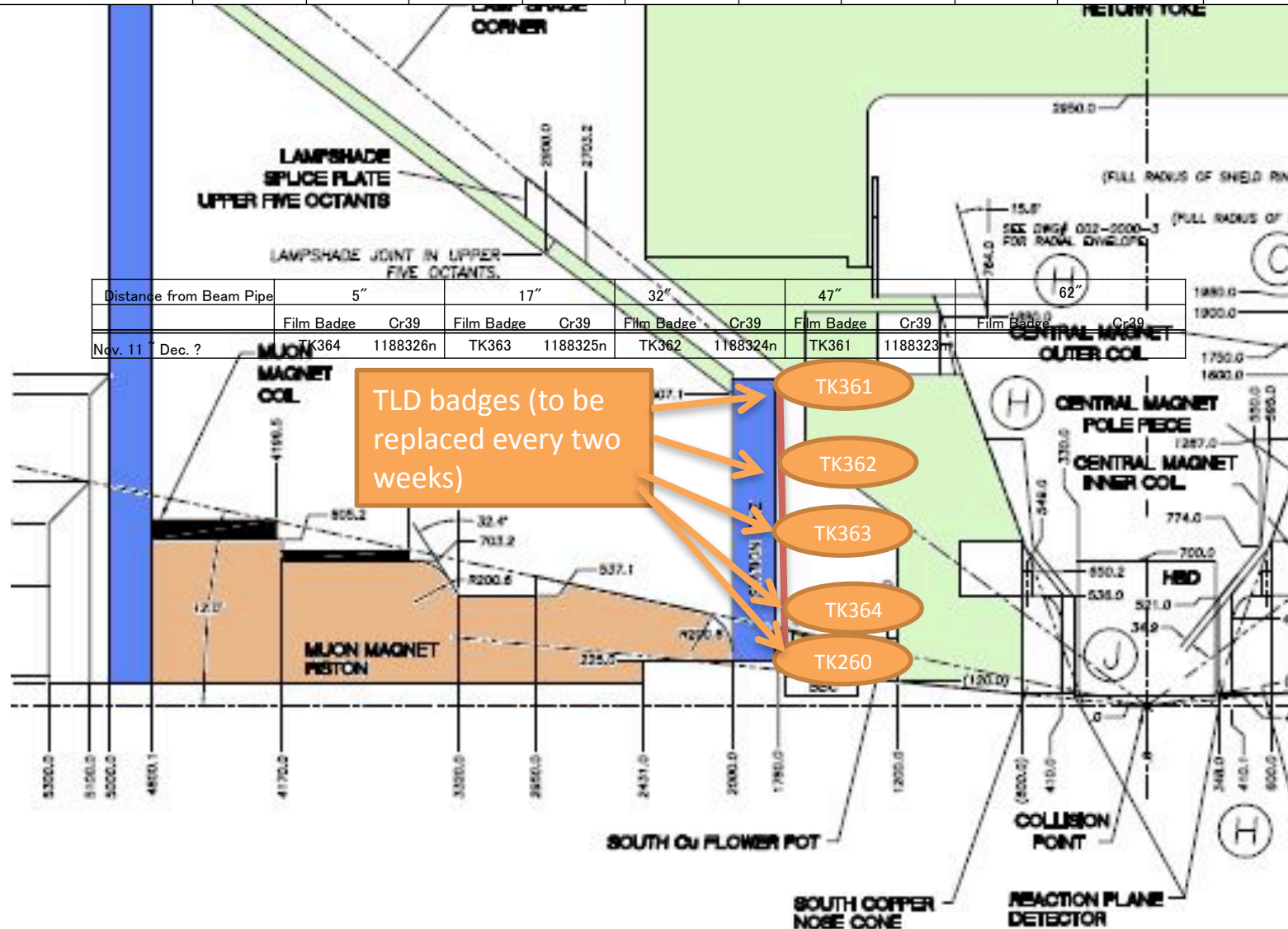


TLD Measurement Analysis Results

Itaru Nakagawa
RIKEN/RBRC

Location of dosimeters in MuTr.S St.1 (Nov.20 ~ Jan.13)

