meter 85%; recorder 82% GR.

SIG GEN
 10^{-10}

RANGE	PANEL METER	EXT. METER	METER TRIP	VT TRIP
10×10^{-12}	100%	82%	1.17×10^{-11}	1.17×10^{-11}
		90%		

get K2 VT TRIP at
 Need to adj K2 VT TRIP LEVEL

9-27-63

7.25×10^{-10}

K 2 RANGE	RANGE SIG. GEN.	PANEL METER	EXT. MTR.	MTR TRIP	VT TRIP
10×10^{-12}	10^{-10}	100%	84% (95)	1.25×10^{-11}	same
			84% (96)	1.20×10^{-11}	1.18×10^{-11}
				1.20×10^{-11}	1.15×10^{-11}
				1.20×10^{-11}	1.40×10^{-11}
				1.20×10^{-11}	1.36×10^{-11}
				1.20×10^{-11}	1.40×10^{-11}
				1.20×10^{-11}	1.42×10^{-11}
				1.20×10^{-11}	1.40×10^{-11}
				1.20×10^{-11}	1.42×10^{-11}

ADJ VT TRIP POINT

10×10^{-9} 10^{-7}

OBSERVE THAT METER TRIP DOES NOT ACTIVATE VT TRIP, as in case of K1.

K1 Reset EXT METER CALIBRATION. Reading before - 93/100

UNABLE TO LOWER K1 EXT METER. POT AT "Low" EXTREME

10×10^{-9} 10^{-7}

1.30×10^{-8}
 1.55×10^{-8}
 1.40×10^{-8}

Safety Check - continued

9:27-28

PM-1. Sra Gen to input of main chassis - Voltage Mode.

RANGE	DIAL	MTR.	
50v	0	0.62	
	810/153	0.37	TRIP
	155	0.365	
10v	827	0.365	TRIP
	813	0.37	
	807	0.37	
	799	0.37	
	815	0.37	

8:40 A)

ADJ LEVEL (DIAL) 0.62 → 0.60

769	0.365
759	0.365
758	0.365

step h = 790 0.36 TRIPS. ETR4 TIME

OK

BEFORE ADJ

PM-2:

NO SIGNAL

$I_L = 1.23$; $I_H = 0.3$

BALANCE

481 LEVEL = 5µA

(%fs)

REC_B = 48

9:10A)

ADJUST BALANCE TO 491

LEVEL = 0µA

REC_B = 1

SIGNAL	DIAL	I_L	I_H	METER	RECORDER
10v	064	12	9.0	100µA	420; 20.4c
	127	117	8.7	200µA	845c; 39c
	160	116	8.55	250µA	0.5; 49.5
	190	114	8.40	300µA	19
	258	111	8.10	400µA	79
	323	108	7.80	500µA	49

Trip level $I_L = 105$ ma - SET for dial I_L of 115

SIG RANGE	DIAL	I_L	I_H	LEVEL	REC.
10v	0	117	9.55	0	0
	235	106	8.2	365	72
	231	106	8.2	360	71
	235	106	8.2	365	72
	230	106	8.2	367	- OFF,
SET	240			370	TRIPS each time
	220			365	NO TRIP
10	000	75	5.0	>	
50v	495		0.4		TRIP ✓
	490		0.5		NO TRIP ✓

248v

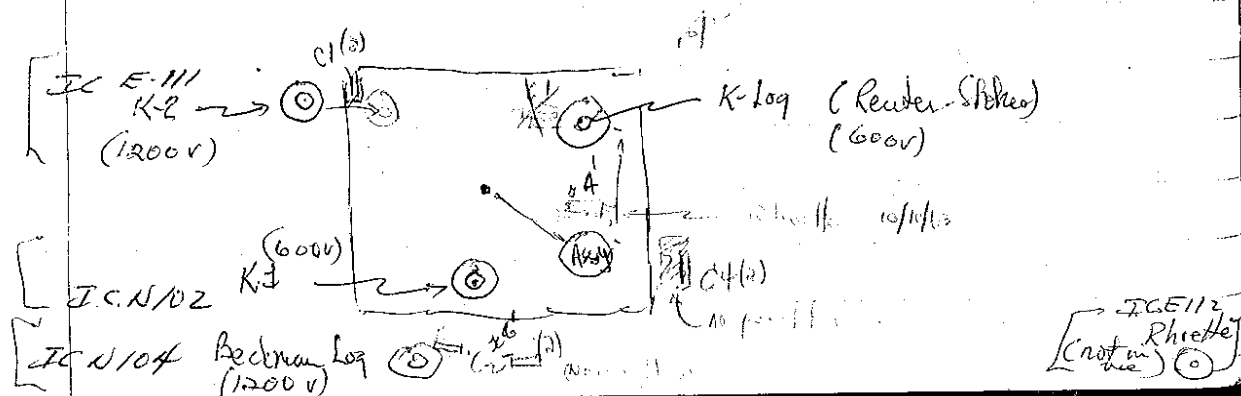
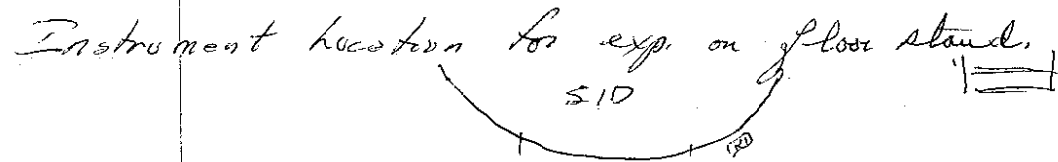
10/9/63 Sid operations check for exp. with assemblies on floor.

During pre-operation check, noted failure of Fuel Dump to ~~release~~ ^{be de-energized} on demand. Water dump and feed-draw circuits were normal.

All relays in circuit appeared to be normal - no stuck contacts.

Toggle switch on console to right of Fuel Dump switch was in up (or closed) position. This switch, though out of use for some time, was still wired into circuit. Had served as a fuel dump bypass.

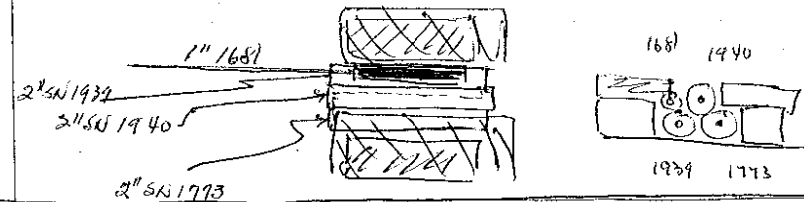
Removed lead at terminal P30, panel 3 of console. This eliminated this switch function. (Switch had not been shown on revised wiring print of 4/63 because it was no longer considered part of operation.)



10/9/63 Counting channels checked out.

Jumper cable sets from Top hat to pre-amps were re-identified & located properly C1-C4.

Set pre-amps & sensors on floor with all sensors inside of paraffin for check of response to source.



Channel	C1	C2	C3	C4
Sensor	REL 2" BF, 1973	REL 2" BF, 1939	REL 1" BF, 1681	REL 2" BF, 1940
Pre-Amp	44B	349	45B	50C
Amplifier	Y123801	Y100303	Y123800	Y100363
Setting	16,012,20	16,012,20	32,012,20	8,012,20
Pulse Ampl.	2.5cm/1x8 Y1238712	2cm/1x8 Y118714	2cm/1x8 Y123871	2cm/1x8 Y89642
H.V.	1500	1500	1550	1550
Scaler	Y123799	Y123798	SN65	SN67

All channels are operable.

Th.
10-10-63.

Reported change in swim front of K-2.

Remain normal start-up range 10×10^{-12} a.

Had index drift of background up during day (10/9)

Background $\approx 3 \times 10^{-11}$ (30% on 10×10^{-11} scale)

Replace IC E-111 with IC U-101 (from K-2)

OK.

~~1/8~~11:00^{AM} Locate Rhodite IC E112 & counters for period use
red pencil on diag 10-gpositions α — C₁C₂C₃

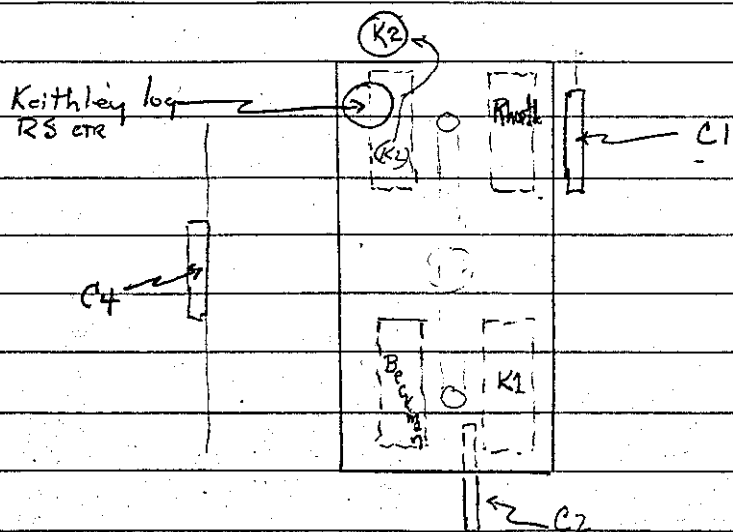
bkg

808

152

2596: - remove

10-14-63 Instrumentation Location monitoring slab tank.



Taped Al strips (spacers formerly used in slab exp.) to floor under tank to hold Ion Chambers in place.

T.C. channels	T.C.	Battery Supply
K1	N-102	+600 v.
K2	N-101 (internal rattle)	+600 v.
K-log	RS	+600 v.
B-log	N-104	+600 v.
Rhoette	E-112	+1200 v.

⇒ Checked voltages of battery supplies with 1Meg load on 600v & 2Meg on 1200v. This put load of 0.6 ma on batteries. The 600v units all read ≥ 600 no load & dropped to ≈ 580 d/wld. under load. The 1200v unit read 1160 no load & dropped below 1000

212

10-14-67

under load, decreasing to 2.900v. with 2Meg Ω on output,

Replace batteries in unit.

No load & load reading $> 1200v.$

(A second 1200v. unit which had been in use on Packman log channel was checked bad & replaced by good 600v unit.)

(K2 T.C. N-101 on side \square under tank:

reading 0.8. negative -

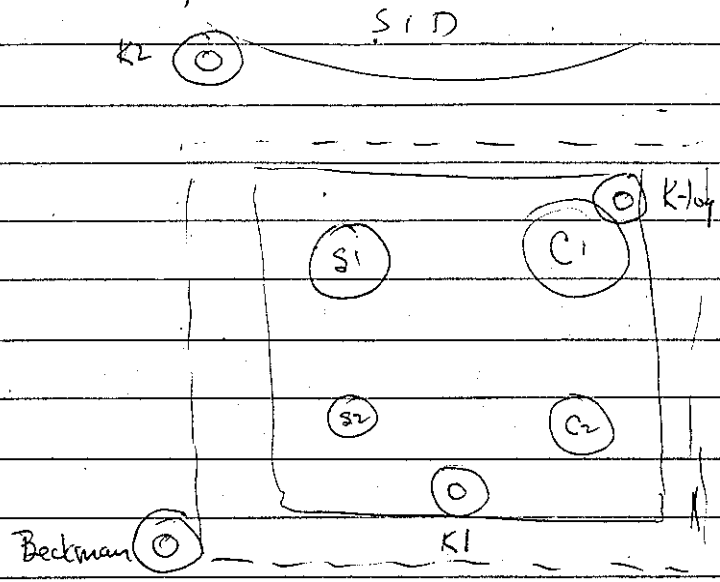
Pulled from under tank and placed vertically outside tank. Now OK.

