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**Assessment of Alternative Approaches to Source Reconstruction Using Solid State Dosimetry**[1] RYAN O'MARA, ROBERT HAYES, North Carolina State University — Recent advancements in luminescence and electron spin resonance dosimetry have made it possible to measure radiological exposures to nearly every insulating material in the developed world. By measuring populations of unpaired charges in the material, these techniques can probe the electronic population distributions caused by ionizing radiation exposure. Previous analyses have shown that luminescence dosimetry can be used to localize and assay radioactive materials after that material has been removed. Traditionally assaying historical radiation sources has involved coupling measured dose deposition profiles with computationally expensive particle transport calculations. Our analysis will attempt to determine the extent to which these full transport calculations can be replaced with analytical equations that account only for geometric and material attenuation while providing adequate accuracy. The goal of this analysis was to determine the bounds in which such analytical simplifications can be used to develop a correction function approach to account for the additional physical processes without requiring iterative Monte Carlo type approaches.

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