Distance from Beam Pipe	5"		17"		32"		47"		62"	
	Film Badge	Cr39	Film Badge	Cr39	Film Badge	Cr39	Film Badge	Cr39	Film Badge	Cr39
Nov. 30, 2009 ~ Jan. 13, 2010	TK364	1188326n	TK363	1188325n	TK362	1188324n	TK361	1188323n	TK260	1188312n



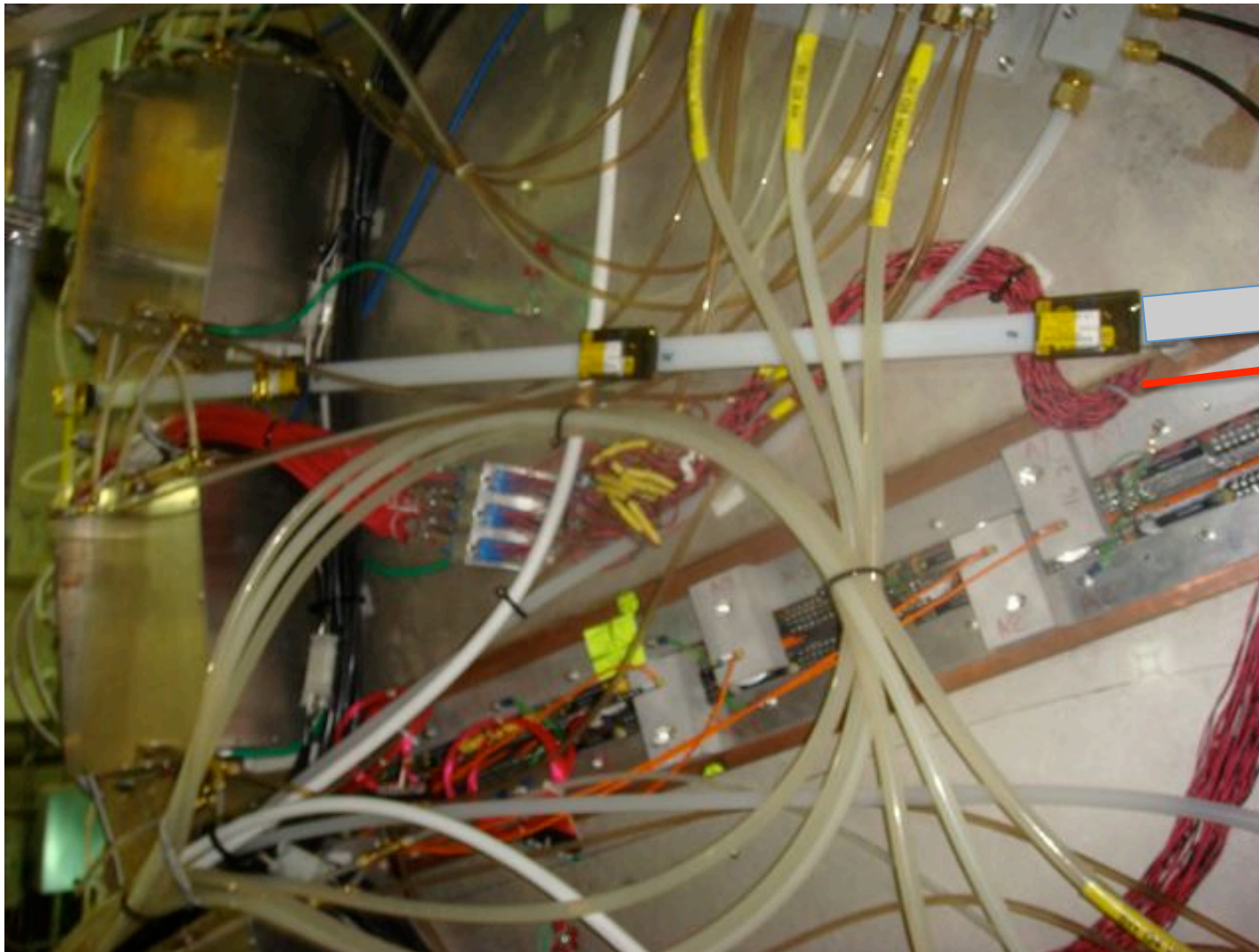
Dosimeter Install



CR39
TLD

All TLD badges are facing IP, not beam pipe

Dosimeter Measurement



TLD Analysis Results

TEST DOSIMETRY WORKSHEET

Requestor(s): Paul Bergh

Phone No: 5992

Beeper No: - na -

Account # 18014

Badge Type:

8814/A

Prepared By:

