High Resolution X-ray (hiRX) offers a new approach for high sensitivity detection of plutonium in soil samples. The use of doubly curved crystals (DCCs) in hiRX provides a unique combination of high energy resolution and sensitivity which provides potential for environmental, forensics and safeguards applications. The DCCs are utilized on both the excitation and collection sides of the instrument. This affords both monochromatic excitation and detection resulting in high sensitivity single element detection. The prototype instrument uses the RhKa line at 20.214 keV for excitation. When this monochromatic excitation is combined with another DCC used to collect the X-ray fluorescence for the Pu analyte, in this case the PuLa line at 14.279 keV, the resulting spectra exhibit a single peak with near zero background. The prototype instrument has achieved a limit-of-detection of around 60 ng with direct excitation of a PuO2 solid specimen. When the hiRX spectrum is compared with a conventional energy dispersive X-ray (EDXRF) spectrum there is a significant reduction in background. This background reduction is attributed to several factors based on the monochromatic features of the instrument: 1) monochromatic excitation reduces the scatter from the sample; 2) monochromatic detection filters out the intrinsic radiation from the sample, 3) intense peaks from other elements are eliminated from detection. Each one of these features enhances the sensitivity of hiRX and provides a high fidelity signal for detection. This is particularly important when dealing with such samples as contaminated soil which typically has weight percent levels of silicon, potassium, calcium and iron. Such high elemental composition, coupled with an oxidized matrix generated significant background which reduces the sensitivity for direct compositional analysis of Pu in soils using conventional micro X-ray fluorescence. This paper will present results on the application of hiRX to actual contaminated soil and comparison with conventional micro X-ray fluorescence instrumentation. These results offer insight into the advantages of hiRX for sensitive Pu detection in a complex matrix. This work was supported by the Next Generation Safeguards Initiative, Office of Nuclear Safeguards and Security, National Nuclear Security Administration.