10-23-63

Instruments position for work with assemblies on floor
by Sid,

Counters not needed, placed out of way under steps

I.C. placements



10-28-63

Counter set-up for pulling sphere - DWM -

[Arrangement as 6-18-63 (p 102 DWM pulsed neutron NB)]

(ref counting channel file) J ✓

[DWM NB pulsed meter p 123]

} B-A Linear not stopping scales - }
{ Repaired. Ref. file folder for timer. }

10-29-63- Assist in set up of long counter to check yield of neutron generator.

Sensor - P-5 7-5 1" counter. R511/1 jumper to 1'

Channel C3. PA 45B

LA Y123800 6x, 0.2, 20

HIPS BA Y123871 1700v.

Output of LA \approx 30v. (Tektronix scope -543A)

[Noted jitter on Beam Current meter with source M-227 on target.

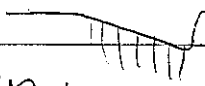
Disappeared when source removed.]

11-6-63 - DWM requests fast counter sense for normalizers,
 & counters only during pulse from accelerators.

11-7-63

+ Gate from EP gate generator (up to 70 v N.L.) to VHF
 EXT clock received on scaler Y140343
 Works at 30 volt pulse (amplitude set by 5) Set 6.

11-11-63



Counter Channel 3:

11-18-63

Remove PA from 1" counter probe
 Attach - 6810A & 1/4" NE102
 HV: Hammer Y117540, neg. @ 1025v.
 Amplifier Setting 2x1, 0.2ps, -, 30. (Pulses 60-80)
 [Bias @ amplitude \approx 10v]

Gate to grid of 608 pentode section. Clip lead at one end of 39k & another
 to frame. Coax jumper to gate output.



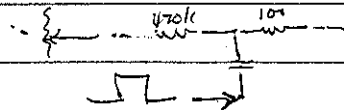
11-7-63 - Scaler Y140343 separate cut operation on X10.

(Coax jumper disconnected at gate output, but clip leads still in place)
 Removed clip leads - in vac. Noted loading of jumper
 reduced signal output from 608 by better than factor of 2,
 making first decade steps unoperable.

11-7-63

11-20-63

Tried gate on input to scaler



Set PHS further +

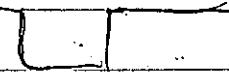
worked, but not as well as gate @ 608.

Load effect from gate output & HP output.

11-22-63

12-3-63

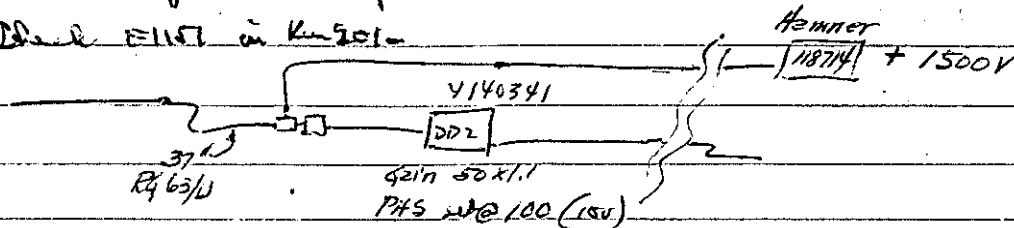
Gate on grid of 608 pentode



- 11-7-63 with amplitude of $\approx 15v$ - no signal or signal loss.
 with amplitude of $\approx 70v$ - counting gate pulses
 Set at ≈ 45 volt gate level.
- 11-11-63 Module made for missing signals at input to scaler.
 Tests OK. (Refer to ERR NB.) -
- 11-18-63 Check out module for operation. Gate output set @ "6" ($\approx 30v$)
 Signal from BF₃ windowizer thru P3 to HP460B.
 LA Gain 16, 0.2, PHS 20.
 Scaler bias -25 Appears OK.
- Probe light on dumps well low level went out.
 Connection at dumps well not good. Tightened to make good contact. OK
- 11-25-63. Pm 2 - HVPS - unable to raise above 1100v -
 Fixed
- 11-20-63 TNC unit. Terminal trouble on p41 service log next page -
- 11-22-63 Evidence of $\approx 140\mu s$ period on background from after accident
 pulsing -
 Effort to track down source - 11/26, 27, 12/2
- 12-3-63 By substitution of different amplifiers, finger points to DD-2 amp.

12-4-63 Repair R-S pulse counter E117 8E117

Check E117 in K-501-



Amplitude of pulses - max 60V

- heavy concentration 18-40 volts -

Pulse symmetrical 3µs overall with \bar{A}

(Photo in Ctr. file)

set up C3 normalizer as on 11/6/63 (p 216)

12-10-63 : wired water pump motor for Nell.

(Small 24V tank pump has been tied to this disconnect contactor.)

Pump - full - dump operable.

Con to
facin
-p

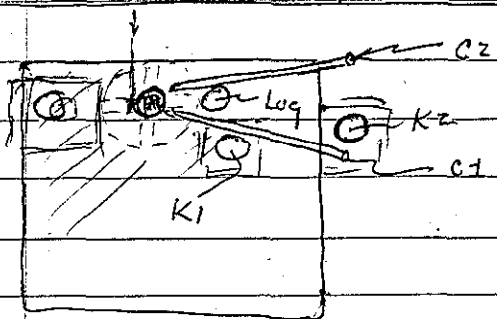
12-11-63 Instruments Arranged for monitoring small solid sphere

Chambers to use:	Nb.	Scram
Counter	- 2	-
Linear	- 2	2
Log	- 1	-
PM	- 2	2

Counting Channels:	C1	C2
Linear	2"BF ₃ #1773	2"BF ₃ #1939
Pre-Amp	44B	349
Lin. Amps	Y123801	Y100303
Gain	16	16
R.F.	0.2	0.2
PHS	20	20
H.V. PS	Y123872	Y123871 (C3)

(on balcony facing over steps to cell)

PM1 under steps near tank



Counter four feet down in tubes
Log chamber on platform
K1 & K2 chambers at 4 & 6 of sphere

After experiment re-located log & K chambers around pulsed assembly area, removed C1 & C2 from source.

220

12-12-63
#13

Wheels recorded charts not traveling. Needs
clutch service.

DWM setting up for traversing-normalizer run,
pulsing at vertical.

Traverser - ~~R58~~ 1055-N12

DD2 - Gain 50 x 1.1

NW = 1500v Hemmer 118714

PHS 100

Pulse 220v @ 50v

Good pattern

Output of DD-2 PHS + thru AP46 BR to scaler "C2"

Normalizer BSN-75

C3: PA 44B

NW:

LA 123800

Hemmer 4117540

Gain: 32, 0.2, -

1700v

PHS: 15

Output to scaler "C1"

Pulses all 2 15v - (N1304 101) some > 40v

(PA 45B removed from C3 - DWM reports gain increase
of 2 by switching to 44B)

12-20-63: PM-1 - HVPS - low output, need to lower
control full up to get reading of 0.6
Replace 2 X2A.

[12-31-63 Power failure - All power to bldg 4213]

1-2-64: (Power was renewed on 1-1-64 - K-1 reported
off-scale + Power to K-1 cut-off by ADC @ 3rd P1/16K
K-1 to stop for service - refer to file on instrument.

1-3-64: Return K-1 (4124028) to rack Rm 202 10:03 AM.

	K-1	K-2
Room Background:	1.5×10^{-12}	0.5×10^{-12}

Calibrate K-2 (4124029) & Check Trip - refer file.

Check New Source B-50 (5mc Cs)

[PM-1] $AV = .5 \quad I = .55$

(refer file PM-1)

Source trips on contact at $\approx 1100V$ (0.64 ma)

→ Suggest trip voltage of 0.70 A @ 1200V

[PM-2]

Trip sensitivity 1200V - low level @ 12" and high level @
contact.

1-3-64 Inj check on K-1 & K-2 - (refer to files)

		Range	Dist
New Source	K1	10×10^{-12}	1"
	K2	10×10^{-12}	1"
	PM-1	.70 (1195)	contact
B-80	PM-2	1200v.	12" contact

1-8-64: Wire in drain valve to EGS tank for second "screen" controlled means of removing water from assembly. Refer to Well file & Control Console file.

1-14-64 Counting Channels. PA 457B checked to have gain 325 cts, Instrumentation Placement for re-removal of EGS exp.

Counting Channels				Ion Chamber		
Source	PA	GA	HUPS	K1	K2	Log
C ₁ #1773 2" AF3	44B	Y123801	Y123872 (1500) BG		K1 = N102	
C ₂ #1939 5" AF3	349	Y100303	Y117540 (1475) H		K2 = N101	
C ₃ #1940	45B	Y123800	Y123871 (1500) H		K3 = RS 77A	Log = 2-112

Gain 10
R-012
P-270

22 p 211

1-14-64 - Count Channels - Timer 3A - not stop -
RIDL - not shut cycling - {refer to Counting
 Channel & Timer
 files

Log N - second channel - Y99087 ORNL Log N in stacks not
 operable.

Replaced with Y90068 unit.

(refer to instrument files) -

Log N channel Y90068 calibrated internally and with JFE
 signal generator.

1-15-64. Log N Channel - ORNL Y90068 seems to be operable.

8/15 Internal calibration - OK

Signal	Meter	Bevards
10^{-11}	1	1
10^{-10}	1.09	1
10^{-9}	1.02	1
10^{-8}	1.03	1
10^{-7}	1.00	.93

Finish RIDL Timer service - OK. (up in file)

Counters - C1 HUPS Y123872 panel meter sticks

C3 No pulse thru to output.

To provide 2 operable channels, drop C3 &
 use C3 HUPS (Y123871) for C1 channel.

1-15-64 -

11:15 During present run, door to recorder was sharply shut, trace jumped up in step. By shutting again managed to reduce record trace to previous level. (There was some evidence of spread reading of recorder 1-14-64 whereby we was unable to get recorder zero with input shorted. This seemed to ^{have} cleared itself.) During earlier checkout recorder had responded with making log instrument

11:30 Power to shuttle cabinet -

12:30 Power to pu-amp - Subst check indicates system OK

11:45 Put T on rear of C3 WPS & tie both HV1 & HV3 coils. Now have HV to all three counters.

Check of pulse amplitudes -

	C ₁	C ₂	C ₃	
Gain	16	16	32	Gain
PT5 Bias	0.2	0.2	0.2	R.T.
Pulse H ₁ St 20		20	10	PT5.
HV	1500	1475	1500	HV.
Pulse Ampl:	60-70	80-100	40-50	v/d B. ✓

1-17-64 Request check on comparative sense functions of Rentschler-Stokes & ORNL E-112 Ion Chambers.

{ R-S is used in tank & feeding Keithley log.
 { E-112 is used with tank & feeding Rhett

Interest is in reducing top power to minimize "heating" of elements.

Checkpoint used was levels attained during period #2
 1/16/64.

Near end of period began collecting reactivity values on Rhett at signal level of $.8 \times 10^{-8}$ amp (calibrated this date, see Rhett file). Collected 24 readings - time 17 sec.