Gerry Townsend

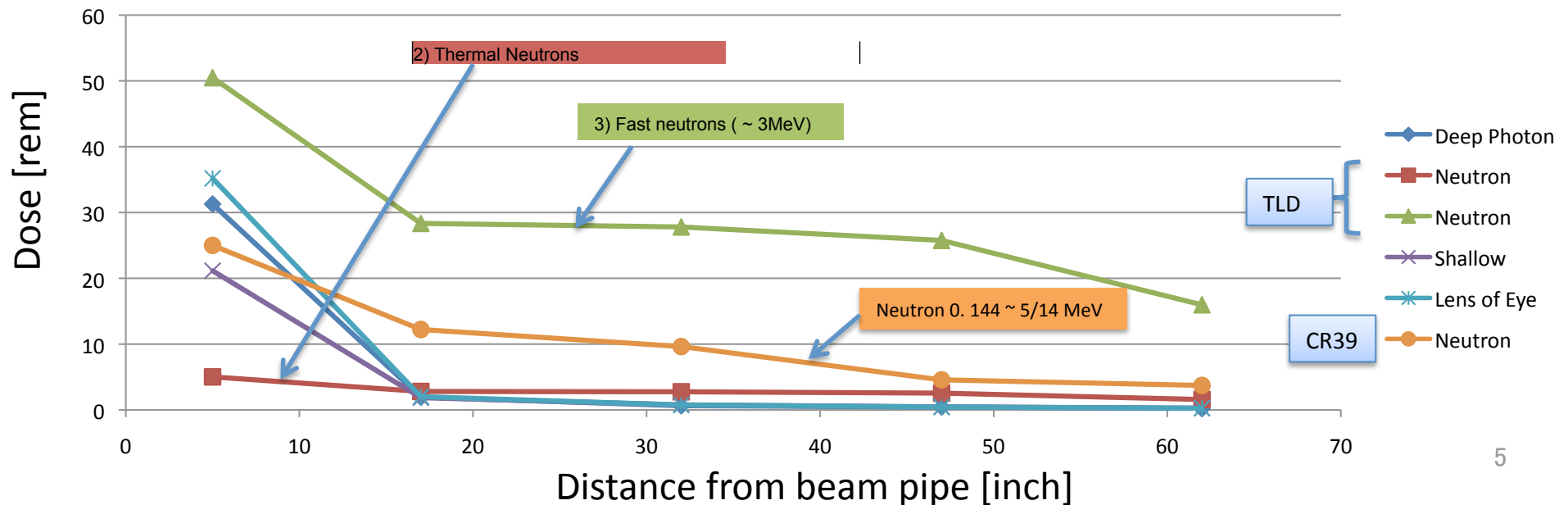
Date Issued: 1.13.2010

BADGE ID NO.	PROCESS ID NO.	DATE RETURNED	Distance [in]	DOSE RESULTS (rem)						NOTES	
				Deep Photon	Neutron from TLD (remark #2)	Neutron from TLD (remark #3)	Shallow	Lens of Eye	Neutron from CR39		
										TLDC#	CR39 ID#
TK356	#1002320	1.27.2010	62	0.208	1.582	15.97	0.268	0.270	3.720	7015804	1307309n
TK357	"	"	47	0.450	2.552	25.76	0.471	0.440	4.570	7011830	1307311n
TK358	"	"	32	0.639	2.756	27.80	0.770	0.758	9.630	7010538	1307313n
TK359	"	"	17	1.944	2.806	28.34	1.862	2.017	12.220	7015624	1307314n
TK360	"	"	5	31.28	5.017*	50.49*	21.15	35.187	>25**	7000804	1307315n
TK361	UNUSED	----		----	----	----	----	----	----	7010140	1307316n

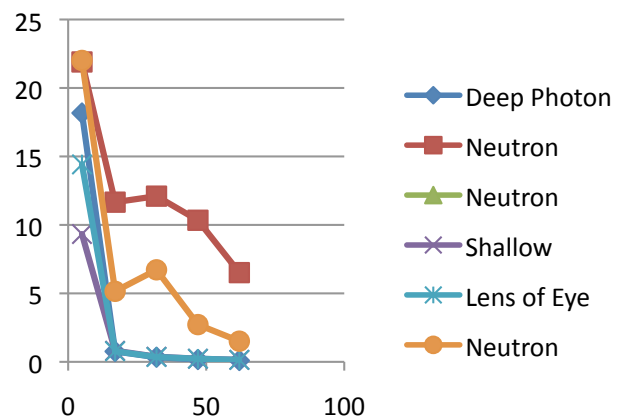
The CR 39 is used for measuring neutron with energies up in the 10s of MEV. The 8814 TLD measures neutron dose with energies up to a couple of MEV. The Deep Photon Dose is gamma. The shallow and lens are typically used to measure skin and eye dose, typically from beta dose.

