

Fixative Sprayer Platform

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Points to Cover

- Objective
- Background
- Site Setting
- Technology Description
- Results
- Conclusion & Recommendation
- Future Work



Test Objectives

- to demonstrate “proof-of concept” under conditions similar to those actually found in a DOE hot cell facility
- to evaluate ability of technology to enter, maneuver around hot cell mock-up, transition from floor to wall, and compensate for obstacles (drum, table, electrical box and conduit, etc.)
- to document the ability of the remote system to spray fixatives on horizontal and vertical concrete surfaces (ceiling, walls, and floor)



- to evaluate technology performance, cost, and health & safety factors
- to document which parts of the technology are removable and what can not be reached for cleaning
- to document spraying rate and quality of fixative coverage
- to document waste volume and characteristics



- Many facilities are scheduled for decontamination and decommissioning (D&D) across the Department of Energy (DOE) complex .
- DOE requires that each of the hot cells be cleaned and stabilized to allow demolition to occur .
- A study on available remote technologies for D&D activities is being performed at FIU.
- Fixative products typically used inside hot cells were investigated for potential remote application.





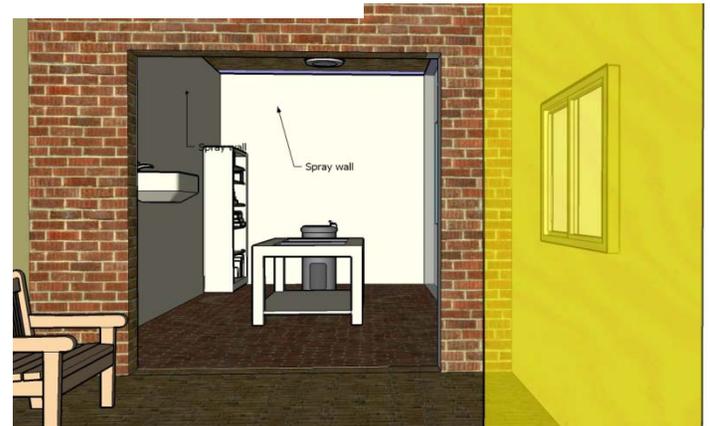
- A mock-up Hot Cell was constructed at a current Applied Research Center (ARC) - FIU site.



- The hot cell design represents a typical DOE site facility hot cell in size, construction materials, and points of access.
- The hot cell mock-up is 10-ft wide x 20-ft long x 10-ft high and have an entry point at one end as well as a window in the side.
- Two video cameras (Logitech) were installed during Demonstration.



3-D Modeling



Work in Progress



Figure 1. Hot cell mockup facility at FIU-ARC's outdoor Technology Assessment Facility

