U.Holm, Nov. 13, 2000

ZEUS radiation background

- Regular measurements of doses behind F/RCAL near beam pipe with thermoluminescence dosimeters (TLD) (FCAL: x=15 cm, y=0, z=445 cm. RCAL: x=15 cm, y=0, z=-298 cm).
- TLDs are retracted with calorimeter halves during injection.
- Pairs of TLD600/TLD700 allow separate estimation of γ and n doses.
- DU contribution (only when calorimeter open): 1 mGy/d.

TLD doses 92-2000; FCAL, γ:

- Dose rates became stable in 96/97 despite increase of lumi 'rate'.
- Strong increase of dose rate from '97 to '98 (installation of FPC and repositioning of collimators).
- Further increase from '99 to '00.
- Dose/lumi ratio increases from '97 to 2000 by factor 12.5!
  The dose/luminosity ratios are (mGy/pb^{-1}):
  1997: 68; 1998: 690; 1999: 355; 2000: 855.

TLD doses 2000; FCAL, γ:

During 2000 dose rate rather constant except in last period (machine studies!).

FCAL, neutron:

Similar development. TLD600 are calibrated for thermal neutrons. If n in detector are fast, as expected, ordinate scale has to be multiplied by factor about 6.

TLD doses 92-2000, RCAL:

Behind RCAL both γ and n doses rather small since beginning.

/home/x4u2/u02/holm/cal_rad_doses/accu.ps

TLD DOSES 1992-2000

γ background at **FCAL**					
year	days d	dose/year mGy/a	dose/day mGy/d	total days d	acc. dose mGy
1992	268	244	0.9	268	244
1993	256	1010	3.9	524	1254
1994	254	1222	4.8	778	2476
1995	265	1416	5.3	1043	3892
1996	222	1877	8.5	1265	5769
1997	287	2511	8.7	1552	8280
1998	206	7035	34.1	1758	15315
1999	295	16409	55.6	2053	31724
2000	236	57278	242.7	2289	89002
γ background at **RCAL**					
1992	268	137	0.5	268	137
1993	256	301	1.2	524	438
1994	254	1112	4.4	778	1550
1995	265	2276	8.6	1043	3826
1996	222	1346	6.1	1265	5172
1997	287	1389	4.8	1552	6561
1998	206	859	4.2	1758	7420
1999	295	1362	4.6	2053	8782
2000	236	895	3.8	2289	9677
neutron background at **FCAL**					
1992	268	156	0.6	268	156
1993	256	3941	15.4	524	4097
1994	254	626	2.5	778	4723
1995	265	1325	5.0	1043	6048
1996	222	1588	7.2	1265	7636
1997	287	2219	7.7	1552	9855
1998	206	2444	11.9	1758	12299
1999	295	3764	12.8	2053	16063
2000	236	33589	142.3	2289	49652
neutron background at **RCAL**					
1992	268	66	0.2	268	66
1993	256	88	0.3	524	154
1994	254	190	0.7	778	344
1995	265	299	1.1	1043	643
1996	222	206	0.9	1265	849
1997	287	269	0.9	1552	1118
1998	206	223	1.1	1758	1341
1999	295	184	0.6	2053	1525
2000	236	168	0.7	2289	1693

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/home/x4u2/u02/holm/cal_rad_doses/2000.ps

TLD DOSES 2000

TLD exch. date	days d	dose/period mGy/period	dose/day mGy/d	total days d	acc. dose mGy
γ background at **FCAL**					
12.1.00				0	0
7.3.00	55	5427	98.7	55	5427
4.4.00	28	5550	198.2	83	10977
2.5.00	28	7846	280.2	111	18823
6.6.00	35	8989	256.8	146	27812
4.7.00	28	6628	236.7	174	34440
1.8.00	28	7614	271.9	202	42054
4.9.00	34	15224	447.8	236	57278
γ background at **RCAL**					
12.1.00				0	0
7.3.00	55	167	3.0	55	167
4.4.00	28	99	3.5	83	266
2.5.00	28	105	3.8	111	371
6.6.00	35	131	3.7	146	502
4.7.00	28	184	6.6	174	686
1.8.00	28	136	4.8	202	822
4.9.00	34	73	2.1	236	895
neutron background at **FCAL**					
12.1.00				0	0
7.3.00	55	1113	20.2	55	1113
4.4.00	28	3606	128.8	83	4719
2.5.00	28	3041	108.6	111	7760
6.6.00	35	4295	122.7	146	12055
4.7.00	28	3294	117.6	174	15349
1.8.00	28	5416	193.4	202	20765
4.9.00	34	12824	377.2	236	33589
neutron background at **RCAL**					
12.1.00				0	0
7.3.00	55	19	0.4	55	19
4.4.00	28	15	0.5	83	34
2.5.00	28	13	0.5	111	47
6.6.00	35	16	0.4	146	63
4.7.00	28	22	0.8	174	85
1.8.00	28	68	2.4	202	153
4.9.00	34	15	0.4	236	168