saturated

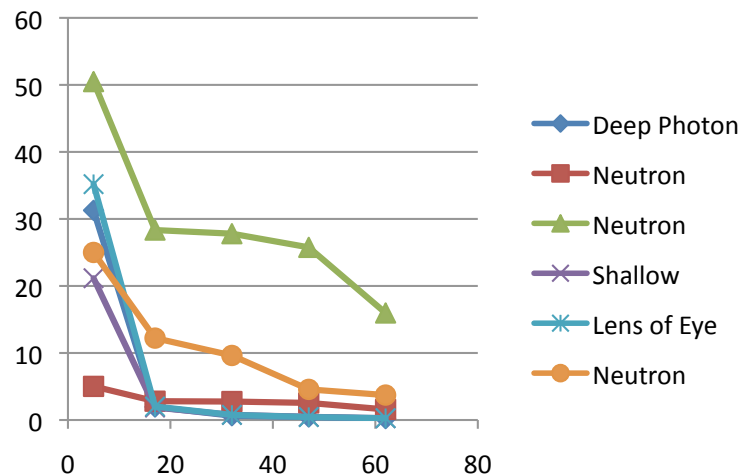
TLD measurment 1/13 ~ 1/27



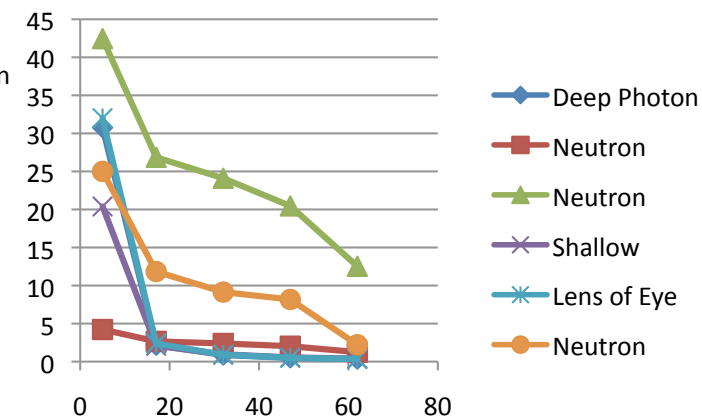
**TLD measurement
11/30 ~ 1/13**



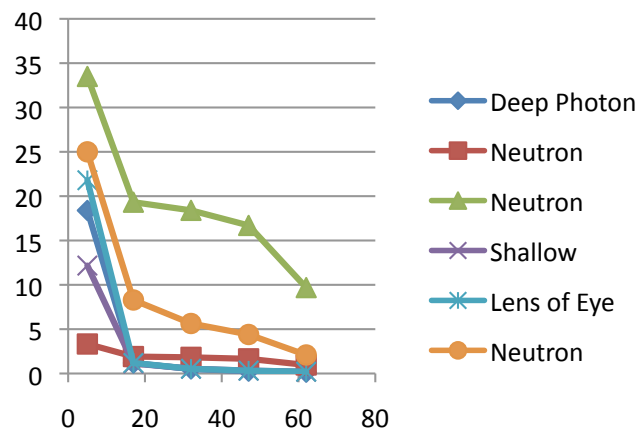
TLD measurment 1/13 ~ 1/27



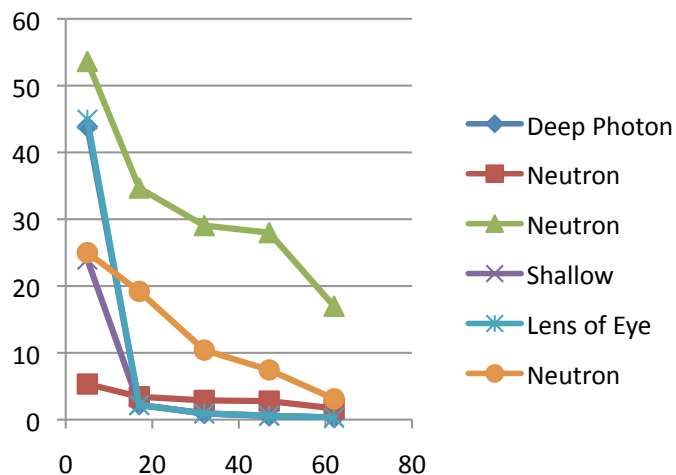
**TLD measurement 1/27 ~
2/12**



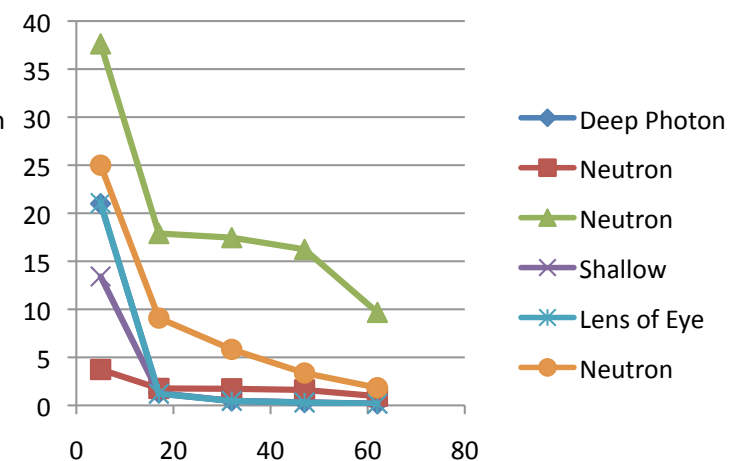
**TLD Measurement 2/12 ~
2/24**