On trace - found level at 17 sec before began leveling, this was 1.67×10^{-8} a.

R-S/E-112 @ 2% This difference not enough to warrant switching ion chambers - which would require adapters to fit cables to pre-amp (Rh) and top hat connecting by N.

Comparison of Rhett & Keithley log

(1-16-64	period #1	14.7 f	15.2 f	$\left\{ \begin{array}{l} 6d = 7715 \\ 1d = 12855 \\ T = 12855(1.4343) = 55815 \end{array} \right.$
		(5)		
	#3	5.8 f	6.6 f	$\left\{ \begin{array}{l} 5d = 18995 \\ 1d = 379.85 \\ T = 379.8(1.4343) = 16445 \end{array} \right.$
		(8)		

1-20-64 PM-2 HV low - Replace 2X2A 66 \equiv 1200V (2 mo)

1-22-64 Plot data taken 1/17/64 to compare Phoette with counter.

	Counter	Phoette	ΔP
P	10.89	10.2	0.69
	7.03	6.6	.43
	9.57	9.2	.37
			$\Sigma / 1.49 / .497$

1-23-64 Comparison Counter - Phoette - log -

	Counter	ΔP	Phoette	ΔP	log
	8.96	.71	8.25	.85	.91
	11.91	.54	11.37	1.03	12.4

Observed count rate rather high - shield counter with sharp/20mil Al -

This not enough - need Al sleeves.

1-24-64: K-1 reported noisy - (ref FF-W-2105.)

The three recording wax chamber channels seem to have somewhat more noise than usual, particularly evident on log record (as well as log pencil meter).

- Deflect air stream of central duct port in Run 101.

Seems to be no difference on log. K's ac. for operation.

Refer to FF-W-2106 for detail on log.

2/27/68: Keithley log recorder - Wheelco -

level 40.4 "****" pulsing plates -

RKR could it be battery or repeating standardizing?

Battery ok.

Manual standard operate only once - NOT SURE OF CASE.

(3/2/68 no repeat of this trouble so far)

3/2/68 Wheelco residue chart drive momentarily hurs
RKR-called & had running by time ERRC arrived,

1:10 PM Reported noise on log N Keithly. This had
appeared after earlier (before lunch) period,
when water was dumped.

Earlier similar noise problem had been noted on
linear instruments, as well. This time, only log
affected.

2:40 PM Check on noise on log channel -

a. Signal f NW connectors at top hat of battery
apparently ok.

b. Swap signal from I.C. with K2.

log IC \rightarrow K2

K2 IC \rightarrow log

Noise now on K2. (Trouble is NOT in Log Amp KA20)

3/2/64.

c. Return signal leads as orig. @ top hot.
 Swap battery leads -

Both traces normal! NO NOISE LOG
 NO NOISE K2

d. Return batteries as orig - Noise on log trace -

e. Swap back batteries; Unit marked "K2" now to K2
 Unit in plastic wire to Log
 Traces normal.

(If noise develops on K2 in future, check battery first.)

3/3/64

^{8:30} Vehicle Recorder - Log channel - failure of chest drive -
 adjust clutch -

^{8:50} further pressure on clutch needed

^{8:50} AM-2 Recorder - After battery change - as per brief
 not standardize.

Leads to battery not secure. et

230

2/5/74

Long recorder - chart drive stopped again - slipping clutch

RKR - removed clutch & drilled holes for set screws.

After re-assembly & two adjustments on tension,
can fine check.

Start 1:58:30

End 2:33:30

Time 35 minutes = 2100/5

@ 50 \leq /div - , 3 div = 2.5m, 6 div = 5mm.

Time - 42 div = 4 x 5mm = 35mm,

no shift in last 25 mm.

Seems ok -

Need to find front of 2-pen Brown recorder, so it can be used.

Long cable for shuttle pre-amp installation in 108,

3/4/69 9:20A / Call to check C-1 - will not stop at end of
pre-set defined count.

Notes that both C1 & C2 counting then "reset"
mode B-A timer running - this gets scales on
Power off on B-A timer - New R10C timer controls ✓

3/6/69 10:30 A / Rhodite connected for remote operation -

PA & power supply in Room 108.

RSN 77A, F 245 (newly received for West End use)

Use diaphragm upright by side of fixed part of array
with +600v battery box.

Check with gamma source - need $> 10^{-10}$ @ contact
System responds

5-5-64 R-S Ion Chamber RSN 77A F242-245 - 4 ea in
 watertight housings with 30' signal & HV cable.
 [Preliminary check in lab (RM 210) recorded in
 ref. file R-S Ion Chamber. HV = +600V each case.

Location	Sensor	Channel	to Bkg	MTR	M-229
standing on floor	F 245	K1	<10 ⁻¹³	+	7x10 ⁻¹²
under steps	F 242	K2	<10 ⁻¹³	+	8x10 ⁻¹²
	F 244	Log Well	-	-	6x10 ⁻¹²
	F 243	Log SID (E-H)	-	(-)	67x10 ⁻¹²

352P Sensor Source

5-6-64 Comparison of R-S ion chambers with ORNL shield E-112

Source	Sensor	Channel	Source	Distance	Ch ¹ Reading K1+	Ch ² Reading K2+	Ch ³ Reading K1 ^(H)
	F 245	K1	M-229	20cm	3.5x10 ⁻¹²	4x10 ⁻¹²	-
	F 242	K2	"	"	4x10 ⁻¹²	4x10 ⁻¹²	3.5x10 ⁻¹²
	F 244	Log	"	"	2.2x10 ⁻¹²	1.5x10 ⁻¹²	1.5x10 ⁻¹²
	E-112	K-H	"	"	9x10 ⁻¹²	10 ⁻¹¹	2x10 ⁻¹²
	F-243	-	-	-	-	-	3.5x10 ⁻¹²

Background	Sensor	Channel	Reading	Distance	Source	Reading	Distance	Source	Reading
	F 242	K2	5x10 ⁻¹³	2x10 ⁻¹³	E-H (-)	1.05x10 ⁻¹¹	M-229 1030	4x10 ⁻¹²	
	F 243	K2	<10 ⁻¹³	<10 ⁻¹³	K1+	8x10 ⁻¹²	+	2.9x10 ⁻¹²	
	F 244	K1	2x10 ⁻¹²	1.8x10 ⁻¹²	K1+	6x10 ⁻¹²	+	7x10 ⁻¹³	
	F 245	-	-	-	-	-	-	-	
	E-112	Log	7x10 ⁻¹³	<10 ⁻¹³	E-H (-)	2.1x10 ⁻¹¹	+	8x10 ⁻¹²	

M 43 13.2 x 10⁵ n/s 2.44
 M 229 5.6

S-604 10:58	F242 EH (-)	F243 K2	F244 K1	F245	E-112 Log
Bkg	1.7×10^{-13} (4)	3.5×10^{-13} [7]	1.1×10^{-12} [7]	-	$< 10^{-13}$
1144	2.8×10^{-13}	3.5×10^{-13} [7]	8.5×10^{-12} [7]	-	2.8×10^{-13}

1:57 Swamp E 112 & F242

F242 (Log) F243 (K2) F244 (K1) -F245 E-112 (E-H)

Bkg				X	
M-229 @ 2000	3.5×10^{-12}	3×10^{-12} (+)	1×10^{-12} (+)	-	1×10^{-11} (-)
M 43	9×10^{-12}	8×10^{-12} (+)	7×10^{-12} (+)	-	2.7×10^{-11} (-)

5-7-64 7:40A

Bkg	2×10^{-13}	5×10^{-12} (-)	1×10^{-12} (-)	2.8×10^{-13} (-)
7:49	1.8×10^{-13}			1.2×10^{-13} [7]

Sets ~~F247-K1~~ ~~F248-K2~~

7:51	$< 1.0 \times 10^{-13}$	1.6×10^{-13} [7]
7:52	"	$> 3 \times 10^{-13}$ [7]
7:54		0
7:55	70s peak	2×10^{-13} (-)
7:56	30s peak	3×10^{-13} (-)
7:57	25s peak 10^{-13}	4.8×10^{-13} (-)
7:59	4×10^{-13}	5.5×10^{-13} (-)
8:00	100 ∞	4.2×10^{-13}
8:01	∞	4×10^{-13}
8:02	3×10^{-13}	3.5×10^{-13}
8:04	2.3×10^{-13}	2.5×10^{-13}
8:09		3.5×10^{-13}
8:09	5×10^{-13}	4.5×10^{-13}
8:14	1.5×10^{-13} (50s peak)	2.2×10^{-13} [7]
8:17	$< 10^{-13}$	1×10^{-13} [7]

234

Jon Chambers

5-7-4

6.19

F242

E-112

< 10-13

2 x 10-13 E

GRNE chambers need same polarity as occurs in Bkg
Two of R-S. chambers 243 & 244 consistently read reverse
polarity on Bkg.

5-12-64 Counting Channels -

H.V. - Remickell B-A HVPS & output meter panels

Data in file FF-W-2001 - 5/11-18/64

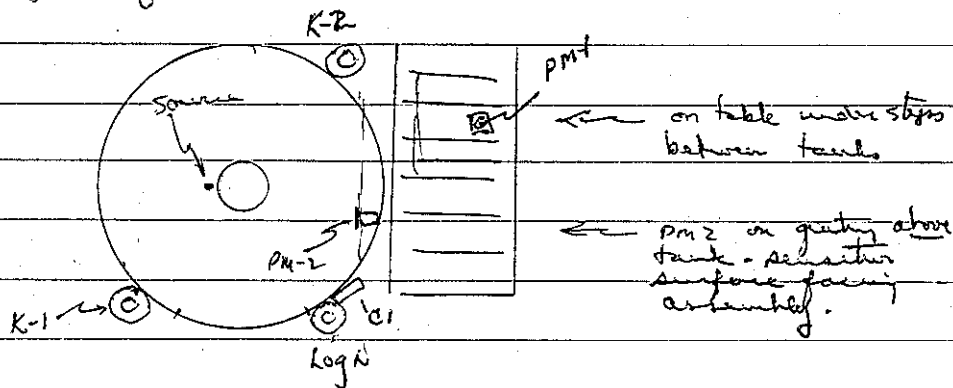
5-20-64 Use counting channels to check weak neutron sources -

Po-Be PN 213 & 214, each $< 20 \mu\text{sec}$.

	C1	C2	C3	C4
Bkg (om)	27.9 c/m	28.2 c/m	31.5 c/m	63.3 c/m
Sources (om)	28.9 c/m	36.5	32.3	47.4
	33.4	31.5	30.9	46.7
Blkg	29.4	29.4	28.0	44.8

5-21-64 Clean recorder pens & refill with ink.
Replace battery on K-1 recorder (5/20)

Check response of instruments to source (M-43)



- K-1 RS-F242 in pip on floor - to left of "door" in tank
- K-2 RS-F244 " behind tank
- Log N RS-F243 " - to right of "door" in tank
- C1 RCL #1973 " - beside Log pip

Instrument
Response to Source R_S
 $F=242$

5-21-64

Source M43

Source M43 $60I$ Source M43 $60I$

Source effect:

x4

x17

x6

 R_S R_S R_S

K1

K2

Log

 $1.05 \times 10^{-12} (3 \times 10^{-12} \text{ aFs})$ $1.15 \times 10^{-12} (3 \times 10^{-12} \text{ aFs})$ 6.1×10^{-13} $.25 \times 10^{-12} (3 \times 10^{-12} \text{ aFs})$ $.9 \times 10^{-12} (3 \times 10^{-12} \text{ aFs})$ $< 10^{-13}$

Note - start up range on K1 & K2 now 3.3X more sensitive than with older model ORU in chambers.

