Assessment of Non-Destructive Decontamination Methodologies for Mixed Porous Surfaces under High Humidity and UV Conditions

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EPA's Office of Research and Development and Battelle have conducted experimental work to evaluate the efficacy and applicability of several radiological decontamination technologies for deployment in response to a wide-area event, such as a radiological dispersal device (RDD) scenario. The work described here evaluates the decontamination efficacy of two commercial strippable coating decontamination technologies for removal of cesium (Cs)-137 from mixed and non-mixed brick surfaces typically found in urban buildings and infrastructure. These technology testing experiments were conducted using brick surfaces that were stored throughout the duration of the testing (up to one year) in elevated temperature (T) and relative humidity (RH) conditions. A subset of baseline experiments was done in ambient T and RH. In addition, a subset of experiments conducted with elevated T and RH using UV light during the strippable coating drying phase to simulate sunlight.

Exterior bricks were collected from buildings that were being demolished in Columbus, OH. These buildings (and hence the brick) were approximately 55 years old at the time of demolition. Approximately 2 microcuries (µCi) of Cs-137 in aqueous solution were applied to the exterior surface of the brick and placed in elevated humidity storage. The one-year elevated T and RH study included application and removal of strippable coatings after 0, 3, 6, and 9 months of elevated T and RH storage to determine the timeframe where humidity affects the removal of the strippable coating. Preliminary results have indicated that percent removals across the two strippable coating products range from 21%-47% and that the physical removal process gets easier after storage in elevated RH for 6 months. The UV light drying component of the study included application and removal of strippable coatings after 0, 3, 6, 9 and 12 weeks of elevated T and RH storage. Preliminary results indicate that elevated UV has minimal impact to ease of physical removal. Results covering the percent removal of Cs-137 are still pending.