Table e1. Analytical Fit to Radial Dose Distributions. Radial dose distributions were fit piecewise using a cubic polynomial to represent the inner cupped portion of dose deposition and a power function to describe the dose tails extending radially outward. Function coefficients and goodness of fit are shown.

Analytical Fit to Radial Dose Distributions

Collimation width (cm)	Central Fit: $f(x)=p1x^3+p2x^2+p3x+p4$					Tail Fit: $f(x)=ax^b$		
	p1	p2	p3	p4	r^2	a	b	r^2
1	-5.83E-09	4.61E-09	-1.18E-09	3.38E-09	1.000	1.30E-09	-1.18	0.979
2	-3.32E-10	5.67E-10	-2.84E-10	1.69E-09	0.733	1.53E-09	-1.28	0.944
3	-4.80E-12	8.05E-12	1.21E-11	1.10E-09	0.688	1.82E-09	-1.36	0.900
4	-9.44E-13	6.96E-12	4.40E-13	8.27E-10	0.703	2.24E-09	-1.45	0.837
5	-1.34E-12	1.05E-11	-5.66E-12	6.64E-10	0.840	2.80E-09	-1.53	0.775
6	-8.14E-13	9.83E-12	-8.91E-12	5.57E-10	0.929	3.61E-09	-1.64	0.701
7	1.29E-12	-3.24E-12	1.30E-11	4.68E-10	0.988	4.86E-09	-1.76	0.626
8	6.31E-13	-6.60E-13	1.01E-11	4.08E-10	0.991	6.51E-09	-1.87	0.581
9	1.13E-13	2.75E-12	1.97E-12	3.67E-10	0.996	9.36E-09	-2.02	0.561
10	1.05E-13	3.06E-12	-9.88E-13	3.33E-10	0.996	1.58E-08	-2.25	0.550
11	2.09E-13	1.94E-12	1.04E-12	3.02E-10	0.998	3.62E-08	-2.63	0.556
12	2.15E-13	1.73E-12	9.37E-13	2.77E-10	0.998	1.06E-07	-3.12	0.662
13	3.36E-13	3.88E-13	3.90E-12	2.54E-10	0.998	7.80E-07	-4.07	0.850
14	4.08E-13	-3.73E-13	4.95E-12	2.36E-10	0.996			

Figure e1. Simulation Geometry. Two dimensional dose profiles of primary and scattered photon interactions were generated by rotating an x-ray source around a cylinder with a voxelized central disk (0.1 cm isotropic voxels) (a). Three dimensional distributions used a fully voxelized cylinder (0.5 cm isotropic voxels) (b).
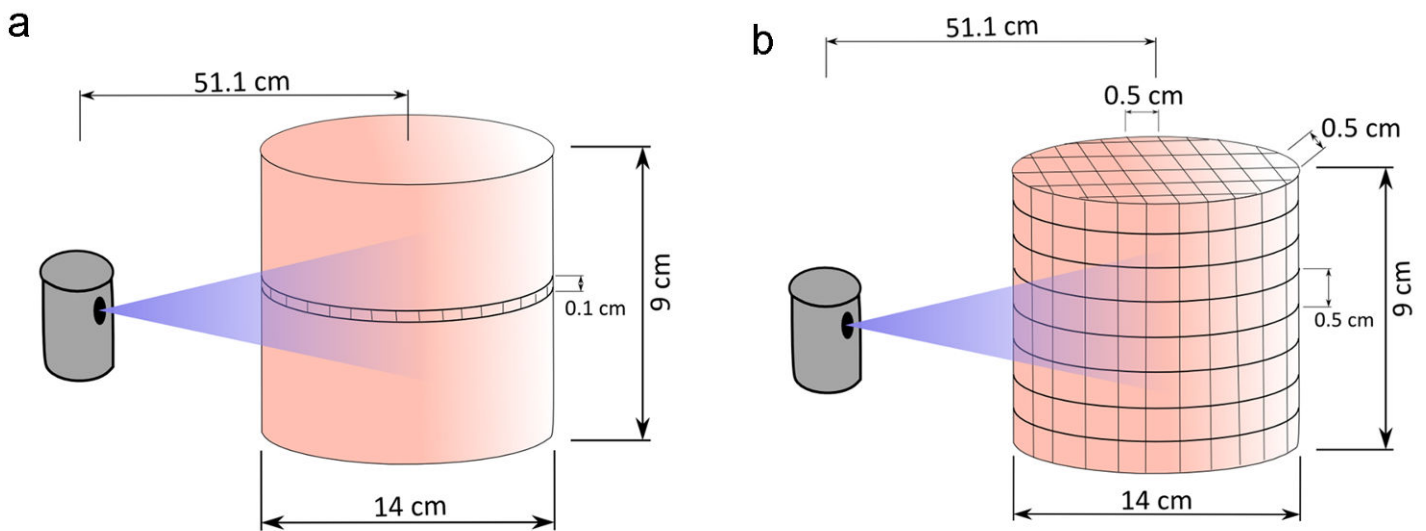
Figure e2. Simulated Photon Spectrum. The spectrum of a 320 kVp x-ray beam