Previously starting on 10×10^{-12} aFs, now 3×10^{-12} aFs

Recorder spread on K1, K2 & Log very good. Less noise on trace with RS ic's in sensitive range than with ORU ic's in range at least 10x less sensitive. These RS in chambers appear to be good.

Instrument check for screen.

Source Co^{137}
B-80

K1 3×10^{-12} aFs trays @ 5"

K2 " " 2"

PM2 1200v 18" - contact

PM1 .760 (1200v) contact

Log N responds to source

Operator range - start up

K1 3×10^{-12}

K2 3×10^{-12}

PM2 300v

PM1 .500 (860v)

Adjust zero PM-2 - HV off set balance to 457

5-21-64

10:07 { disturbance on K2 for about 2 1/2 minutes -
 Signal very noisy - fluctuations from 10-60% on recorder.

5-22-64 9:20 No more wild noise on K2 since entry above -

Background is somewhat higher today -

Yesterday 9×10^{-12} was equivalent to 30% on recorder

Today recorder was reading 6% before source insertion

Start-up scale for K-2 10×10^{-12} Source is 25% recorder
 or 2.5×10^{-12} ai

11:05 - Ion chamber in dark with weights -

2:20 - Ice setting water valve to hold got serum.

Double re-setting - note K-1 frozen.

K-1 fast dig - K-1 transient numbers

	Source Check:	Source Out	Source In
K-1-64f	K1 $(3 \times 10^{-12} \text{ fs})$	3×10^{-12} (10%)	1.7×10^{-12} (54%)
	K2 $(10 \times 10^{-12} \text{ fs})$	2.2×10^{-12} (22%)	4×10^{-12} (40%)
	log (Spont)	$< 10^{-13}$	10^{-12}

o.k.

6-7-64

Install Fuel Probe Module -

To check zero in tall tanks in lid of carburetor
manometer.

Readings with some fuel in tank

17.485

17.45

17.455

17.44

12.44

19.16

19.13

19.13

} 13" Tank zero.

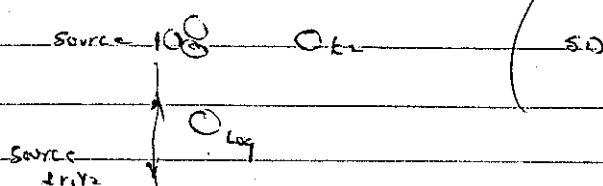
11:15 Set probe @ 7.13

Fuel Manometer { 6.71
6.72
6.70
6.70

probe - 7.135, 7.135

6-30-64

best location for ~~the~~ multiple cylinder array exp.
using $k_1, k_2, \text{sl. log. N}$.



3:00 P - Log N trace noisy. Check connections ok
(This batt. box had fallen from shelf under
table. Maybe loose plugs w/ box.)
New batt. box worked ok.

4-7-64

7-7-64

Log N - No meter deflection on 10" arc calibrate
check fuses. Broken.

To get in service quickly, replaced all tubes
& fuses. Appeared ok @ 0900 after one run.

July 9, 64

PM 2 channel: Records sweepers, upside -

Note no upward deflection on output meter

Seventeen sheets: to: "CHECK". Records trace drops to

normal level.; "BK₁" Trace ok.

"OPOR" Trace now ok.

Maybe contact on sheets switch.

July 9, '64 Observed readings of K1 & K2 on 3×10^{-12} range
 K1 $\approx 7 \times 10^{-10}$ or 4.7×10^{-12} or 2×10^{-13}
 K2 65% 1.8×10^{-12} 18×10^{-13}

Sum on any 7/22/64 No change in background of chambers.
 Log of chamber $\approx 10^{-13}$

July 21, 1964 K-1 reported very noisy chamber on recorder - coming through
 amplifier. This noted on startup scale 3×10^{-12} a ff.
 Still very much present on next range 10×10^{-12} .
 Call to JFE. Went noise went away when JFE
 entered control room. ? - Be on alert for recurrence.

July 24, 1964 K-2 reported noisy - out of typical. Noise not remain?

Aug. 3, 1964 K-1 noisy again. (K-2 ok)
 Re-check of cable connections shows no obvious loose
 connections.
 Replace battery box. (Box did not indicate any failure.)
 Noise some what less, but still present.
 Swap leads at amplifier. Noise swaps. Problem in
 line and/or head. Keep under observation.

Aug 4. On start-up K2 & K1 both noisy.
K2 settled down within 2 minutes.
K1 noise remained.

Change battery box on K1 - Before putting
box in channel, spread plugs in battery box to
make better contact.

8-12-64 Log N - spend some time - also on meter on
amplifier, Observed.

9-15-64: History of noise problems on K1, K2, and Log N.
Log N 600V battery was found clean of any
noise, then put back in - inst works OK! (?)
K1 and K2 both showing occasional erratic
jumps & jitters. K2 is by far the worst.
Installed spare 600V battery box on K2 which has
2 new batteries inside & box just carefully checked
& found clean of any noise using Tektronix 543
0.2 sec/cm, 0.005 V/cm using mica condenser
isolation box (2000V).

[Carefully observe now and compare to just past
behavior:

Note: Both K1 & K2 ~~are~~ ^{have been} perfectly quiet when signal
input ~~is~~ ^{was} removed. Noise occurred only with
sig connected. Observe now & see if any change.

(Note: Spare Bat Box (old K2) had 2 noisy cells in it) JFE

9-16-64: K2 OK - noise never occurred once - Clean - 9-21-
 beginning to suspect battery troubles for sure
 now. Have 4 300V batteries on shelf
 suspected of noise - observe each one carefully
 on scope & isolating condenser combo.
 Did find several noisy conditions - some
 were quiet for several hours then
 producing large spikes - one found
 sensitive to loud noise in air! produced
 about 1mV on loud noise close up. JFE

Continue observation:

ALSO: Increased capacity coupling of new
 parallel plate chambers compared to
 overall capacity of system may make
 system more sensitive to battery noises
 than before. JFE

9-18-64 New 1 1/2 V battery in Recorder PM 2 JFE 9-21-

9-18-64 Several sample 300V batteries on bench - Continue
 examine noise problems & patterns of batteries
 both with & without load.
 Devised special battery & isolation boxes for this. 9-30-
 JFE

9-21-64: Examples of 300V batteries & noise conditions:

Example 1. used - Under 5.1 meg load, noise = 0.1V Peak-Peak
 " " " - No load " = 0.01V " "

" 2. " - 5.1 meg load " = 0.002 " "
 " " " - No load " 0.005 " "

Example 3 - used - 5.1 meg load - noise = 0.1 V Peak-Peak
 " " - " - no load - " = 0.003V Peak-Peak

Example 4 - used - 5.1 meg load - noise = 0.005V " "
 " " - " - no load - " = 0.005V " "

Example 5 - new - 5.1 meg load - noise =
 under load from 0-5 sec = approx 0.001V
 " " more than 5 sec = " 0.005V
 no load, noise < 0.0005V peak-peak.

Note: for few seconds after removing load, noise level is high but rapidly decreased - after about 10 sec. practically no noise is detectable.

JFE

9-21-64: Left on scope (Example no. 1. above) for several hours - later on, load = noise < ^{.001}~~.005~~ V Peak-Peak
 No load = noise < .001V " "

This goes to show battery noise patterns unpredictable

JFE

9-30-64: K1 - large pos. spike causes system screen. Remove K1, 600V Chamber battery. Check 600 bat box for noise. general level about .0005V, scattered spikes to .005V, and occasional isolated pulses off screen. This later diminishes to almost no noise. - over - JFE.

9-9-30-645 Substitute another Chamber Vat (Coor) JZE

11-3-64
 Consider
 a. Remove fuel probe module, rack 3.
 b. Install water control modules, rack 2,
 for operation of Well water system -
 include pump & tanks.

Quantity channels.

- Invert BA Model 630 (V-124254) not operable.
 Service - refer to file FF-W-2010
- Scanner C-2 (V-123798) not operable.
 Service - refer to file FF-W-2007
- RVDL Invert not operable. Service notes in
 file FF-W-2011

11-4-64 Completion of installation of modules

- a. wired chimp module
 - i. b. added relay K8, 1 as holding relay, replacing
 older K8 which is out of service.
 - c. wired fuel drain module.
- Modules fused @ 5 ampere.

11-17-64 Log Channel -

During start up on experiment, spikes noted on recorder trace. With signal level of 2×10^{-12} , positive spike of almost one decade occurred. Ten minutes later, there was another + spike of magnitude between 2×2.3 followed in a 30 sec. by a neg. spike of $x 4$.

12-1-64
11-30-64

NIPS PM2 ref. FF-W-2109

12-10-64: K2 noisy - note trace on scale of 10×10^{-12} a.f.s.

Swap signal leads at instruments 202.

After running, lead has not conclusive that noise was in battery or lead of K2 channel.

Returned leads back to original position. K1 now appeared to be noisier than K2.

Log N noisy & hard to calibrate! In shop.

refer to file FF-W-2106.

12-11-64

Log N in service.

12-15-64

Instrument check

- K1, K2, Log for noise

K1 }
K2 } 10×10^{-12} range

Log operate

K1 seems to be normal

K2 may still have noise problem.

Log N looks normal

246


12-15-24 AM-2 Siding (low level) FF-W-2108

Experimental Setup - Control Circuit

Logic fluid moving system used previously
on small slab tank.

Chumpup wired to 3 ϕ contactor for Well
water pump supply.

Feed, drain, & dump valves plugged in
Well water control circuit.

Check out. 

1-4-65: Random spikes on Log N trace of panel meter -
 2:15 PM signals \approx 1 every 30-40 sec. Under observation.
 2:40 PM sec over 2 to 4 seconds. Rate much greater.
 @ 2:15 + spike followed immediately by smaller reg spike.
 @ 2:40 only + spike.
 No spikes with 10^{-11} or 10^{-7} signals (a amp balance)
 [Calibrate instrument]
 JFE sig gen on input to Log N. No spikes - in range where
 they had occurred.
 3:00 No spikes - by swapping leads @ top pot 201.
 Swap signal leads of Log & K2 at top pot.
 Noise signal to K2 instrument in 202; Log quiet.
 Replace battery box Log chamber with unit operating in 210.
 Both channels quiet. OK.

1-6/7-65 Laundry channel checked out - Refer to appropriate files.

1-8-65 Log N - calibration shorable (Refer to FF-W-2106)

1-14-65 Log N - no response to source. Signal $\ll 10^{-13}$ ct.
 Remove ^{or check} & install R.S. F245. Ion Chamber F245 to
 shop. Refer to File FF-W-2102

1-29-65: Kr. wiring cabinet - Battery from 210 - has been in
use w/ E-H amp & steady (w/o noise)

2-4/8-65 Reducts temperature recorded ^{in 202} T.C. for ports in 201.
T.C. extension run through instrument cable tray
on balcony of 201. Run in rack by desk.
T.C. coupler in 201 by north water window.
T.C. extension #5 open circuit 202 & 201. Use #5 point out
for Room 202 thermocouple.
T.C. # 1-4, 6-16 OK, as marked in 201.

