The Argonne SuperGel was developed between 2003 and 2015 to fill a gap in our nation’s capability to quickly decontaminate important structures following a radiological or nuclear release event. Specifically, the decontamination technology was developed to minimize damage to monuments, high valued facilities, and critical infrastructure while reducing environmental and health impacts. An important criterion during its development, common reagents were employed that could be easily acquired in order to minimize the timeline for its deployment. Its current formulation uses off-the-shelf super-absorbing polymers, spray technology is off-the-shelf, long chemical shelf life, common reagents, cost effective, and the decontamination technology was developed to minimize damage to monuments, high valued facilities, and critical infrastructure while reducing environmental and health impacts.

Since its development, we have had the opportunity to test the SuperGel in the removal of legacy contaminations in hot cell facilities and former glovebox spaces at Argonne. This has provided a unique opportunity to evaluate the SuperGel on a range of contaminants outside the original specifications for its development.

Concept to Pilot-Scale demonstration in 18 months
- Long chemical shelf life, common reagents, cost off-the-shelf
- Waste is compatible with low level radioactive waste regulations
- Decontamination from concrete aggregate fraction was 0.2-0.5 mm at tropical of many U.S. based facilities. Particles are predominantly quartz (which can be different colors although more intense ones are present). For development studies:
  - Building materials were contaminated with Cs-137 or Am-241 and solution allowed to age.
  - Full-sized wall samples were made with appropriate additive to decontaminate the solutions at various pH levels.

For gamma analysis, all monolithic samples were wrapped in plastic prior to movement and analysis on an ORTEC high purity germanium detector (HPGe).

- For Am-241, the samples were counted until no signal was detected.
- For Cs-137, an initial 10 minute count was performed to determine Decontamination Factors (DFs).

Argonne SuperGel was applied (left) for a 2-3 hour dwell time and then removed (right) and reanalyzed, if necessary. The final area (right) was counted by HPGe and used to determine Decontamination Factors (DFs) as high as 95%, and 13 of 15 spots were cleaned to free release standards (~20 cpm).

**METHODS**

**METHODS (CONT.)**

- The gel was prepared from an anionic polyelectrolyte/monomer/surfactant (HPMMA/SA/SDS) solution at ~80% polymer by weight.
- The anionic gel was precipitated at a cross-linked tetramer ratio of 1:1 (polyacrylamide) containing 10% sodium acrylate, 40% water.
- Viscoelastic properties were determined by adding the gel as a dry powder in gel preparation of 50% by mass and included cryotag data收集or (2011-2009, internal HP products).
- Nanoscale transfer (NMT): High voltage detector (UH), Optima Chemiluminescence, U.S., calibrations are (50, 500, 1000, 1500). Since its development, we have had the opportunity to test the SuperGel in the removal of legacy contaminations in hot cell facilities and former glovebox spaces at Argonne. This has provided a unique opportunity to evaluate the SuperGel on a range of contaminants outside the original specifications for its development.

**PILOT SCALE TESTING ON WALL-TYPE TEST PLATFORM**

**DECONTAMINATION OF PLUTONIUM FROM FORMER PU FUEL FABRICATION FACILITY AT ARGONNE**

**REFERENCES**