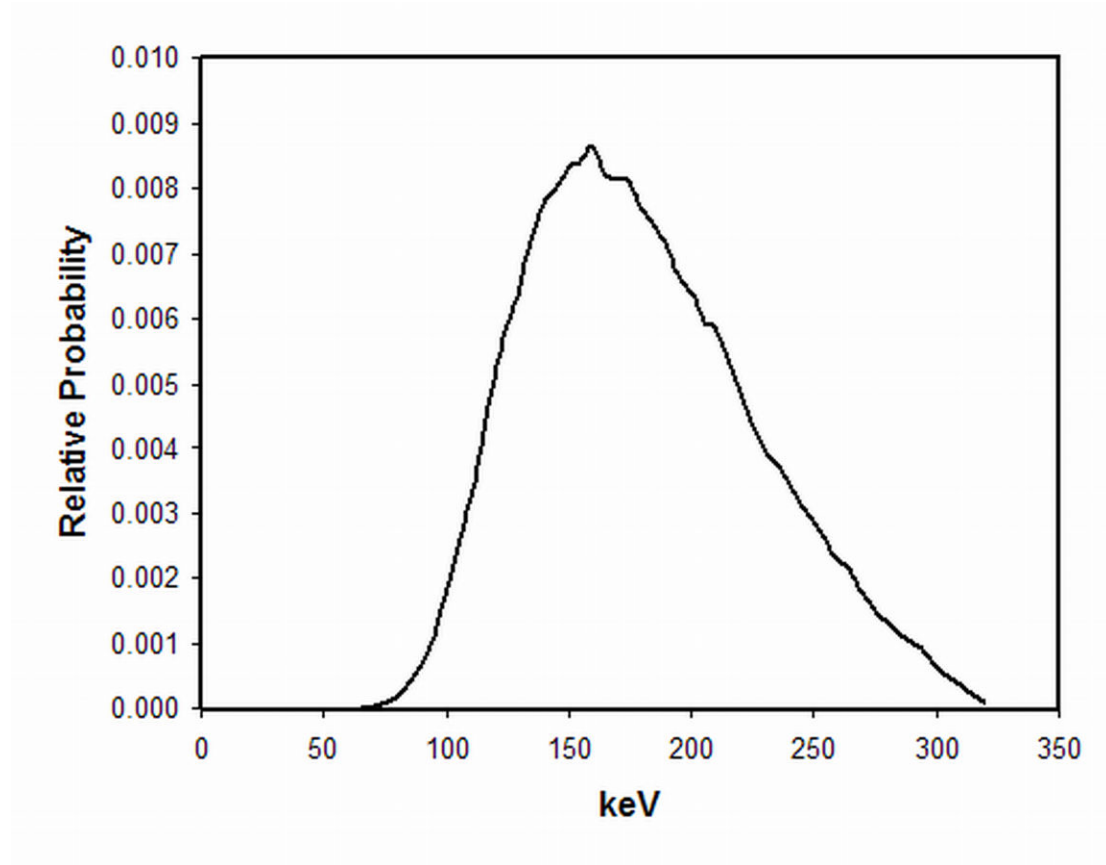filtered by 4 mm of copper was simulated using MCNPX.