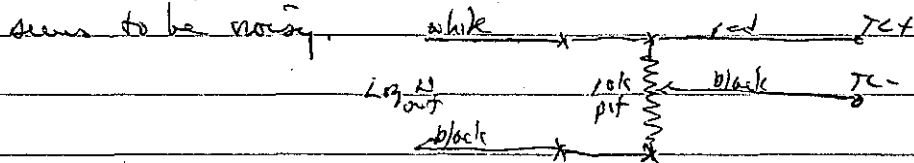
2-14-65. Course:

Source Module moved from panel 2 to 3, extend leads.

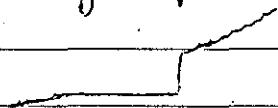
Water pump & pump modules for Sid removed from panel.
 Water dump & pump modules for Nell " "
 { These still were to terminal board }

3-1-65

Log N - Report erratic trace on positive periods. Only on recorder ^{NDP} on amplifier. ^{Revised} Battery OK.
 Input pot. is ^{adjust.} removed to reduce 50mv to 10mv.
 seems to be noisy.

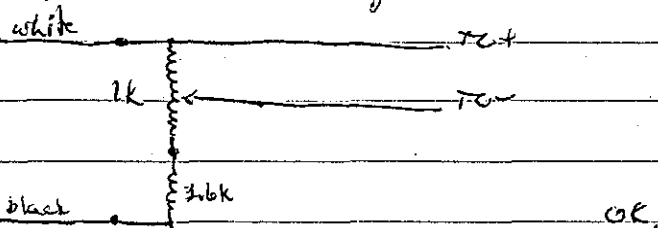


PM-2 trace hanging up on a positive period:



3-3-65

Log N: replace input circuit with following:



PM-2: Trouble again on trace. Only on recorder.
 Need to check recorder.

3-4-65 PM-2 Recorder - no evidence of discontinuity in trace.

Recording 15kg 8:30 - 10:20 A/ -

Trucks must be interrupted.

3-8-65 K1 - noisy? spikes $\pm 30\%$ fr- on 10×10^{-2} range!

0945 - Some through amplifier

3-10-65 RKR reports log₁₀ calibration instabilities and erratic
trace on pen - still securing on recorder only.

Check calibration or replace 1.5V battery in recorder.

4-1-65 RKR Reports noisy K-1 - Check shows noise in

detector &/or battery. Replace battery. Seems better.

4-15-65 RKR - liquid level Manometer - giving erroneous readings

Check - V-R register hanging. Replace unit with
M-2 readout module.

M-2 unit lens examined.

→ M-4 unit re-installed with new registers ok.

4-30-65 Log - Keithley - Calibrations
 On 10^{-7} IEC showed drift up scale to level of 1.5×10^{-7} ?
 ERR. readjust - seems to hold at 10^{-11} & 10^{-7} ok.

5-4-65 Report K2 trouble: ERR. slowly recover after trip.
 when switch range from source to operate range,
 got several rises in falls - fluctuating pattern -
 until pushed bypass switch a couple of times.
 Need to keep close watch on this.

5-6-65 Report of K2 noise: on 10^{-12} scale - scaled to 3×10^{-11}
 & then back; then ok. Need to check switch contacts.

5-13-65 Instruments Calibration of Trip Check -
 K1, K2, Log, PM 1, & PM 2.
 refer to files for record of data.

No adjustments required for sensitivity. Trip levels
 holding pretty well. Last such check 1-64.

5-14-65 Counting Channel Check - ok refer to file FFU-2001

5-21-65 Liquid Level Manometer - Mt - 2 place.

Trouble - Drive down only.

a. Lower limit switch action does not drive up.

b. Insertion of paper between light & cell does not drive up.

c. Reduction of gain to minimum of pump drives down? (Should be motion less)

Tube Check:

Both 12AX7's weak - Replaced

⇒ Unit now controls properly.

OK.

PM-1 HVPS. Unable to reach trip check voltage (the equivalent to 17 ma)

Replace 242A. OK.

5-26-65 PM-2 low level light not always on. relay trips evident but light not operable.

MT- again driving down. ??

Service links with M2 - This does no good.

Trouble: upper limit switch!!

5/25/65: PM-2 Trouble in Records.

→ i Trace on "Open" range run from 0% to full scale in ≤ 3 div. in
check

ii Switch to "Bkg"; ok; 12%

iii "Open" - steady across 12% to 68% in $1\frac{1}{2}$ div.

iv Bkg/op - using trace

v Bkg : steady @ 12% $\pm 2\%$

3106 - Check records. Refer to PM-2 file - FF-W-2108

5-28-65: Control Console.

Request for setup to operate ^{auxiliary} water system.

This system had been wired up for use 12-15-64 and was
~~not~~ wired in det cell. Set modules in place on console.

6-2-65 New Battery w/ Micromax Controller for outside water tank.
RKR reported pointer reading high.

6-9-65 Reported LGN - req. spikes - RKR said cleared up
after operating reverser button several times

6-11-65 OF XXXX-

6-11-65 C3 channel feeding monitoring signal to busway
sealer for "popper" operation

11:15 not operating.

Check operation with signal from channel C4. OK.
Swap detector - presumps.

⇒ C3 channel needs to be checked out.

6-29-65 Temp. recorder - hunting on open circuits. Tunpered open lines (JFE.)

7-15-65 Report drift of "gas" reading on PM-1 meter.

Should hold at a .6 m. RICK reports it drifts
above & below this point for fixed HV on PM tube. Trip OK
1020 Reading .615

1235 .605

1235 - Request monitor counter while "loading". Unable to
get CT readable (RKR)

Check slow HVPS source - BA 7-123871

← 500V & 500 counts

Replace HVPS with HC unit or Busway sealer
used for CT credible count, OK

Scale 25% - a 2k scale with source in at plant -

LA - 16,000, = 20.

7-23-65

PM1 see 7-15-65 - 11:11 A 500m on meter (drifting)

RADMON 201 B - Trip on weak source w/ 25% sens of AOC
WATCH.

7-27-65: PM-1 - Under test after trip.
Meter reading $\approx 150 \mu\text{a}$.

Replace 543 & 5692 Tubes - Key under observation
for 24 hours.

Noisy chamber - mechanical vibrations are cause.
~~Shock~~ ~~vibration~~ chamber

7-28-65 PM-1 OK. - On line.

8-12-65: Call to check Linnai Count Rate Meter.

Level dropped for no reason from 30% to 15% deflection
on recorder with activity in room constant.

Disc. set @ -5. Set disc to -8 get proper level
Now drift. Need to service unit.

B-B Linnai not stop short of line. When does stop will
start up w/o trigger.

Replace 5696 & 5927 OK

8-23-65 Spill - Cable to log in ion chamber ran thru spill area. Disconnect cable from top hat of chamber for cleaning.

During clean up operations blast fuse on dump well valve circuit.

8-24-65 Replace fuse for dump well drain valve. Low chamber re-pressurized at 10:00.

8-26-65 Power Failure - 2 1/2 hr 55 min.

When power on - check instruments

K1 quite noisy for at least 15 minutes

K2 settled down after couple of minutes

log =

PM's OK.

8-30-65 Question re log percent trace. Changed slope after standardization. Will keep check on this.

8-31-65 K1 not changing factor / 3 on range change. Zero off. Re-set zero. OK.

9-27-65 K1 & K2 have been reported as noisy.
 9:20 A/ Sum on recorder of set instrument on 3×10^{-12} a/c

K1: 10% with spread of ± 3 units.

K2: 16% with spread of ± 4 units.

Note an unusual neg. spike on K1 of $\pm 17\%$

Check recorder batteries:

Replace batteries in K1, PM2, Log, & CRM recorders

(Old batteries inserted 1-29-65 in all but Log & that
 3/65)

Set gain PM-2 455 to 457 on balance

10:45 No spikes on K1 since battery replaced. Trans
 on K1, K2 & Log appear to be normal.

10-6-65 K1 noisy during part of experimental run. Quiet up to
 certain water level (multiphase 3.5) then noisy
 for $\approx 3\frac{1}{2}$ minutes, during which time K2 increased x10.

10-12-65 PM-2 - Zero drift. Unable to reset low level.
 refer to file.

11/5/65 Call to observe K2

On 3×10^{-12} range had gone through noise "spikes"
 ± 40 full scale! These disturbance periods
 are short ≈ 10 sec and on no regular frequency
 When began to fill with water in presence of ORK,
 noise occurred. Noise settled down with one
 10% reg. spike at $2\frac{1}{2}$ min. In another 4 min.
 got large noise $\pm 40\%$ - There was no switching
 at the time. After this there are reg.
 single spikes of 10% more frequent than before

Reported that K1 was noisy yesterday. Not showing
 noise as yet today.

0938 K2 noisy change to 10×10^{-12}

0957 K1 & K2 -

On drum out noisy frag on K-2 - this during early
 stage of drain operat -

Check cables at top hot & batteries. All tight.

Measure battery on K-2. OK.

Check signal lead to K-2 amplifier. Wiped clean -
 very slight amount of dirt on insulator.

Tightened signal lead to K-1 amplifier.

11-11-65 Outside Temp. controller.
 Set H_2O to $30^\circ C$, sheath @ $300^\circ C$
 Watched sheath rise. Cut off @ $300^\circ C$ setpoint
 Raised H_2O setpoint OK.
 Watch and for flush sign.

11-18-65 K-1: Pump handle loose - lightning
 Absent?? ?

11-22-65 Log Channel: Signal level $\approx 10^{-12}$ a. Getting occasional
 mag jumps ($10^{-12} \rightarrow .7 \times 10^{-12}$) ~~staying~~ staying for a few seconds,
 then recovering. Jumps not present when
 signal of 10^{-12} a from signal generator.
 K-1: still noisy.

Battery check - Log OK

K-1 voltage up - looks as if there is
 some noise here.

→ Replace batteries in K-1 channel.

9:15 - K-1 trace looks vastly improved.

Log trace - may be better (?)

12:00 Log reported worse than earlier this AM.

12:40 Sus. Th chamber output leads at top hat in 201.

"Log chamber" now to K-1 instrument.

"K-1 chamber" now to Log instrument.

No evidence in K-1 trace of noise

11-22-65

Log frame still noisy. Doubt may be instrument?
(Refer FF-W-2106 for inst. service)

12-2-65

K-4 noisy. RKK reports clearing by moving range switch
backed forth.

K-4 to SW 180 in to replace K-1 SA-10215

SA 10215 service record in FF-W-2103

12-3-65

Replacement K-4 to noise - Zero shift w/o touching instrument

10:00 AM - re-installed K-1 SA 10215. replacement to shop -

10:20 - observed SA 10215 during 20 minutes. There shows no noise,
however, this is not conclusive since noise was intermittent.

10:55 AM - Zero shift slight on SA 10215 - reset zero.

12-6-65

09:30 Check K-1 - Operation appears good.

2:00

Scram on "release" of drain valve. * closure

Shock wave as result of closure of drain valve, produces
transient pulses on all instruments - K₁, K₂, Log.

It appears that K₂ channel is more sensitive of trip
channels affected.

12-9-65

K-1: Recorder - hung up for several minutes of time (50s. end)
during run. This occurred ~~during~~ after peak change.
Instrument panel meter continued to function normally.
All scram circuits, therefore, still operable.

