Attenuation measurements of primary x-ray spectra from 25 kVp to 18 MV were made using aluminum filters for all energies and copper filters for diagnostic energies. An iterative perturbation method, which utilized these measurements, was employed to derive the apparent x-ray spectrum. An initial spectrum or pre-spectrum is used to start the process. Each energy value of the pre-spectrum is used to start the process. Each energy value of the pre-spectrum is perturbed using the perturbed values. The value of xrays in the given energy bin is chosen which minimizes the difference between the measured and calculated transmission curves. The goal was to derive the minimum difference between the measured transmission curve and the calculated transmission curve using the derived x-ray spectrum. The method was found to yield useful information concerning the lower photon energy and the actual operating potential versus the nominal potential. Mammographic, diagnostic, orthovoltage and megavoltage x-ray spectra up to 18 MV nominal were derived by this method.