Target Ideas

R. Palmer 2/10/01

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The following sketches represent my current thoughts.

Fig (a) shows the intersection of Hg jet and beam. This differs from earlier assumtions in that The Hg jet and beam have been interchanges, as suggested by Nikolai, on the assumption that it will increase production. It also seems to have advantages in getting the falling debris from the jet out of the way and into some system of baffles designed to slow and capture it before it blows the mercury out of the pool.

The jet is shown truncated at z=0 which is where the new 30 m/sec jet will have reached in 20 msec on the assumption that the previous beam puls had fully disrupted the jet all the way back to the nozzle. If it is found that that part of the jet prior to its intersection with the beam is not disrupted, then the jet velocity would be lowered to 20 m/sec and again the limit of undisturbed jet will be at z=0 after 20 msec.

Note that the jet nozzel is recessed into the shielding, and is thus partially shielded from radiation.

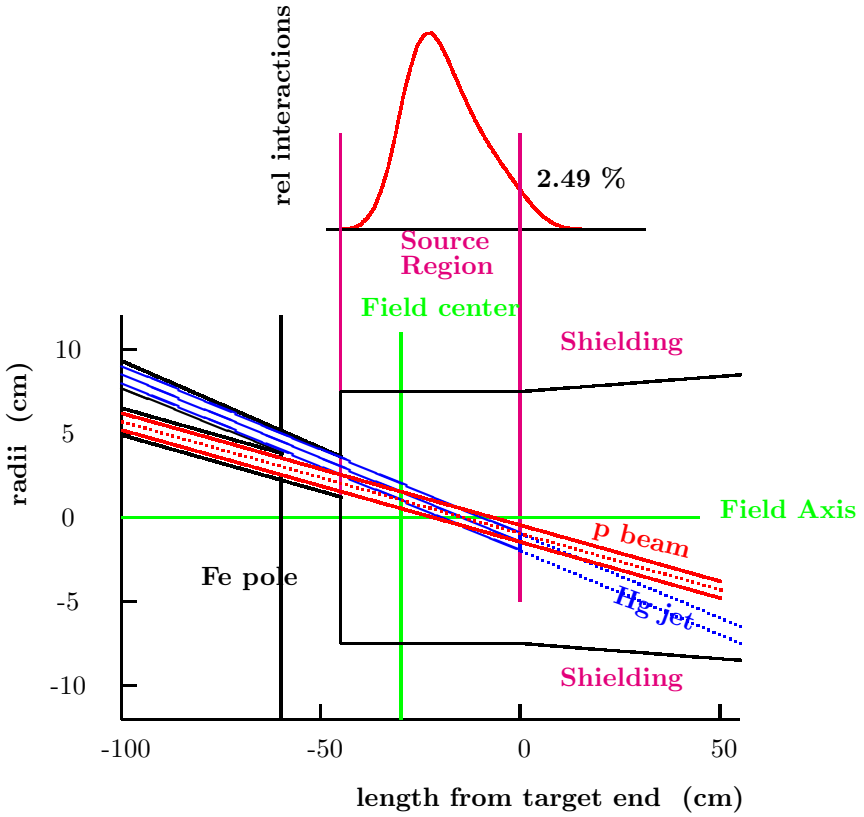


Fig b shows the mercury containment and beam dump mercury pool. In order to remove this continment, the hollow conductor coils must also first be removed, and then separated from the containment when outside the other coils. Note that the mercury jet, or what remains of it, will fall under gravity, and thus further separates from the beam axis. A system of baffles is introduced to slow the mercury spray before it joins the beam dump mercury pool. Note that the outflow pipe must be quite large (it is drawn as 10 cm diameter) in order to take the considerable rade of filling from the jet. The drain would only be opened when emptying the contaiment for its removal.