⇒ May be sheld wire problem. Do not have opportunity to
observe event. True not ~~is~~ conclusive.

12-10-65 Cleaned slide wire on K-1 readers.

1-4-66: Pm-1 imogonation serviced in road (FF-W-2107,9)

1-4-66: Temperature recorder - re-wick posts - check thermocouple

1-15-66: K1 & K2 Readers per inst writing some of them when change range. Check of pens - pens to be working now -

1-24-66: Thermocouple Calibration:

T.C.'s used in exp. checked with recorder.



Setup

T.C.'s taped to thermometer bulb & top leads to
Immersed in vacuum ~~flask~~ bottle
filled with water.

Thermometer range 0-50°C to 0.1° markings

Readings taken as water cools.

Mark = pointer reading on scale as set

Print = readings on chart paper

Temp = thermometer reading

Time	Mark	Print	Temp	Time	Mark	Print	Temp
9:42	48°	48.5°		10:22	46.5	47.0	
	48°	48.5	46.7°		46.5	47.0	45.4
			46.7°	10:44	45.5	46.0	44.5
9:49			46.7°		42.7	43.1	42.6?
	48	48.5		12:00	42.7	43.1	
9:48	48	48.5		12:52	41.0	41.5	39.4
			46.7°		41.2		
9:49				1:00	40.7	41.2	
					40.9	41.4	

1-24-66

See with from cooler in bath @ 1106 P.

Time	Mark	Print	Temp	Notes
1:11	10.1	10.5	8.7°C	-1.3
	10.0	10.4		

1:34	10.1	10.5	8.7°	
	10.1	10.5		

2:44	10.3	10.8	9.0	-1.3
	10.3			

remove from water -

3:42	24.9	23.4		-1.5
	25.0			

2-8-66

Outside water tank not heating

Check fuses: Phases A & B blown. [A-B-C] ^{order}

Replace fuses & check C to be sure ok. ✓

Current per phase 29.5 A.

Switch measurements on K1 meter. Ben this way for
302 V. amp (RKR) Accuracy is $\pm 10\%$ for 10×10^{-12} A. max

5-21-66

Log N - Doubler rep. 15 min.

6-3-66

PM2 HVPS instability.

6-7-66

K-2 instability on record. Comm; thru amplifier
Range 3×10^{-12} a.

Replace batteries - 2 @ 350V. in Batt. Box.

6-8-66 K2 still noisy
K1 also shows some instability.

K2 removed in shop (210). Reinstalled in 202. Better
(Refer to FF-W-2104)

(6/11-21/ Vacation)

6-22-66 R.K.R. Reports that K-1 has gotten progressively worse during past week.

Speaks every 3 or 4 minutes.

Checked connection at Battery

Checked gas level to turn 2 full turns
about an hour later needed to readjust
gas back 2 turns.

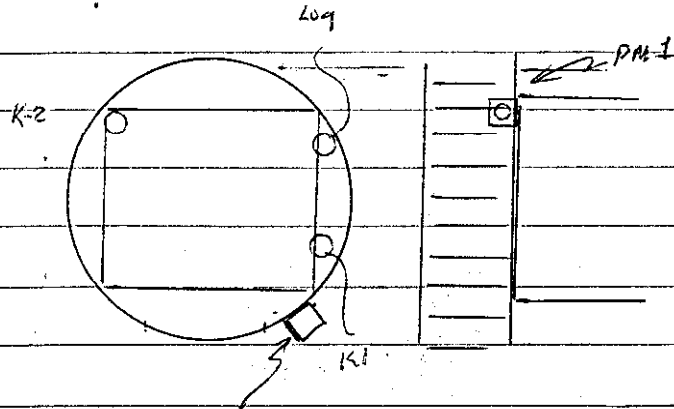
Unit needs service. (West End down only this week)

6-23/30-66 K1 In shop for service - (Ref. FF-W-2103)

7-1-66 K-1, K-2, L-1 Regime check. Chokes have been disconnected
from top stat during maintenance operation. etc.

7-6-66 Check plumbing on Sid - RKE has made change w/ sec -
Water handling system ok.

Instruments place in Sid preparatory to run with massive
elements.



Iron chamber housings suspended from center @ top Sid
about 1' above bottom of elements.

PM-1 Near floor at base of Well.

PM-2 Member on bracket @ 5' above floor level.

PM-1 RUPS weak - Replace 2x2A -

7-12-66 Inst. Change: Sid to Nell.

Relocate: AM 2 beam

K1, K2, by Dose Chamber

Re Connect: Dumps, Drain, & Face Valves under Nell
(Connection had been made to tank ^{amp.})

Re Connect: Nell water pump, replace leads
for Chem pump.

Module Change: Nell water Modules (2) on Rock 2
Source moved from ^{Rock 3} to (2).
Hatch Sid Modules (2)

Check out - OK.

7-15-66 Unit checkout - after modifying battery boxes
to limit current to 3 ma @ 600V. [Unit took in
series]

- after bldg. failures due to bad storage!

PM-2 need to adj. zero. & H Trip & Lo Trip

Pool set to 394 ←

H Trip set to 10 min

Low Trip set to 1.2 min.

9-22-66 ~~10/11~~ Gate Alarm Trouble

Full tone when any one of three gates &/or door is opened. This at. When gates are all closed, there is a low intensity buzz or beeps in 202. Alarm device at outside gate does not give "background" noise - only alarm in 202. ???

After a few minutes noise died out. ? This did not appear to coincide with re-check of closure of door at 102. ?

Trouble resumed later in morning when - after a green light condition, the red light was turned on.

Checked wiring in afternoon when had third incidence of trouble.

Traced source to microswitch @ outside gate

FULL OF WATER 006
010

10/11/66 RKR reports PM-1 HUPS work. Rydman 282.

11/14/66 RKR reports - Amber light on unit A, Run 102 alarm
Set low limit points down - reading < 10ms.
Needs "zero" adj.

11/15/66 1:05P - J.D.C. called to report Amber light on Annex Sta 102.
Adjusted right hand pot - as viewed from front of lowered panel.
Very slight cw rotation brought meter needle on scale to 20ms.
Dvd not have enough height to see to adjust lamp intensity.

12/23/66 Remove K-1 for temporary use in 218 with APR experiments.

1/4/67 Install Keithe S/180 (under observation in 210) as
substitute for K-1. This unit is noisy.

Report wear HUPS on PM-1. Fixed -

1-9-67 Injc - unable reset PM-1 - ref PMI file (FF-W-2107)

File report on gate trouble 1-4-67.

1:55P Outside gate not make up to switch.

Arm has slipped on shaft of switch housing.

Found it difficult to operate switch.

Removed lower section - arm, camshaft & plunger. Lot of moisture in cups.
Dried out. ^{switch hangs down} ~~down~~ applies pressure to arm in normal direction only.
Mr. Garrison installed copper shim on side to position vertical
sliding member. Now no hanging. Reinstalled 2:53PM ac.

1-10-67. Bentall S/W 180 unit as K-1, after bench check of modification

1-16-67. Jans adj on S/W 180 repaired. Was reading $\approx 2/3$ fs. in water.
No problem to go. (E73J)

1-23-67^(M) RKR. Requests liquid (reflector) level probe to mount in HEIR element test tank to indicate water at 6" above top of elements.

Existing probe circuitry available.

Put probe power switch & probe light on console desk front.

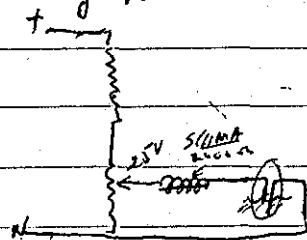
Use S11 (42) to a probe mounted at top of tanks.

Checks out ok when lead in 201 is grounded.

Should be ok for water.

1-24-67^T RKR - Tried with water. Not work water too clean. Not enough conductivity to permit operation of relay.
Try water circuit in place of relay, ok.

Relay Operation:

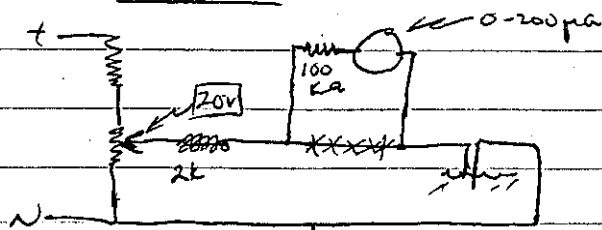


measured voltage on probe
when in water in water
Ramban @ 25V

One needs a 4 volt drop across relay to operate contact and illuminate probe light.

1-24-67 (T)

Water Conductivity



Set dc voltage level at 20 volts at top.

When water in contact with upper probe, meter reads ≈ 70 pa.

If a dead short occurs, current would be:

$$E = 20V \quad R = 2k + 100k = 1.02 \times 10^5 \quad I = \frac{20}{1.02 \times 10^5} = 196 \mu A \quad (\text{less, actually, because of meter resistance})$$

Measured 70 pa:

$$R_w = \frac{20}{7.0 \times 10^{-5}} = 2.85 \times 10^5$$

$$R_{ws} = 2.85 - 1.02 = 1.63 \times 10^5 = 163k\Omega$$

1-24-67 (T)

RKR - temp. recorder. Seemingly reads high by about $2^\circ C$

Readings @ 3 ft 26.2 & 26.5 $^\circ C$

thermometer check 24.2 $^\circ C$

1-25-67^(u) RKR: Outside gate - unable to get it to operate.
Lever not move CCW, as required in this
installation. Will move CW.

Replace lever - cam section. Now lever
operation ok.

When turn on red light, get buzzer
continuously - regardless of switch ~~function~~
position. After working lever back & forth
a few times, get proper action.

RKR shimmed A1 angle to prevent
gate hitting switch & possibly damaging
same.

12:30 Electrical crew (Craft w/ Cobb) here to
install new switch.

1:30 Job completed.

1-26-67 Temperature recorder - Has been reading several
degrees high for several days.

Replacement battery on 1/24 did not help.

Replaced tubes at balance amplifier.

Now seems to be reading properly.

There was a drop of $\approx 2^\circ$ in reading after
new tubes installed.

1-20-67 Temp recorder ok.

2-1-67: Probe current meter mounted on module on console.

2-8-67: Water storage temperature monitor (micromer) battery replaced.

2-15-67: K-2 - RKR reports wiring. Had triggered system
 Note jitter in pin. Swap signals K2 \leftrightarrow K1 amps (in 202)
 Noise transfers to K1 \Rightarrow trouble at head in 201.
 Battery check K2 batt. weak. Replace one of two 300V units
 in batt box. Now reading > 3 ma as test, whereas before
 was reading 2.2 ma & drooping.

2-16-67. Conclusion for K-2 taken to 215 Shop
 RKR reports temp recorder again giving erroneous readings
 as on 1/26/67.

2/17/67 K2 back in service - New wa chamber G342, replaced ~~F244~~ ^{F244}

2/21/67 K2 ok ~~after test~~.
 Temp recorder now ok. ?

2/23/67 Log N: trace noise: appears $> 3 \times 10^{-11}$ a (03)
 below 3×10^{-11} a. trace is normal.

2/24/67 Log N: Swap K2 & Log N sensors.
 Noise still in Log N channel. Amplifier?

3-13-67

Log N channel. Remove Keithley & install
 OESL Log Y90086 Y90068 from shop.
 (Unit cal. for 10^{-13} sensitivity)
 Trace smoother. Keithley to shop.

