



Aerosol Facility

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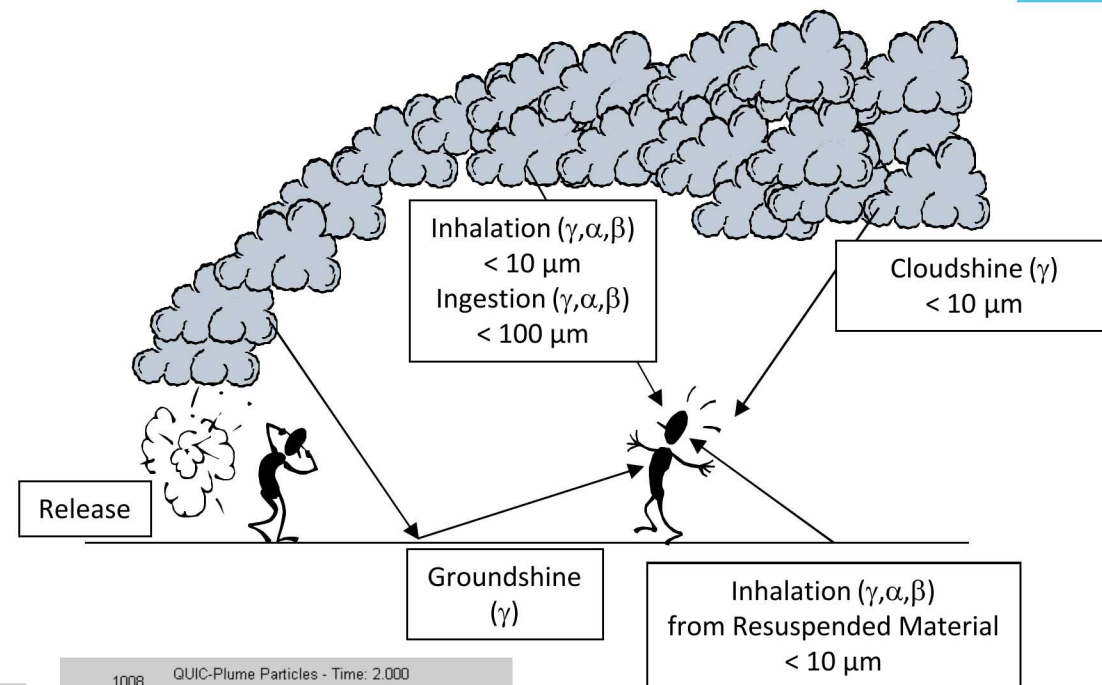
Widespread Dispersion

Small particles ($< 10 \mu\text{m}$)

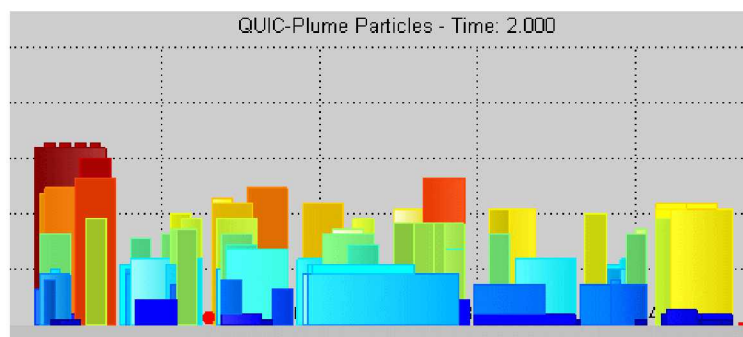
- Also referred to as respirable particles
- Will travel kilometers down wind

Intermediate particles ($10\text{-}100 \mu\text{m}$)

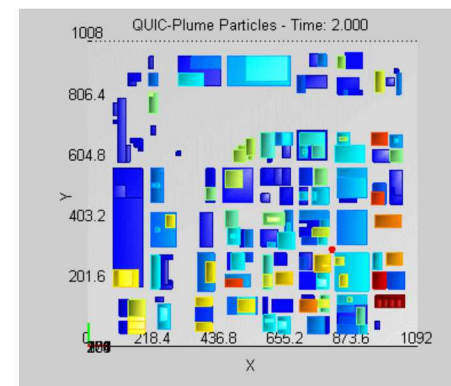
- Primarily a groundshine problem but can also be an ingestion problem
- Will travel a few 100 meters to a few kilometers down wind