Figure e3. Depth Dose Curve. The simulated depth dose profile of 178 keV
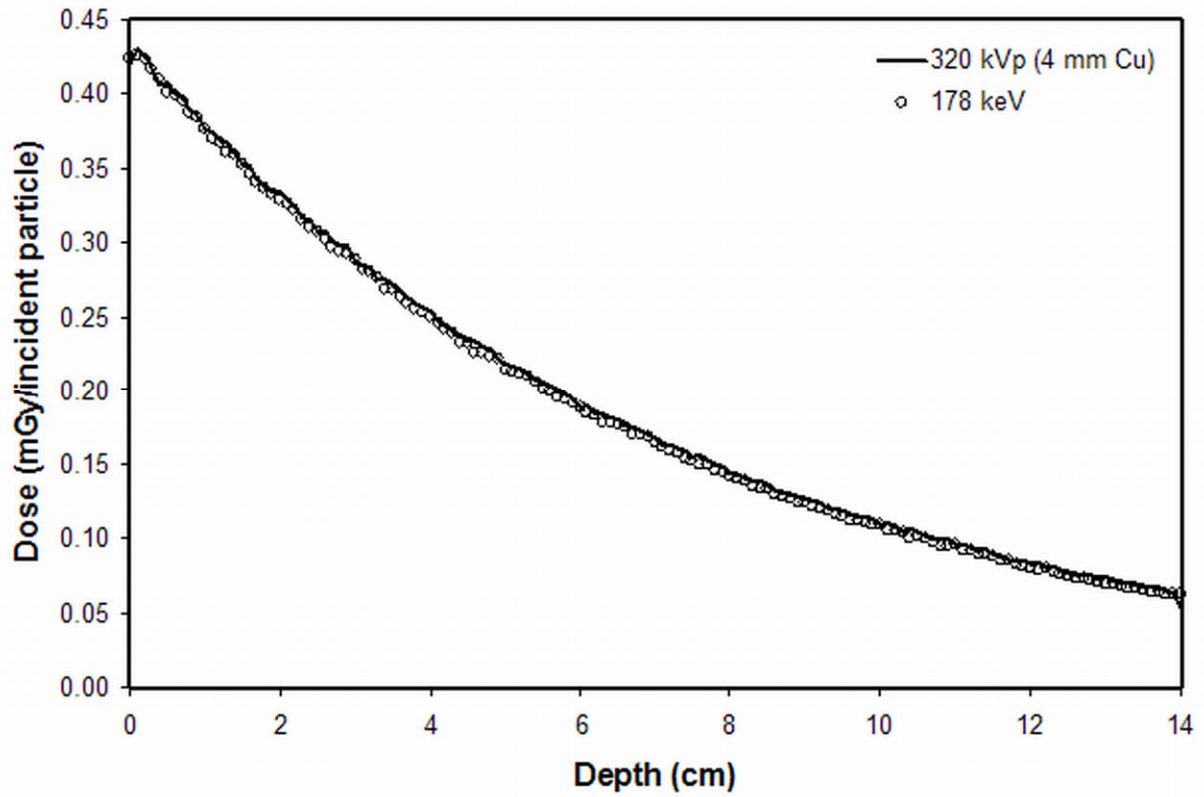monoenergetic x-rays closely matched that of 320 kVp x-rays filtered by 4 mm of
copper.

Figure e4. Z-Direction Scatter Tails. Z-direction dose profiles from primary and scattered x-rays are shown for 2 cm z-collimation and three different x-y collimation widths (2, 7, and 14 cm). For all x-y collimation widths, scatter tails decreased towards the cylinder top/bottom to no more than 5% of maximum dose deposition. Error bars represent the standard deviation in dose deposition from primary x-rays across the beam field of view.