3-14-67

Cal. Log N.

Remove worn pen reservoir from K-1 & substitute unit for
 CRM recorder (not presently in use)

3-22-67

Log N Y90068 has a touchy recorder adj. pot.

It is difficult to set recorder to correspond to
 meter deflection.

Remove Y90068 & install Y90087 (RU) after modifying -
 24% of unit Y90087 has warmed up and is calibrated. ok

5-5-67

Re-install Keithley log in rack 202 for observation check-out

5-8-67

Using K-1 Ion Chamber for signal to K-Log.

Re-activate 2-pen recorder to record K-log.

RM-2 reading 10% on recorder on operate range.

Check zero.

a. Cut off HV to tube

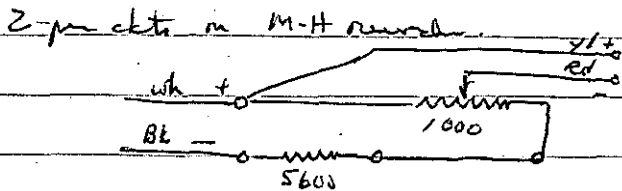
b. Range to Bkg (max. sensitivity)

c. Adj. Balance to zero from as position.

d. Re-adjust zero - showing $\approx 10\%$ in Bkg range. OK.

5/1/67

Remove 50-to divider from Wheeler recorder & install in one of



Need new rear pen

Somewhat messy on cal. parts - seems to be in recorder

Need to check tubes. Explain - after replacement unit done for a while - ?

Re-installed tubes w/out cold. ok when power on?

Level of K Hz jitter as before $\approx 10^{-10}$ / 10⁻⁹ Hz

Very sensitive to sudden transients on crossk.

⇒ Change power from unreg. & regulated - cuts down number of transients. Still getting dump valve transients.

Log. circuits

5/4/67

Adjust damping control to give more nearly normal trace.

5/1/67

RKR requests placement of K-Hz recorder (2-pm) in place of Wheeler for better observation.

Suggested supplier. There are recorders on 4/15 (RKR has driven gear or Brown amplifier to give nice clean trace.)

One prob in K-Hz pen - shows

⇒ at level ≈ 1.0 of great source reg spikes when draining out water.

When level is < 1.0 the noise does not appear ?

276

5-15-67^W

Conf. of RKR.

Will put some recorder relocation 'til later in week.

5-14-67^W

Re-locate log D recorder. Swap wheelco of M-H zone

3³⁰

RKR reports K-1 wrong

Swap input cable w/ K2 noise remains w/ K1

Suggests replacement of instrument

Log D was $< 10^{-10}$ while linear unit on machine

6-15-67^W

^{(76) K-1} Distalys Kable 410, Y124028. This unit had been in service in APR experiments. Pulled out 5/1/68

Log D trouble found to be two channels not connected to right connects at top hat.

Request possible trouble on HOPS of P1. Seems to drop when we were not setting? Not doing it today.

Request 4 50' C-A thermocouples.

6-16-67

Made up thermocouples.

6-20-67⁽⁷⁾ RKR - reports K1 again noisy (?) This is replaced unit?

6-22-67⁽⁷⁾ RKR - reports K1 noise in sens. range - Requests service.
Pulled unit Y124028 to shop.

6-26-67⁽⁷⁾ Y124028 in make as K-1 on head. Seemed improved in shop
after service.

Compare K1 & K2

a. 3×10^{-11} e/s, no input.

b. 3×10^{-12} e/s of signal

Fluctuation $\pm 2\%$

Fluctuation 2% w
occasional $\pm 5-10\%$ pop.

grass $1/2\%$

grass 1%

This is better than
before service but
not that of K2.

satisfactory - feared

Change - wiring on 2-pin recorder so that light is operated
off chart drive switch. This is way other recorders
are wired.

a. Remove blue & white leads to light from
power terminals on input block.

b. Extend leads black/red & white/gray
to terminals B & F on Purple terminal
block. OK.

6-22-67^f Log N Records (2 per)

Problem is small to standardize

b. things occasionally @ .055 on
positive periods & leaves a step or five

b. Cleaned select wire

a. Found arm on gear train had come loose. This
holds gears in place which operate on standard eyes.
Replace

Now can standardize

May have remain step problem.

6-30-67^(f) More Log N Records. Trouble.

This time on positive period the step was 2 / decade
higher.

When leveled off, did not drop with loss of signal!

Are standardizing contacts poor?

7-7-67: (P) Electrical trouble - quit lighty. PKT LPC 7 - hummed/102 out
Electricians have to look. C.D. is hot 1st J.B. is not. {Mithorn & Cutshaw}
Between upstairs hall & tunnel there is break in line.
Could it be new set damaged to conduct.

7-11-67 (P) Electricians (Mithorn & Hayes) have to work on LPC 7 1/2 hrs to
chk LPC 9 & 11. Mithorn reports load of 6a & 7.5amps
on 9 & 11.

RKR reports PMI AUPS failure. Repair.

* Power - partial failure during night 7-11/12

7-12-67 (W) Pm-2 - zero needs adjustment -
a. HV. off
b. Bkg range
c. selj. Balance to 489 OK.

K-1 Resistor sluggish:
When trips on 3×10^{12} takes long time for
signal to drop when source is removed.
(K2 has much faster recovery)

Long time constant problem here?
Adj K-1 trip point more nearly to relay trigger level.

7-26-67 (W) K-1 Extremely sluggish to source & gentle recovery. Pitted

8-2-67 S/N 180 in as K-1 amplifier V124028(?) still working.

8-3-67 Check out "M-4" liquid level transmitter.

8-7-67 RKB requests look @ PM-2.

Some questions as to whether detector suffering from shock from recent problem in SIB.

Check operation - recorder stopped when change range from B1C9 to operate? Range switch cleaned. OK

8-8-67 Installed probe to check fuel level of 20" tank in experiments in SIB.

8-14-67 Recorder on K-109 (with 2pm, user only, own pen).

No response to input signal.

Swap signal to Whelco recorder.

8-15-67: R-1 Trip: Observed trip @ 70-80% Mercur deflection. Should be > 100% to prevent just this thing happening & system trip.

→ ADJUST TRIP LEVEL - Checked - Trip point now between 125 & 140% meter full scale. ✓

3²⁵ K-109 recorder - replace all 4 tubes in amplifier power on after > 24 hours off. Response to input signal is normal - signal from Kettle to this recorder adj. sensitivity. OK.

8-16-67 K-2 Trip Level Check:

Range 3×10^{-11} Signal 1.2×10^{-11} Switch to 1×10^{-11} fs ^(10×10^{-11}) Trips MTR & VT
 " " 1.1×10^{-11} " Trips VT only
 " 1.0×10^{-11} " No trip.

Trip level @ 1.05×10^{-11} or 105% fs.

Adjust trip level - Now tripping @ $\approx 120-140\%$ fs. ok.

PM-1 Trip level check	Set SIGNAL	MTR	
	0	162 ma	
	-1.0v	158 ma	
	-2.0v	58	
	-3.0v	495	
	-4.0v	455	
	-5.0v	415	
	-5.5	40	no trip
	-6.0	375	no trip
	-6.25	360	TRIP

Trips to 6.1 v.

PM-2 Trip level	Set SIGNAL	LO MTR	LOVOLT MTR	Hi MTR	Balance
Set zero BALANCE @ 448	0 v.	1.3 ma.	0 ma	9.95 ma	
	-1 v	1.24	156 ma	9.35	31 %
	-2 v	1.20	307	8.8	62% 0"
	-3 v	1.15	455	8.3	60.5 %
					90% C

Set trip level (low) to trip @ this signal & set reset.

1.05v

Adjust trip point so that low level trip is @ level of 425 μ c on meter.

8-18-67 (F) RKR pointed out bad switch on K2 recorder.
Whenever simply touch Chart Drive switch, throw
transient on Log N channel - in same rack.

- a. Replace switch. Still transient reflection when switch operates.
b. Add three units in this rack - 2 recorders (K2 & Log) & Log Amp
are on one circuit - Controlled line.
Plug two recorders in unregulated power, leaving
Log Amp. on regulated power. ok.

8-22-67 (T) E.B.J. requested check of level probe circuit. This
probe used to indicate full 20" cylinder in series
of experiments. One of two probes on connector mounted
at top of cylinder had fallen from mount.
A check revealed this to be probe in use at the time.
To put ^{full} level indicator in operation, swapped extra sensor
leads. ok.

8-23-67 (W) EBJ: Problem: liquid level Monometer not following solution
Observation: Float of solution level $> 1/2'$ above sensor.
Sensor rising slowly (IDC had reduced lamp
intensity to minimum)
Increased gain of bal. amp. ~~to~~ Sensor speed greater.
When sensor rising top of float, adjusted gain &
checked response of sensor to level changes ok.
(5 min.)

8-23-67 (15) 2:55 P/ E.B.J.: More trouble with Liquid Level Manometer.

Observation: drive cable all off drum except at anchor point. Had pulled loose at screw tie point.⁰

E.B.J. Comment: After exp. found sensor stuck up.

Touched sensor body & it dropped to bottom - free of drive cable.

Unattended, cable drum started to drive up & did so until cable snapped off.

Re-strung drive cable. Close check showed no kinks in cable so decided to re-use it.

O.K. 3:30.

8-24-67 Trim Liquid Level Manometer gain - ^{sense} has been hanging up on drops.

9-5-67 K-2. Channel tripped - Operating @ 95% fs. - Sudden spike (pitcher) caused "scream" - Spike not in other channels? 9-7-

(Observation K-2 noise on 2×10^{12} a range is up to $\pm 8\%$ f.f.s. of $< 2\%$ at Z.)

Followups on K-2 trips: Fill tank with water (K1, K2, Lg, I.C.'s in water in tank) - at ≈ 67 cm filling got sharp transient - principally negative - on both K-2 & Lg chambers.

Drain - During drain got K-2 trip, noting very slight transient on chart. 9-2-

Fill & observe - At ≈ 67 cm got spikes. RKR noted "oil-CANNING" in tank

Drain & observe - Transient in drain cycle occurs when tank bottom snaps back. This time K-2 again tripped.

K-1 Wausy - Replace main unit, after swapper signal leads had no effect. Unit Y1200 is now K-1. After warmup - trace OK jitter $< 1\%$ drift $\approx 2\%$

9-6-67 Swap control from Well to HFIR single element tank. 9-25-

RKR reports unable to operate Dump Valve.

Note: when reset Hold light comes on immediately, without setting valve.

Trouble: Switch in 201 was in HOLD.

"Neutralized" switches in 201.

OK.

9-7-67 PM-1 HU marginal - regular 242A.

9-22-67: RKR - reports feed switch hanging in "up" position.
Adjusted contact spring for better return & lubed
rollers with Qoretrak JEC.

9-25-67: RKR reports K-1 has increased noise level
during past week & has gotten sluggish in
response. Source check shows reduced sensitivity.
Noted sluggish performance on recorder trace.
Reported to be quieter later in afternoon.

10-20-67: RKR reports - K-1 is down from now. In Sid. ? -
 - Need another housing. Screen from leaf weight
 has got cross threaded in one housing.

10-21-67: RKR reports K-2 same. Same trouble as reports out-1
 above (9-25-67) which cured by moving chamber?
 Under observation.

