

Subject: Re: Data from QF measurements

Date: Tue, 25 Apr 2000 17:06:51 -0500

From: Tony Leveling <hamburg@fnal.gov>

To: Kamran Vaziri <vaziri@fnal.gov>

CC: Frederick Krueger <fkrueger@fnal.gov>, "John A. Larson Jr." <jal@fnal.gov>, "James P. Morgan" <jpmorgan@fnal.gov>, "Elvin R. Harms Jr." <harms@fnal.gov>, "David P. McGinnis" <mcginnis@fnal.gov>

Hi Kamran,

The chipmunk we used to normalize the berm data was sitting at the same location for the quality factor measurement as the central detector was sitting in the peak determination measurement. The dose rate normalized to  $3.6E13$  p/h assuming a quality factor of 5 was 1.3 mrem/hr in both cases. My guess is that in spite of the fact that the ground was very wet when we did the measurement, the thickness of the shield which was saturated is small compared to the total shielding thickness. Also, the hydrogen density in the "wet" vs. "dry" layers may not be much of a factor, especially if there aren't many neutrons remaining in the shower at that shield depth.

The good news is that the actual dose rate is somewhere between 0.26 and 0.52 mrem/hr in the accident condition. Since it is less than 1 mrem/hr, no posting or fencing is required on the Accumulator/Debuncher berm for the accident condition.

I think the higher quality factor in the service building can be attributed to two synergistic factors: 1. the backfill used between the tunnel and service building floor is gravel which (I believe) has a low moisture content compared to earth, and 2. the shield is 3 feet thinner in the service building. The peak dose rate in the service building considering that the QF is 5.7 is 25 mrem/hr. We ordinarily claim that 3 feet of shielding give a reduction factor of 10. Simple scaling of the dose rate between A2B7 and ELAM ( $25/.26$ ) gives a factor of nearly 100. . . food for thought.

Thanks again for your support in making the measurement, especially considering the difficult circumstances.

Tony

Kamran Vaziri wrote:

>

> Hi Tony,

> Recombination chamber results for AP30, normalized

> to the Chipmunks at each location give the following

> Quality factors;

>

> Outside on AP30 berm =  $1.0 \pm 100\%$

>

> The large uncertainty is probably to the berm being saturated

> w/water and very little (if any) neutrons leaked out, and the

> gammas were also attenuated further.

>

> I would be interested to know what the Chipmunk counts per

> proton rate was, when you measured ~1.3 mrem/hr.

>

> Inside AP30 Service Building(at D3?) =  $5.7 \pm 20\%$

>

> Please let me know if you had any questions.

> Kamran

>

> On Fri, 21 Apr 2000, Tony Leveling wrote:

Attachment 3

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>
> > Hi Fred, John, and Kamran,
> >
> > Here is the data from last nights QF measurements:
> >
> > Accumulator ELAM
> >
> >           total counts    total protons    counts/1E10 protons
> > Run 1 65 V      142.5      3.49706E+11      4.07
> > Run 2 65 V      167.5      4.15119E+11      4.04
> > Run 1 1200 V   155.5      3.85412E+11      4.03
> > Run 2 1200 V   153.5      3.85712E+11      3.98
> >
> >
> > A2B7
> >
> >           total counts    total protons    counts/1E10 protons
> > Run 1 65 V      83.7      5.74E+12          0.15
> > Run 2 65 V      79.7      5.58E+12          0.14
> > Run 1 1200 V   77.7      5.31E+12          0.15
> > Run 2 1200 V   80.7      5.52E+12          0.15
> > Run 3 1200 V   77.7      5.38E+12          0.14
> > Run 4 1200 V   79.7      5.46E+12          0.15
> >
> > It took an extremely long work day yesterday/today under nasty weather
> > conditions to complete the measurements. We really appreciate your
> > support.
> > Thanks!
> > Tony
> >
> >

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Attachment 3