

Problem Statement

- The need for an advanced technology that can better address potential airborne contaminants at DOE Savannah River Site 235-F.
- Current methods of knocking down or fixing this contamination are labor intensive, costly, and sometimes ineffective. Thus, to make exposure ALARA, the advanced fogging effort is being tested using Idaho National Laboratory's FX2 fixative agent.



Figure 1. Interior of glove box in Building 235F at Savannah River Site

Potential Solution: FX2 Agent Development of FX2 Agent

- The FX2 fogging agent is a proprietary mixture of water, latex paint (LTX), glycerin (GLY) and sodium lauryl sulfate (SLS).
- Initial development began in 2006 when a DOE Small Business Innovative Research (SBIR) grant resulted in the development of a conceptual advanced capture coating fog system.
- This coating is shown to be excellent at reducing airborne contamination and "fixing" particulates in place as demonstrated by Idaho National Lab.

Testing & Evaluation of FX2 Agent

Controlling Potential Airborne Particulates

- Testing capacity to knockdown airborne particulates.
- Evaluating ability to fix to different surfaces (e.g., glass, wood, steel, concrete, brick).
- Line of sight as well as non-line of sight (shadowed) locations will be tested for coverage.

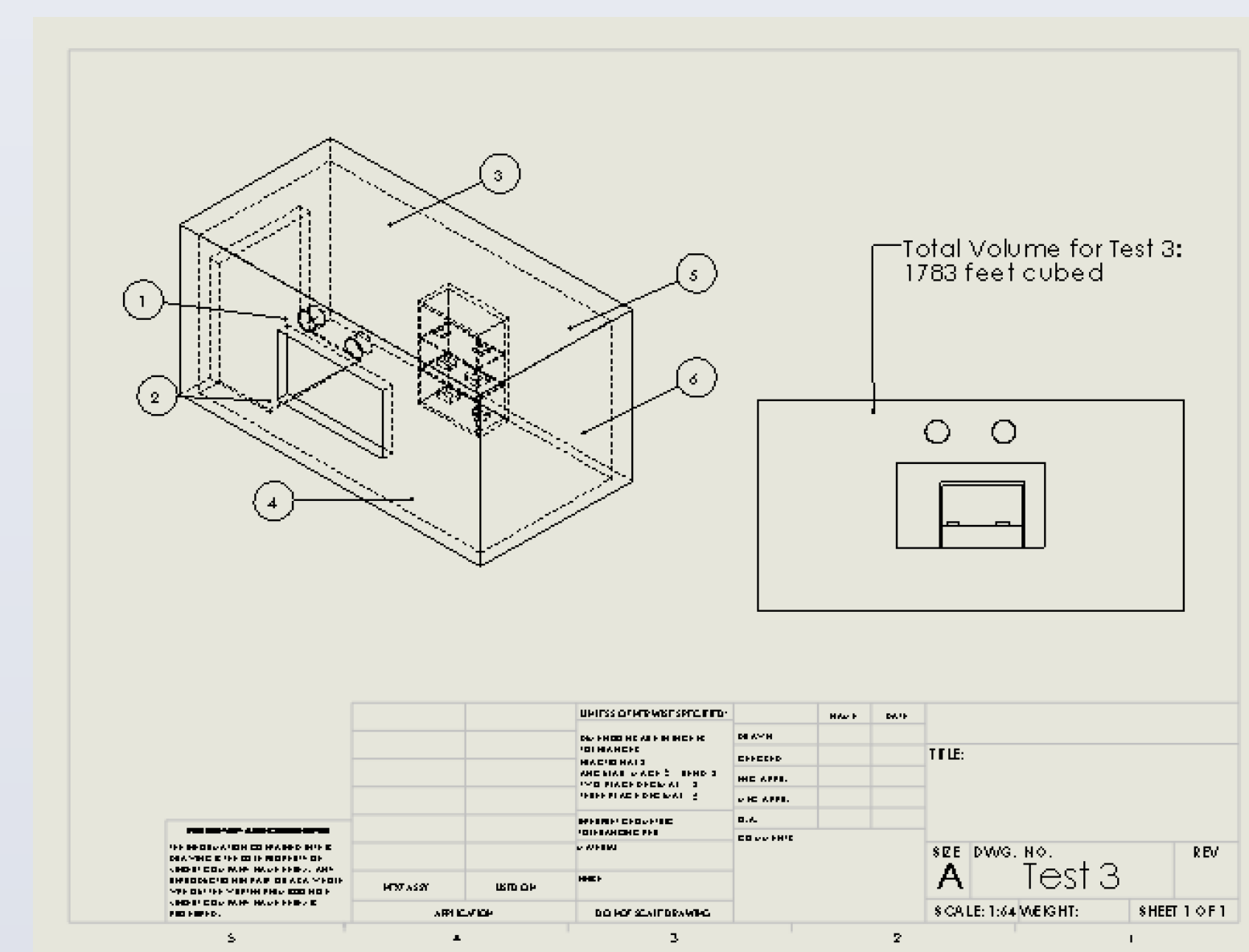


Figure 2. Dimensions/ Geometries of Test Facility

Adhesiveness and Coverage of Surface Area

- Contact area will be placed under air pressure to attempt dislodging of dried mixture.
- Particle analysis utilizing ImageJ will be conducted to determine quantifiable coverage.

