Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Imaging and Localization of Radiological Sources by Luminescence Dosimetry[1] RYAN O'MARA, ROBERT HAYES, North Carolina State University — Luminescence dosimetry has long been a mainstay in the realms of personnel and accident dosimetry, however recent advances have demonstrated these new techniques may also have a place in nuclear nonproliferation and treaty verification. Previous research has shown that using a combination of optically stimulated luminescence (OSL) and thermoluminescence (TL) allows for the assay of nuclear material with surprising resolution. Likewise, doses to surface mount resistors (SMRs), like those found in common personal electronics, have been measured down to background levels using OSL. In the present work, a two-dimensional array of commercially available optically stimulated luminescence dosimetry was used to image and localize the position of a weapons grade plutonium (WGPu) source after removal of the source material. This work illustrates how luminescence dosimetry may be able to reconstruct events, involving radiological source material, occurring arbitrarily far in the past.

[1]This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0002576. This work partially paid for by the Nuclear Regulatory Commission grant NRC-HQ-84-14-G-0059. Additional support of this work was through a joint faculty appointment between North Carolina State University and Oak Ridge National Laboratory in coordination with the Office of Defense Nuclear Nonproliferation RD of the National Nuclear Security Administration sponsored Consortium for Nonproliferation Enabling Capabilities.

Ryan O'Mara
North Carolina State University

Date submitted: 06 Jan 2020 Electronic form version 1.4