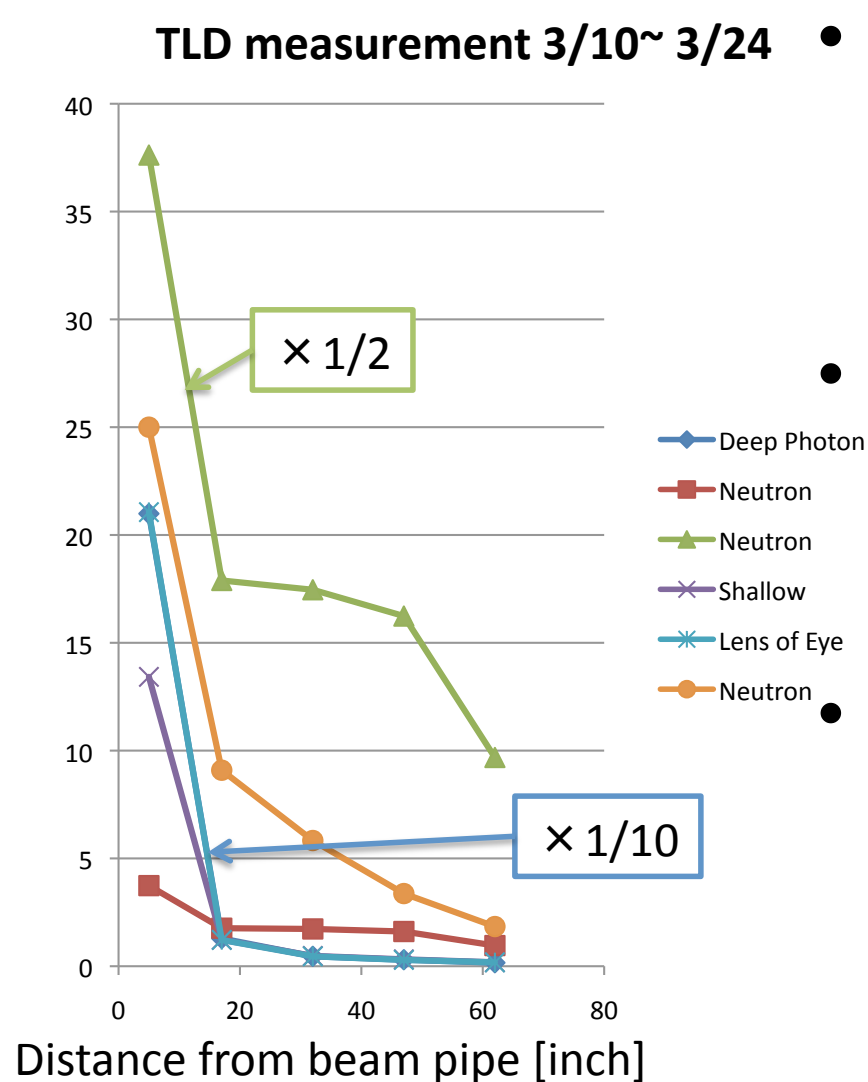
**TLD Measurement 2/24 ~
3/10**



**TLD measurement 3/10~
3/24**



Lessons from Au-Au



- beta&gamma follows exponential curve as a function of distance from beam pipe
- Neutron follows much shallower dependence, but typically gets $\frac{1}{2}$ from 6" to 12"
- Can be one indication that neutron shield in piston hole could be effective