Ignitability

- Observation of the FX2's reactivity to flame and heat sources as it is being applied.
- Results will provide useful information for the prevention of potential hazards.

Determine Shielding Properties Against Alpha Sources

- Determine the shielding abilities of the FX2. Fogging agent against an alpha-particle emitting point source.

Evaluating Critical Properties

- These properties will be evaluated to better characterize the FX2 and allow for optimal understanding of results.
- ASTM E1354 - Burn Rate
- NFPA 296 - Flashover
- ASTM D2196 - Viscosity
- ASTM D1331 - Surface Tension
- ASTM D792 - Density



Figure 3. Savannah River Site 235-F

Testing Innovations

ImageJ

Developed by the National Institutes of Health, ImageJ is a public domain image processing program that allows for the analysis that this effort requires.

- **Coverage:** Through contrast analysis, ImageJ can be used to determine the coverage of the agent upon any of the testing surfaces.
- **Correlations:** With the feature of coverage evaluation, a relationship, and thus a graphical representation, can be made between surface coverage and radiation shielding.

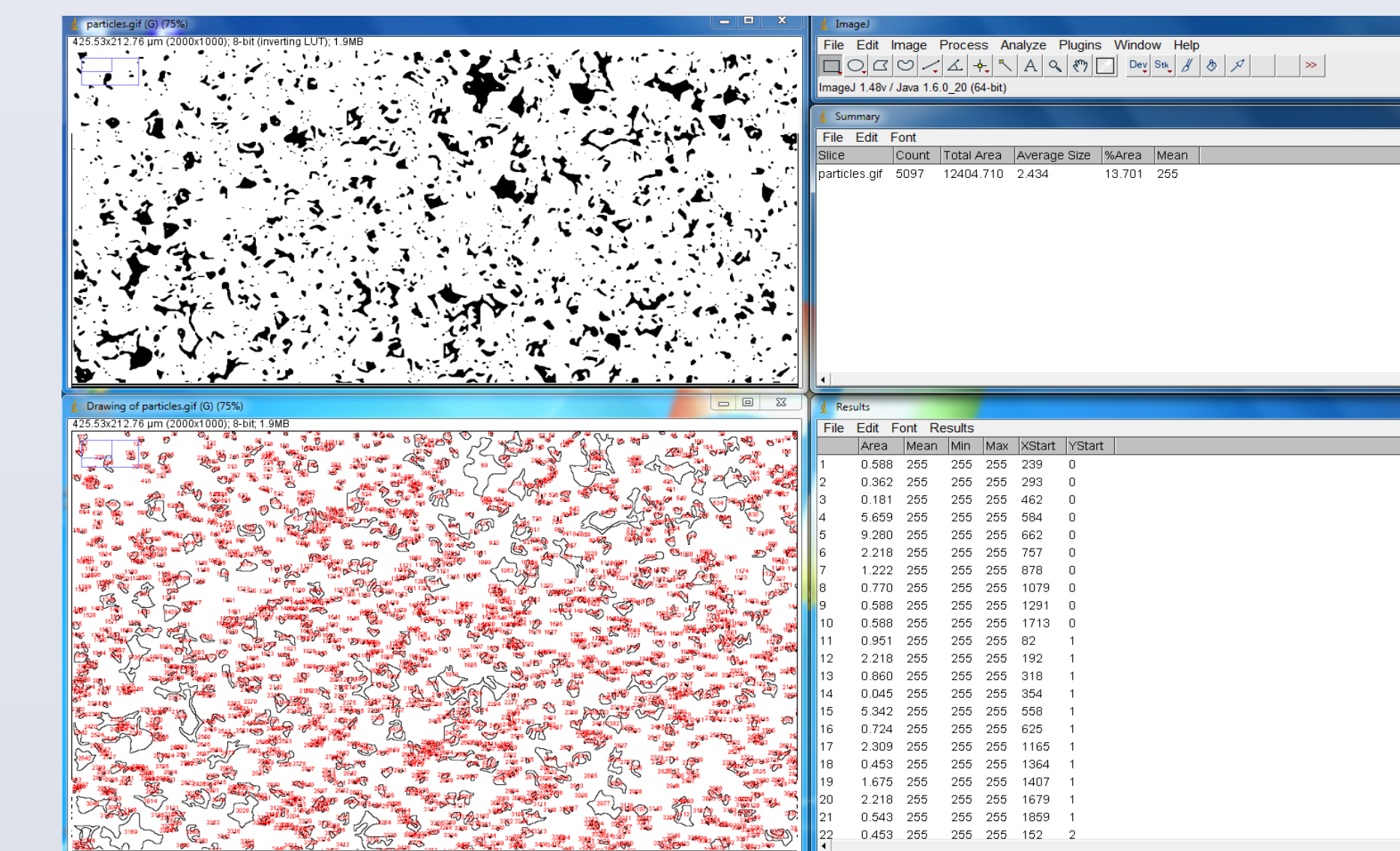


Figure 4. ImageJ Particle Analysis Example

Future Work

- Engineering and manufacturing of mobile robotic fogging device.
- ASTM WK5394: establishing performance specifications for stabilizers to minimize migration of dispersible radioactive contamination.

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