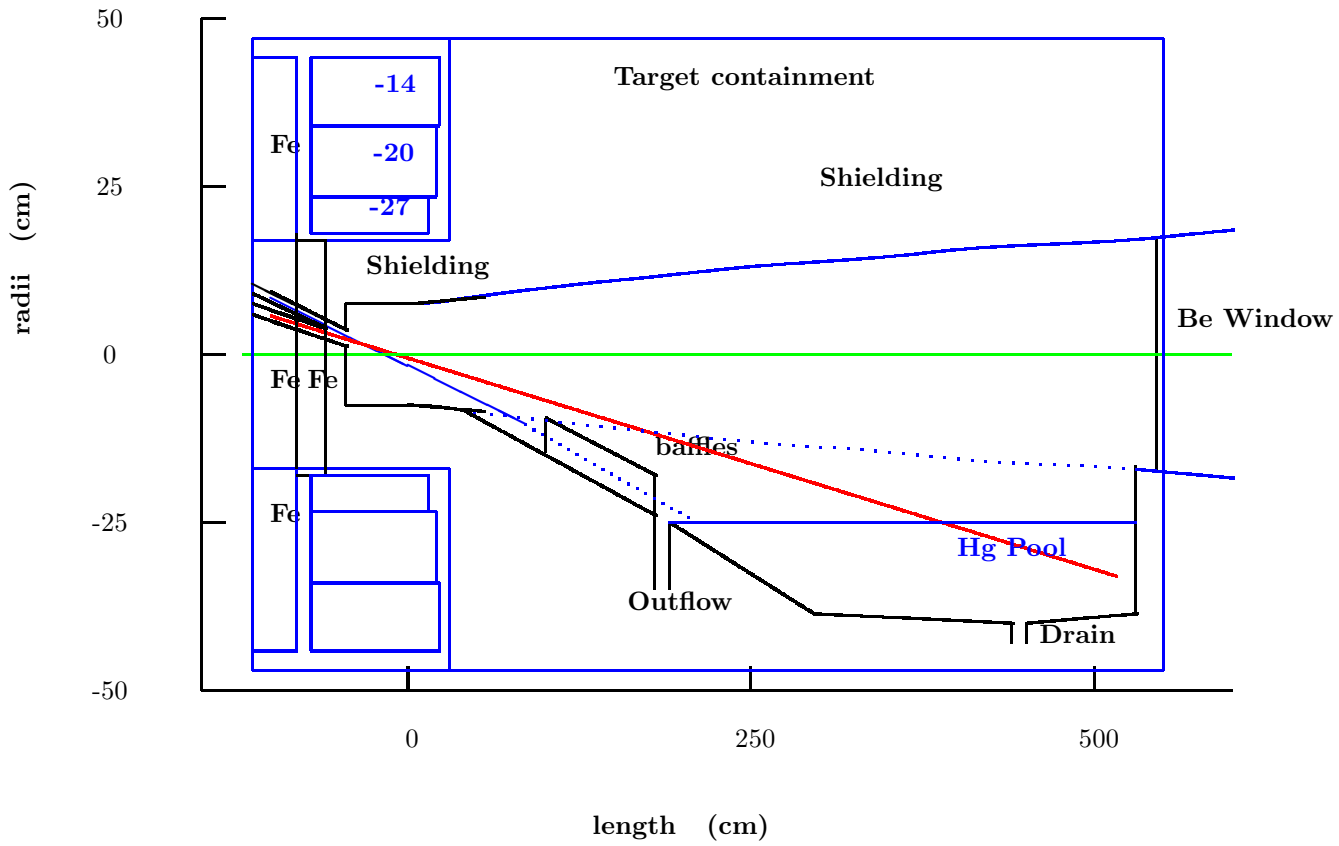
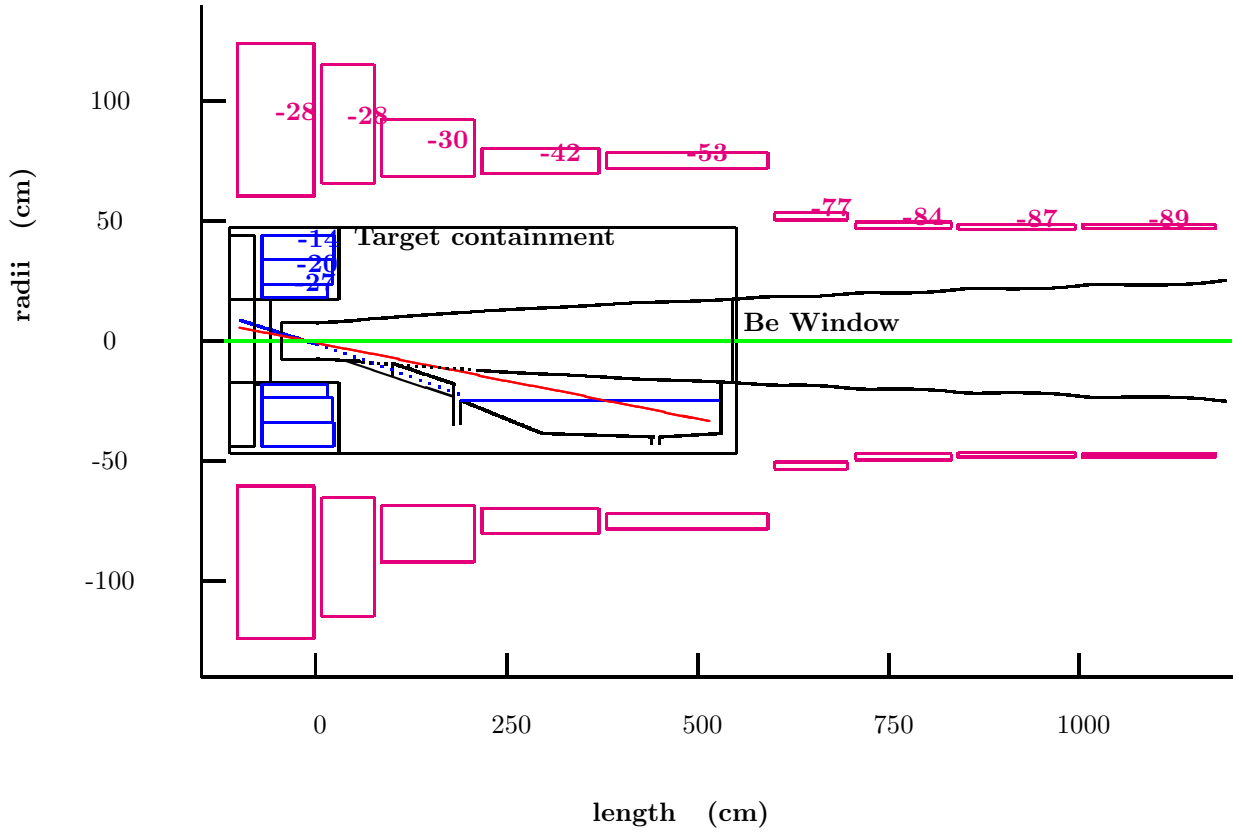