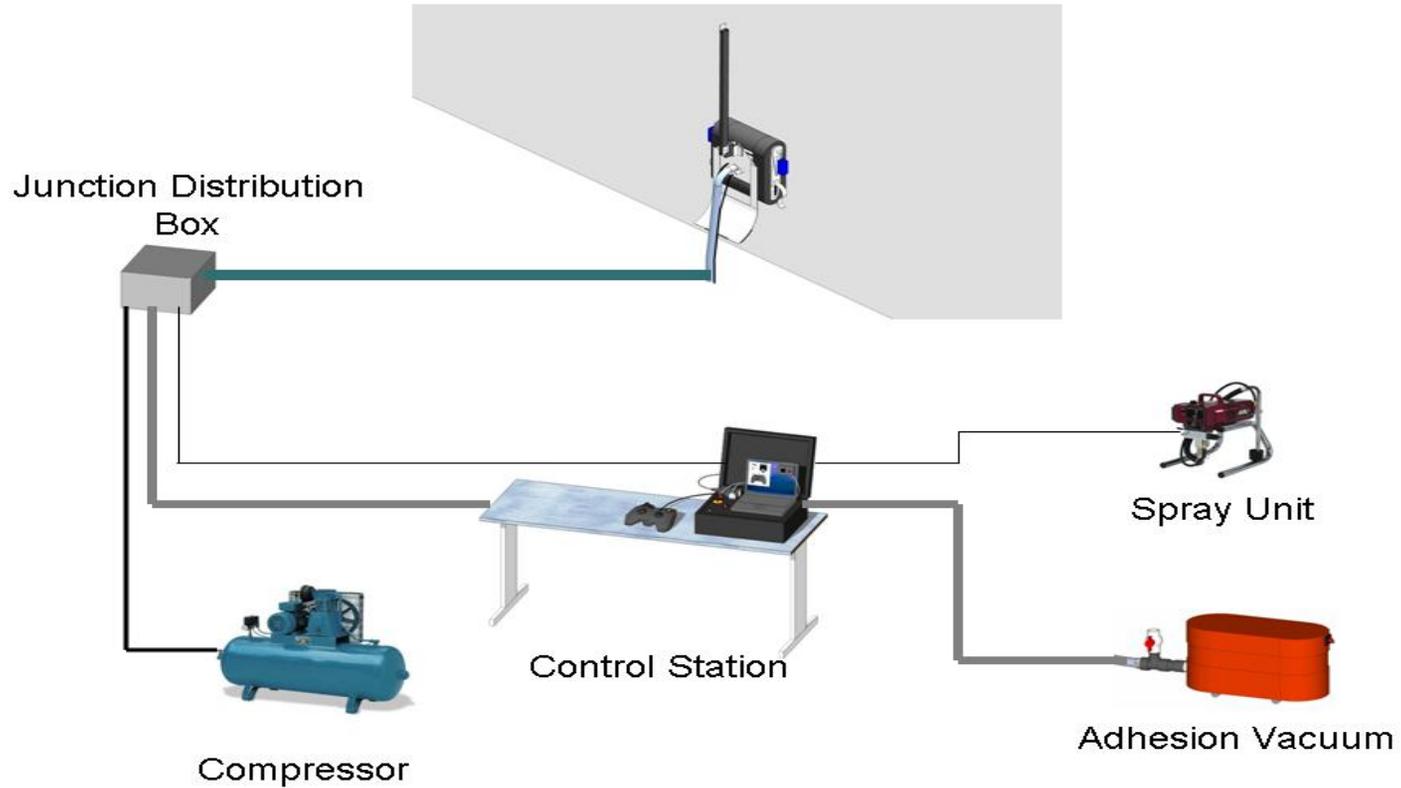


Technology Description

- International Climbing Machines (ICM) were selected for the initial technology demonstration .
- The ICM climbing machines are remotely controlled.
- ICM is developing a coating application via pressure fed roller and spray applicator.
- The machines weigh approx 30 pounds yet have a pull off strength of over 225 pounds.



Technology Description



ICM climber set-up



Fixatives Used During the Technology Demonstration

Product Manufacturer	Name of Product	Type of Product	Surfaces Coated	Surface Area Coated
Sherwin Williams	Promar 200	Latex paint	Ceiling, walls	294 sq ft
Sherwin Williams	Direct to metal (DTM)	100% acrylic coating	Ceiling, walls, floor	627 sq ft
Bartlett Services, Inc.	Polymeric Barrier System (PBS)	Non-toxic water-based solution which forms an impermeable barrier. Specifically for locking down loose contamination.	Ceiling, walls	108 sq ft



Fixatives Used During the Technology Demonstration



Fixative Preparation (Promar 200)





Video Cameras installed inside the Hot Cell



ICM applying fixative



ICM climber video



- The technology demonstration was performed from November 11 to November 14, 2008.
- Trial run was also used to work out logistical requirements of the technology.
- The ability of the remote system to spray fixative products on horizontal and vertical concrete surfaces was tested.



- Coverage of Fixatives

Product	Coverage/Manufacturer	Surface Area Coated	Product Consumed	Actual Coverage
Promar 200	120-170 sq ft/gal	294 sq ft	4.5 gal	65 sq ft/gal
DTM	155-250 sq ft/gal	627 sq ft	11 gal	57 sq ft/gal
PBS	50 sq ft/gal	108 sq ft	2 gal	54 sq ft/gal



- **Spraying Production Rate Achieved During Demonstration**

Product	Surface Area Coated	Total Spraying Time	Spraying Rate
Promar 200	294 sq ft	87 min	3.4 sq ft/min
DTM	627 sq ft	161 min	3.9 sq ft/min
PBS	108 sq ft	25 min	4.3 sq ft/min



- Technology was capable of successfully achieving the objectives of this demonstration
- The different products used acted differently during the demonstration
- Challenges were encountered during the demonstration



Recommendations

- One recommendation is to provide radio communication for the assistant and operator.
- Mobile cameras capable of being controlled remotely would be a tremendous benefit to the implementation of this technology.
- Fixative product be tested thoroughly with the equipment prior to being used in a radioactive environment.



- New Technologies will be tested.
- Different fixatives will be analyzed.