Dose -> Neutron Flux

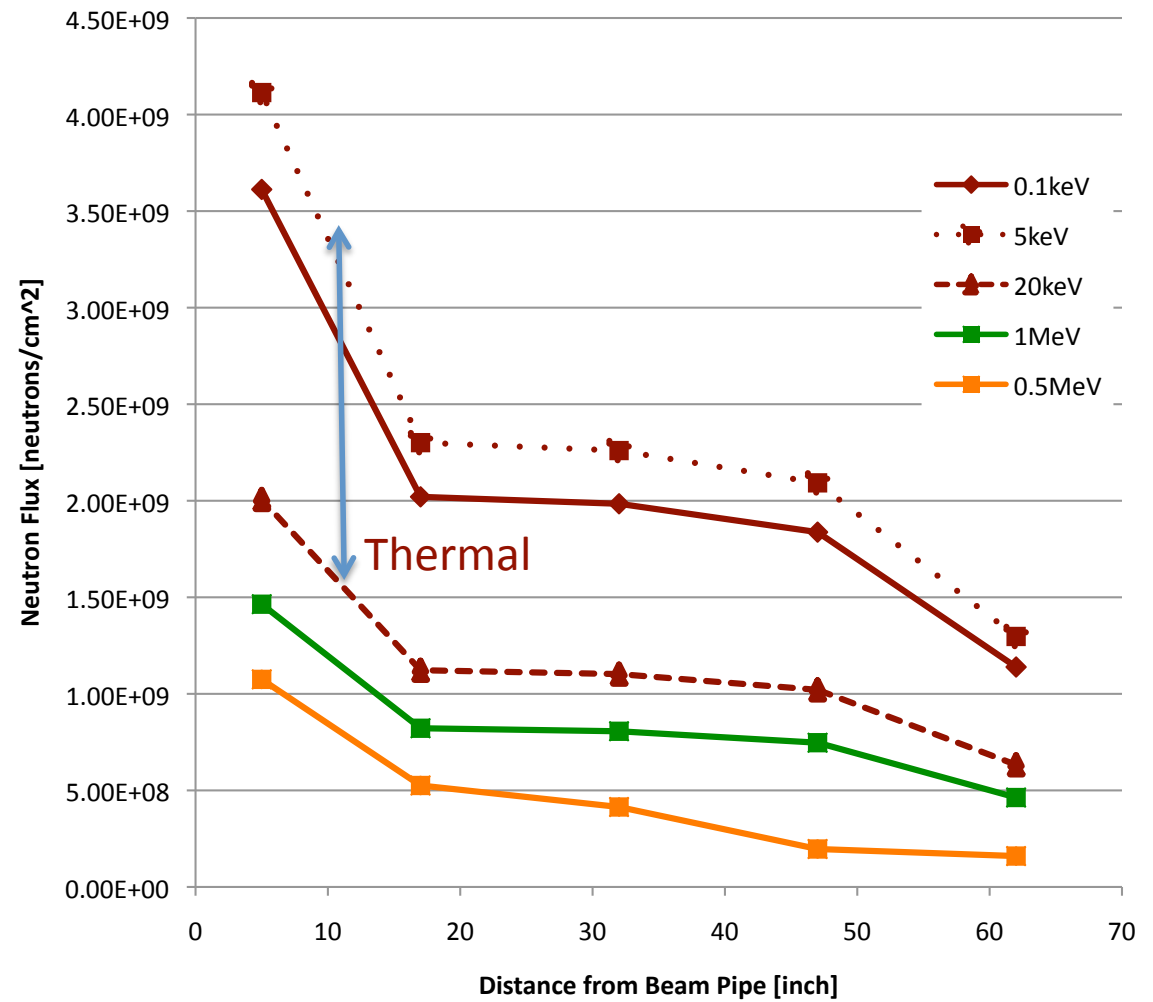