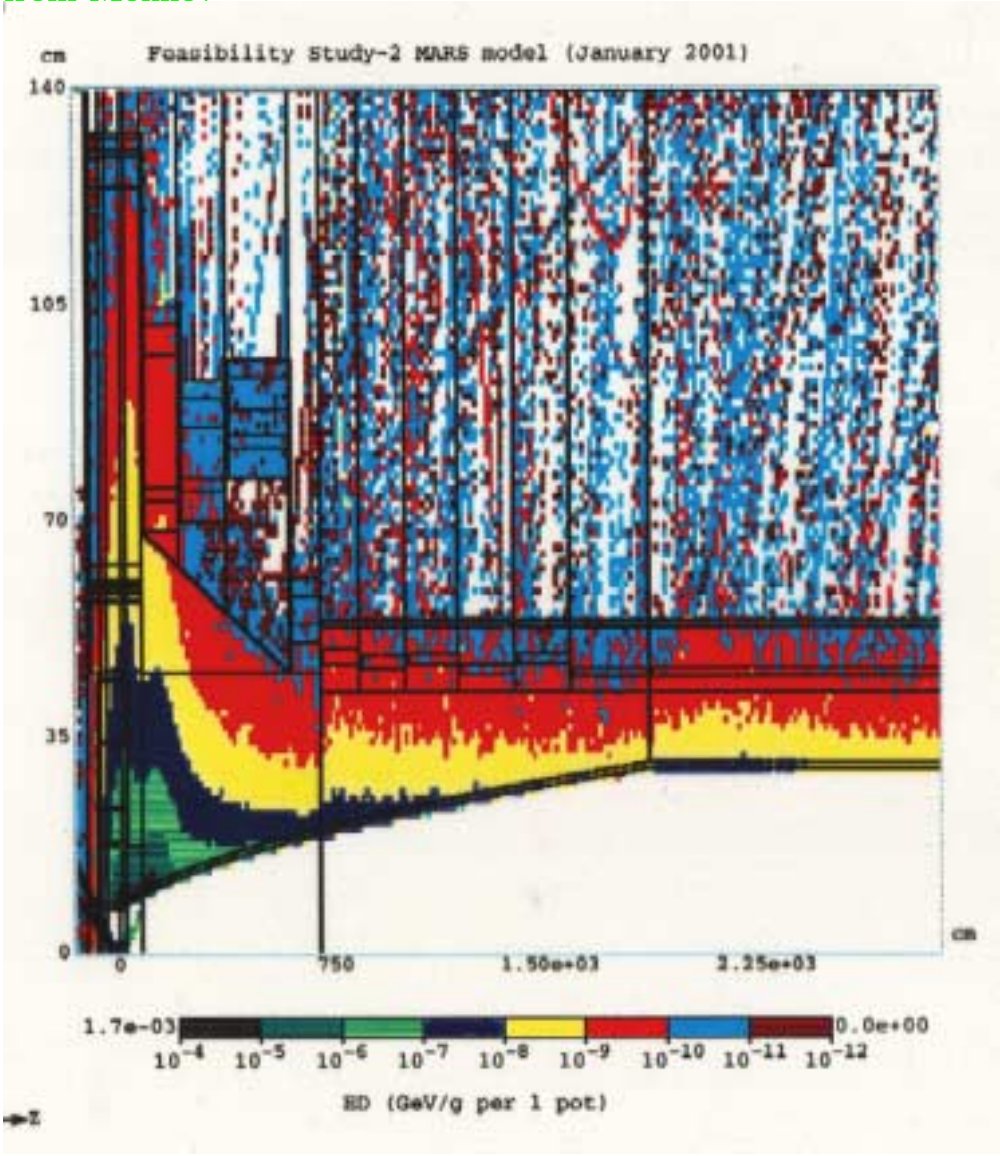


