From: Kin Yip [kinyip@bnl.gov]
Sent: Tuesday, October 14, 2008 10:55 AM
To: Ahrens, Leif A
Cc: Beavis, Dana; Karol, Raymond C; Brown, Kevin A; Glenn, Joseph W; Pendzick, Alexander F; Lessard, Edward T
Subject: Re: BTA dumping
Attachments: btatest.txt

Hi Dana,

So, I have the 1 ft x 1 ft x 1ft steel block at 8 ft from the circular AGS wall. (Dana, I attach the MCNPX input tilfe "btatest" so that you may see how I smartly use a piece of "rcc" to model the AGS arc ...
I can explain if you don't understand.) In forward direction of the beam, the distance between the AGS wall and the block is ~25 m -- my geometrical calculation agrees with MCNPX's (by checking the geometrical plot myself).

Anyway, the AGS wall is 14 inches as Dana told me. I put some ~50 cm of soil behind the wall (but I only use 10 cm actually).

I've put "detectors" at the side (90 deg.) and in the forward area 10 cm behind the AGS wall. It's "10 cm" so that it's not right at the concrete wall and soil boundary. Proton is 1.4 GeV.

Anyway, at the side (8 ft + 14 inches + 10 cm), the flux is 3.92E-7 per cm^2 per proton (error of 8.3%) ;
and in the forward (>25 m away), it's 2.16E-11 (15.31%) .

But anyway, it's the 3.92E-7 which is more significant. (The 25 m is long enough disperse things after the beam hit the center of the steel block ....)

From the standard BNL leaching model, Na-22 is the limiting factor and it allows only 1.065E6 atoms/cc per year ==>

1.065E6 = (flux / interaction_length) * 0.02 * N_proton_allowed

If I put in interaction_length = 39 cm (a no. I used last time) and the above flux 3.92E-7, I'd get :

5.3E15 protons !!

I'm running more (in the IBM BlueGene ...) but I don't think it'd change (without changing any assumption).

Kin

Ahrens, Leif A wrote:
> 1x 10e11 per cycle
>
> -----Original Message-----
> From: Yip, Kin
> Sent: Monday, October 13, 2008 7:54 PM
> To: Beavis, Dana
> Cc: Karol, Raymond C; Brown, Kevin A; Ahrens, Leif A; Glenn, Joseph W;
> Pendzick, Alexander F
> Subject: Re: BTA dumping
>

> Hi Dana,
>
> The result comes quick (I'm using the 8 feet distance between the
> steel block and the AGS wall) ... It seems that the nos. are easy to
> come without too much statistics ...
>
> So, how many protons are we talking about ??? Can someone tell ?
>
> Kin
>
> dana beavis wrote:
>
>> Kin will setup a 1 foot cube block in the forward direction and see
>>
> what
>
>> MCNPX gives for the transverse and forward flux into the soil . I
>> told
>>
> him
>
>> to use a kinetic energy of 1.4 GeV.
>>
>> dana
>>
>> -----Original Message-----
>> From: Karol, Raymond C [mailto:karol@bnl.gov]
>> Sent: Monday, October 13, 2008 1:57 PM
>> To: Beavis, Dana; Brown, Kevin A; Ahrens, Leif A
>> Subject: RE: BTA dumping
>>
>> I am free all afternoon but I need a short discussion on the details
>> since I have been following this from afar.
>>
>> Ray
>>
>> -----Original Message-----
>> From: Beavis, Dana
>> Sent: Monday, October 13, 2008 1:53 PM
>> To: 'Kevin Brown'
>> Cc: Karol, Raymond C; Ahrens, Leif A
>> Subject: RE: BTA dumping
>>
>> I am here all afternoon. I do not know Ray's schedule.
>> Send an e-mail with the time etc.
>>
>> dana
>>
>> -----Original Message-----
>> From: Kevin Brown [mailto:kbrown@bnl.gov]
>> Sent: Monday, October 13, 2008 12:48 PM
>> To: dana beavis
>> Cc: kbrown@bnl.gov; 'Karol, Raymond C'; 'Ahrens Leif'
>> Subject: Re: BTA dumping
>>
>> Hi Dana,
>>

>> Can we meet this afternoon, after lunch?
>>
>> Thanks,
>> Kevin
>>
>> On Mon, 2008-10-13 at 11:05, dana beavis wrote:
>>
>>
>>> Kevin,
>>>
>>>
>>>
>>> I looked at the numbers for BTA dumping.
>>>
>>> I assumed the beam has P=2.1 GeV/c so Ek= 1.36 GeV
>>>
>>> I used the neutron fluxes given by Alan Stevens in a tunnel surround
>>> by dirt with a radius of 5 feet for the tunnel. The target is a 3cm
>>> steel rod 1 meter long, which was to represent an optimized target.
>>>
>>> I then scaled to 9 feet to the soil outside the concrete of the
>>> tunnel.
>>>
>>> My memory is the tunnel wall is 14 inches about equivalent to 44 cm
>>>
> of
>
>>> soil.
>>>
>>> I scaled Alans numbers from 60 depth of soil.
>>>
>>>
>>>
>>> The BNL soil limit (5% of the DWS) would correspond to 1.7*10**15
>>> protons lost. At 10**11 every 2.5 second this is 11 hours.
>>> Typically we try to have special tests be at 10% of the BNL limit.
>>>
>>>
>>>
>>> Comments:
>>>
>>>
>>>
>>> When I look at the present layout it appears that the beam does not
>>> hit anything solid.
>>>
>>> This imples a long distributed source so the soil concentrations
>>>
> could
>
>>> be much lower.
>>>
>>> On the other hand the tunnel turns and the neutrons in the forward
>>> direction and the beam eventually strike the wall. I forget the
>>> radius of the AGS but we would probably need to estimate this.
>>>
>>>

>>>
>>> The other way is to get the beam to strike somewhere well defined.
>>>
>>>
>>>
>>> Probably we should have a small group go over this and see if we can
>>> have a plan.
>>>
>>>
>>>
>>> dana
>>>
>>>