The convolution / superposition method has been successfully applied to external beam dose calculations to determine the dose distribution accurately and rapidly enough to be implemented in a clinical situation. Heterogeneity corrections are natural in the convolution formalism as the dose deposition kernel can be scaled with radiological distance to account for differences in electron transport. Present linear source dose calculations are almost entirely analytical, except possibly for the radial dose function which may be obtained from Monte Carlo simulation or measurement. Heterogeneity corrections at the high photon energies typical of many brachytherapy applications (radium and Ir-192) are not significant and generally are not applied. However, heterogeneity corrections at the low photon energies of low dose rate brachytherapy sources (I-125 and Pd-103) can be substantial. In order to apply a model based dose calculation such as the convolution / superposition method to brachytherapy source dose calculations at low photon energies, it is necessary to have dose kernels for these low energies. We have constructed dose deposition kernels for photon energies of 40 keV and below using the scasph ("scatter sphere") code in the EGS4 Monte Carlo system. This code calculates the energy deposited in spherically symmetric conical shell voxels for photons forced to interact at the center of a water phantom sphere. These dose kernels were calculated at the photon energies of the principle lines in the spectra of I-125 and Pd-103, and will be used in a convolution algorithm being developed for brachytherapy source dose calculations.