11-1-67: RKR - K-2 now improved - response to level changes is back to
 normal, no longer chiggish, noise gone.
 Still has chatter in a few high ranges.

Log N - noisy -

After pushing recorder pb meter & recorder began chatter
 intensity gradually damped out.
 When called in to observe recorder trace was fluctuating
 between $4 \text{ \& } 7 \times 10^{-17}$ a, period meter flippin' alternately f^-
 on ≈ 1 sec intervals.

Check calibrations - ok.

In a few minutes noise had disappeared ?

K-1 developed noise while listening Log N, $\approx 9:50$
 at 12:00 RKR says K-1 better but recorder not zeroing
 reads - 8. Adjust pot in recorder.

1:15 K-1 noisy & sensitive to switch transients

11-2-67 Don chamber in well OK. - (cont)

11-3-67 K-1 in chamber & channel switch sensitive in air (dry)?

11-7-67 Log 15 - drift of cal. points
Service & re-install

11-9-67 10:45 Call to come to West lab to observe K2

K2 initially stopped to service this date

settled out for while then sudden by rising in 10×10^{-12}
fluctuation from 30 to 50 μ A.

Tried to T signal from SG-1 to K1 & K2 amps. No Go. Interactions.

K2 gets signal.

A K2 SG-1 input @ Amplifier $\approx 10^{-12}$ A. Initial reading 1.85×10^{-12} A.

No noise present. Inst. is very responsive to switching

signal off & on K1; no input trace straight line

11:16 A K1 Signal from SG-1 (2×10^{-12}) Reads 1.2×10^{-12} A.

K2 - no input. Trace @ zero essentially straight, but with slight jitter.

11:26 C K2 Signal from SG-1 (2×10^{-12}) Reads - now - 1.0×10^{-12} A.

K1 - no input. Trace @ zero - straight line.

11:35 Disconnect signal leads to K1 & K2.

Waved power @ K2 & K1 in that order.

No response K2 μ ; K1 normal.

SG-1 to top hat disconnected in 201.

→ In removing signal lead for K2 @ top hat left center pin
in receptacle.

11-9-67 K2 channel with SG-1 @ top hat $\approx 10^{-2}$ neg. deflection
 $\approx 10^{-11}$ a good signal response
 on 3×10^{-11} a fs. range

Connect SG-1 @ top hat to K-1 line.

Readout good!

With test signal on input, switch drop valve. No effects!

→ Repair K2 signal connectors ←

K2 channel now ok.

K1 still noisy when switches thrown. No apparent open in
 ground circuit?

11/10/67 8:30 To pursue matter of noisy K1 further -
 swap signal leads @ top hat.

Now slight sensitivity to switching on each channel.

Far less severe than when K1 ~~was~~ connected as before.

Will leave connectors this way to see how channels work

11-13-67 Note log'd calibrate shift during run
to shop for service

11/15/67 Re-welded K-log after servicing.

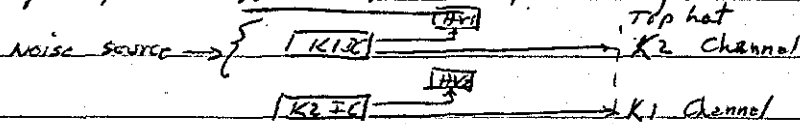
11-16-67 During operation in ^{small} cylindrical tank this week &
(low chamber suspended an air from top of tank) noise
transients have appeared in K2 channel, this
was to be expected since signal cables were swapped
11/10.

Set up for experiment in Well. Reconnect signal leads
at top hat as before 11/10 so as to have conditions as
in previous Well runs. All instruments performed
well during experiment. No transient evidence.
[This has been case in recent weeks:

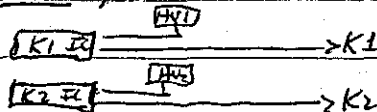
- when chambers are in air @ small tank, K-1 is
sensitive to switching transients!
- when chambers are in Well, all is quiet!]

After completion of runs in Well, I investigated further
noise problem.

Recaps 11/10-15 Noise on K2 readout, monitoring small tank



11/16 No Noise, all chambers in Well, off floor, on water.



11-12-57 K1 noisy - not due to scratch operation?

3:16⁴ after run, average signal leads @ amplifier 202.

noise remains on K1 recorder. This is average

3:23⁴ Signals back to normal -

3:25⁴ K1 changed from EP to CV power.
may be slight improvement.

3:45 All chambers on floor behind Well.

Sig on K2 appears too quiet only 20% deflection
when source near (3×10^{-12} average) $\begin{matrix} ? \\ 0 \\ 0 \end{matrix}$

K1 $\frac{1}{2}$ by chamber response to source.

3:50⁴ same signal lead at amplifier K1 needed to match
to source, but grossly $\frac{1}{2}$

\therefore Source sensitivity problem in cable in 201.

Re check Monday.

11/20/57 Check response to source

K1 (3×10^{-12}) trip -

K2 (3×10^{-12}) 15%

STILL PROBLEM w/ K2

Switch SIGNAL LEADS AT TOP HAT -

K2 [K1 I.C.] (3×10^{-12}) trip \checkmark

K1 [K2 I.C.] (3×10^{-12}) $\approx 20\%$, then off scale $\frac{1}{2}$ trip, when source
withdrawn, level still off scale?

Remove K2 chamber from housing.

292

Check Feathly response.

11/20/67

With K2 chamber removed, note that the connections appear to be good. (Also no evidence of seal leakage).
Still getting only 25% deflection on 3×10^{-12} with source.

Check center pins - Getting 600v HV - pins look ok.

Try replacement chamber. Now normal response
Replacement is $\$340$. Unit removed $\$342$.

Install $\$340$ in housing. ok.

K1 seems to be ok on 3×10^{-12} . Jitter on trace only 2% range
on 100 am $\frac{1}{2}$ %

11-22-67: Outside gate switch - Seem that lever hangs occasionally. Give shot of liquid wrench. RKR to get Garrison make new stop. This may help.

11-27-67 RKR - reports K1 noisy again - hanging in air by side of small cylindrical tank.

11-28-67 Connect arkhite plugs to end of cables to Well water pump & changing @ small cyl. tank reservoir of wire receptacle. (M. Garrison had mounted receptacle on contacts box 11/26)

11/28-12/1 Area clean-up & decontamination -

12-5-67 RKR - reports that both K channels were noisy when checked longer in air by small tank. K2 very loud, unable to keep in 2×10^{-12} range so noisy?

12-6-67: K2 quiet as a mouse!?. K1 sensitive to remote switching. K2 response same as 18% (3×10^8) see 11/27/67 ^{opposite} ~~page~~ sheet page. This channel (9340) essentially new. Check system with

~~12-7-67~~ different arrangements of components.

Sensor	Plugs	Top hat Conn	Amplifier/Recorder	Response
K ₁	K ₁	K ₁	K ₁	switch sens.
K ₂	K ₂	K ₂	K ₂	to source response
K ₁	K ₁	K ₂	K ₂	switch sens
K ₂	K ₂	K ₁	K ₁	to source response

Transient noise & poor response go with sensor/batt combination.

11/20 - 11-7-67

After SG-1 tests on top hat, re-attached Sensor $K_1 \rightarrow K_1 \neq K_2 \rightarrow K_2$
RKR reports different background pattern on re-attach.

$K_1 \rightarrow K_1 \rightarrow K_1 (3 \times 10^{-2})$ jitter 3-4%, lower than earlier

A. transient seen.

$K_2 \rightarrow K_2 \rightarrow K_2 (3 \times 10^{-2})$ JITTER 10-15%, much higher than earlier.

Swap signals @ 201.

B. $K_1 \rightarrow K_1 \rightarrow K_2$ JITTER $< 1\%$ This is odd?

$K_2 \rightarrow K_2 \rightarrow K_1$ JITTER 2%

When switch back get reproduction of effect noted above (A)

10135 $K_2 \rightarrow K_1 \rightarrow K_2$ JITTER $< 1\%$

B repeat $K_2 \rightarrow K_2 \rightarrow K_1$ JITTER 2%

Try amp S/N 180 on K1 with K2 signal - Noise $\Rightarrow 20\%$
Even way of K1 sensor. S/N 180 not fit replacement.

$K_2 (426028)$ removed to shop to see if can find cause of sluggish response.
S/N 180 back to shop also.

$K_1 \rightarrow K_1 \rightarrow K_2$ with main transient seen?

$L_{01} \rightarrow L_{02} \rightarrow L_{03}$ with main OK

Found K1 sensor in same position but with CEASE as suggested
not tank which is consistent w/ plumbing there which there may
be a bracket.

No transient on K1/2 channel now. Transient noise is mechanical.

12-26-67 Sweep. K1 & K2 by Summers @ top hat.

Also both indicate transient sensitivity.

RKR decided to leave them this way.

8:00 Log A trace on star log papers level 203 \pm .001 series of steps.
Increased gain of Log A Recorder.

12-28-67: Y124028 on bank 210. also w/ SW 180

seems to no longer show stepped characteristics?
refer to R7c folders.

12-25-67 9:10 A Keithley ⁴¹⁰ unit SW 180 from shop to 202 to try as K-1 channel.

SIGNAL ATTACHED K1 lead - this had been connected to K2 channel.

On 3×10^{-12} a.f.s. range signal level $\pm 15\%$ with spread of only 1% .

This is very good. Source response good, Recovery good.

Note high level on K2 channel. This chamber has had lead inter-mixing for week.

At start reading 35% on 10×10^{-11} or $\pm 3.5 \times 10^{-11}$ a.

source intermittent up to 5×10^{-11} or 1.5×10^{-11} difference

After 8 minutes - 2.3×10^{-11} level & sound of 4.7 1.9×10^{-11} a.f.s.

Chamber had been switched at top hat.

9:15 Connect K1 \rightarrow K1 \rightarrow K1

K2 \rightarrow K2 \rightarrow K2

Log \rightarrow Log \rightarrow Log

9:20 K2 level still high $\pm 2 \times 10^{-11}$ a.

K2 in re-worked housing - was a water tank.

12/12/67 11⁰⁵ K2 level now 6×10^{-12} . This dropped from reading @ 9:20.
 Still using a 10×10^{-12} range - kept out of trip

12-18-67 8³⁰ K2 Just range now normal:
 On 3×10^{-12} a.s. - reading 18% $\pm 0.5 \times 10^{-12}$
 Titter, or square less than 1% ✓

12-19-67 8¹⁰ K2 RKR reports this instrument channel was noisy again late in afternoon of 18th.
 Check now. Still noisy. Swapped inputs at amplifiers to see if problem was still front end. Noise transferred. ∴ This is in input - not electronics.
 Checked battery box. Measured 600V & gave ok.
 → Tried another good box. ←
 Now noise is gone - ✓

12/20/67 K2 RKR - reading negative on 3×10^{-12} range. ?
 Does respond to source 5' trip (with source in cabinet)
 Look @ housing - slight lead around signal lead in
 Note nut not down as far as HV packing nut.

Replace IC & Cable of housing.
 G 342 out - G 340 in [This & its cable have responded well in 210 since removal on 12/6]

298

12/21/69 Walth G340 w housing response prior to source.
only 50% fs. with source in contact (3x10⁻¹² etc)
took chamber out of housing
→ Now response better ³⁰
leave G340 & cable in circuit w/o housing
hanging outside tank.