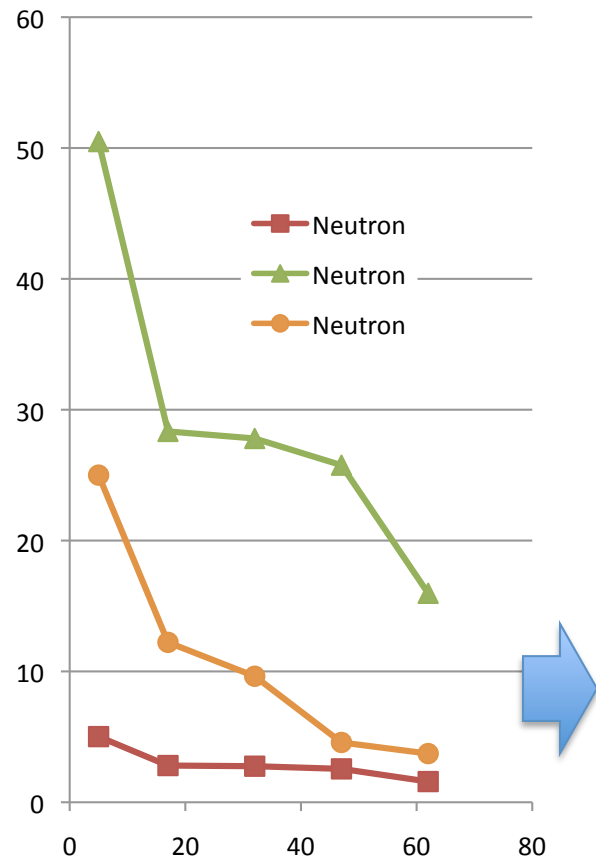
Table 2-3. Neutron Flux Dose Equivalents