Fig c shows the contaiment within the superconduction coils. Note that sc coil 2 has been moved out 5cm and the following coils moved in by the same amount.



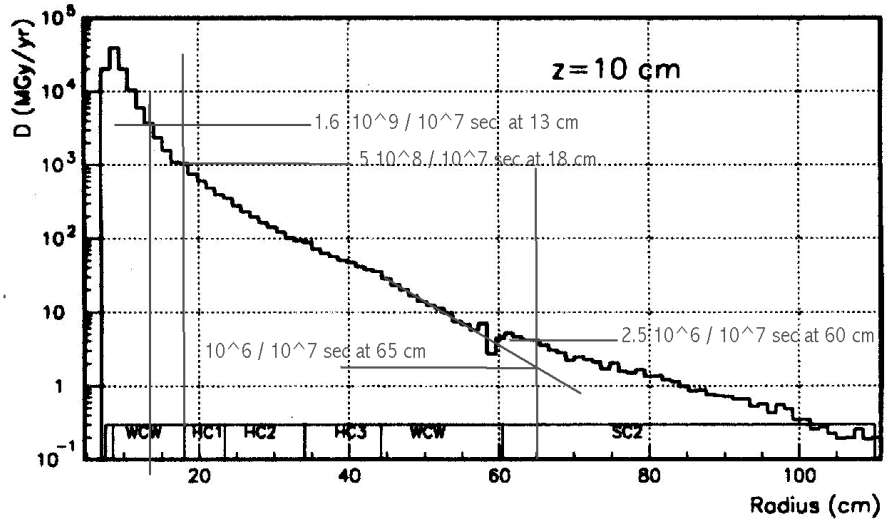
Energy Deposited

from Mokhov



Radiation vs. r at worst z

from Mokhov



Note that the above figure is for a 2 10^7 sec year, but in the following table the year is takeen as 1 10^7 sec.

Component	radius cm	Dose/yr Grays/10^7 sec	Max allowed Dose Grays	1MW Life years	4 MW life years
Inner Shielding (SS)	7.5	2.5 10^{10}	10^{12} *	40	10
Hg Containment (SS)	18	5 10^8	10^{11}	200	50
Hollow Conductor (SS)	18	5 10^8	10^{11}	200	50
Superconducting Coil	65	1 10^6 **	10^8	100	25

* Assuming that stainless steel can withstand this dose so long as it is not stressed. Cu is claimed to take it, but is not compatible with Hg. If SS will not, then we should try and find something that would. It is assumed that this shielding would be cooled by mercury.

** Value obtained by extrapolation

We note that Cu is rated for 10 times more radiation than SS, and would thus last for 40 years as the inner shield, but cannot be used because it is n ot compatible with Hg.