Spray Knockdown System for Rapid Containment and Neutralization of Airborne CBW Agents

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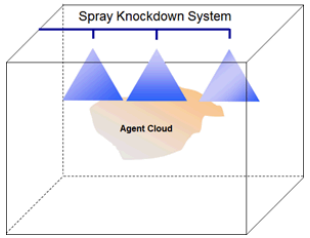
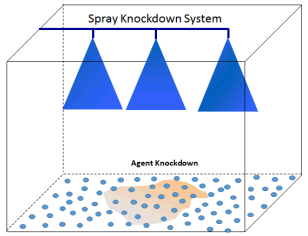
Sandia National Laboratories

Concept

- Deploy a mist of charged droplets to knockdown and neutralize CBW agents.
- Contain agents within a small area and mitigate spread to larger areas.
- Utilize a mild, peroxide-based decontaminant or water.



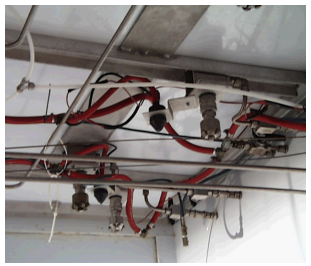
CBW agents are sorbed onto liquid droplets and knocked to the ground and neutralized.

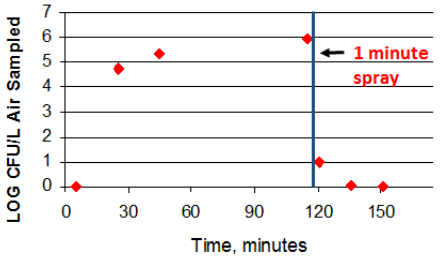


Key Design Parameters:

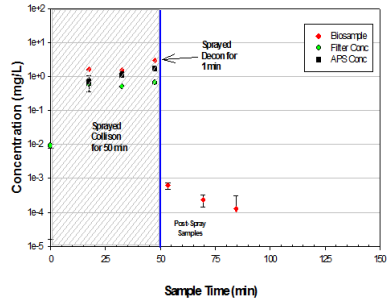
- Droplet Size
- Droplet Charge
- Characteristics of sprayed liquid
  - Surface tension
  - Neutralization chemistry
- Concentration of droplets

System Development



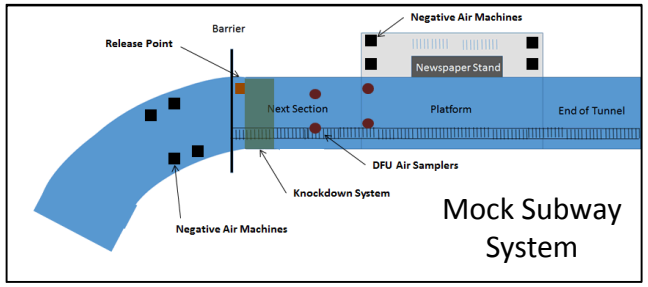


5 Log knockdown of *B. atrophaeus* spores in 1 minute using a charged mist of Sandia DF-200.

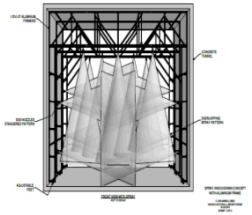


4 Log knockdown of G-agent simulant in 1 minute using a charged mist of Sandia DF-200.

Field Test



Test conducted as part of the US Department of Homeland Security – Science & Technology Directorate Underground Transport Restoration project



- Airflow was approximately 40 ft/min.
- Spray operated for 1 minute, 30 seconds.
- *B. atrophaeus* spores were released (25 mg).
- Spray continued for 18 minutes, 30 seconds.
- 12 gallons of modified DF-200 was deployed.
- 6 pool and 4 DFU samples were collected 15 minutes after the end of the spray.
- Control (release with no spray) and background samples were collected.

Field Test Parameters

DFU	Background	Control	Spray
1	ND	18000	ND
2	ND	24100	ND
3	ND	28900	ND
4	ND	27000	ND
5	13.3	13800	ND

Average Spore Counts

Results:

- Control (i.e., no spray) resulted in ~ 4 log CFU on DFUs
- Spray Test resulted in non-detects on all DFUs
- Spray Test resulted in non-detects in all liquid (pool) samples

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