Neutron energy (MeV)	No. neutrons per square centimeter equivalent to a dose of 1 rem (neutrons/cm ²)	Average flux to deliver 100 mrem in 40 hours (neutrons/cm ² per second)
Thermal	970 x 10 ⁶	680
0.0001	720 x 10 ⁶	500
0.005	820 x 10 ⁶	570
0.02	400 x 10 ⁶	280
0.1	120 x 10 ⁶	80
0.5	43 x 10 ⁶	30
1.0	26 x 10 ⁶	18
2.5	29 x 10 ⁶	20
5.0	26 x 10 ⁶	18
7.5	24 x 10 ⁶	17
10	24 x 10 ⁶	17
10 to 30	14 x 10 ⁶	10

2-11

Neutron Flux

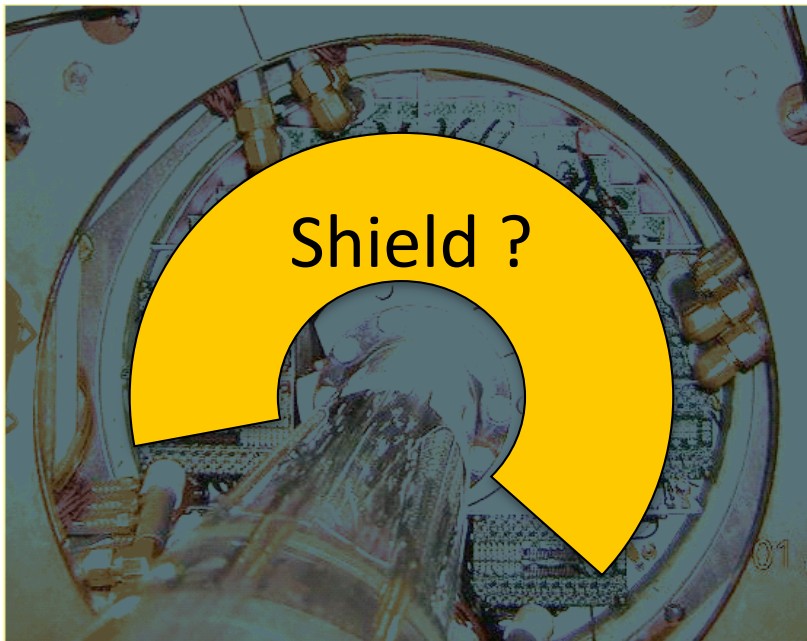
TLD measurment 1/13 ~ 1/27



Backup Slide

Summary

- Indication of higher neutron flux inner radius
- Look for another portable neutron detector with different dynamic energy range from CR39
- Extend measurement into Pison hole
- Possible neutron shield in poston hole



Analysis Results from Past Analysis

TLD Badge Analysis Result (~Jan.13)