Small Particles
($5 \mu\text{m}$)



QUIC simulation by Mike Brown (LANL)



To be an inhalation problem - particles must be in vicinity of people

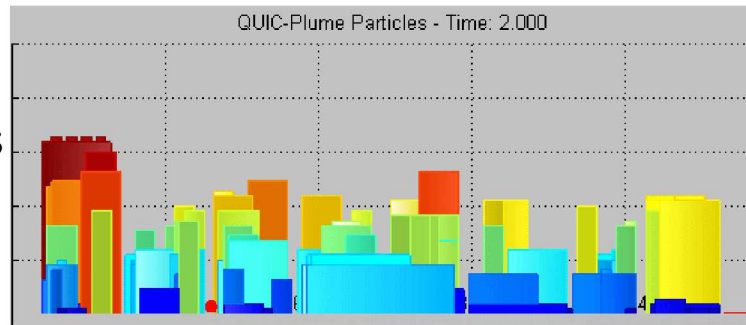
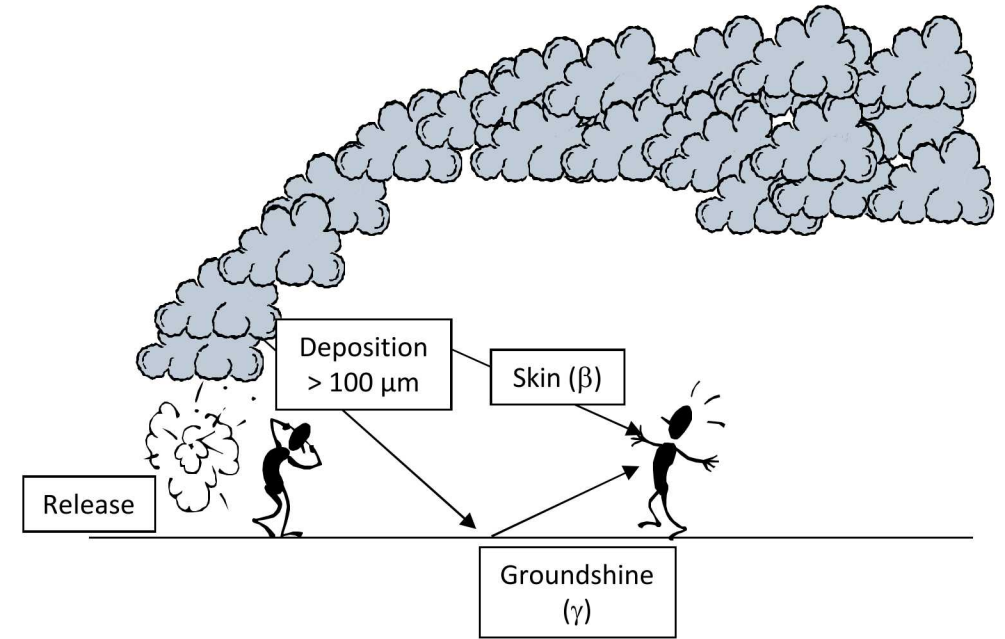
3 Localized Dispersion

Large particles ($> 100 \mu\text{m}$)

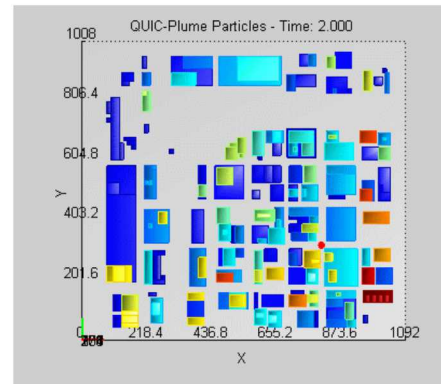
- Primarily a groundshine problem
- Will stay local only traveling a few hundred meters

Ballistic fragments ($> 1 \text{ cm}$)

- Will travel hundreds of meters causing localized hotspots

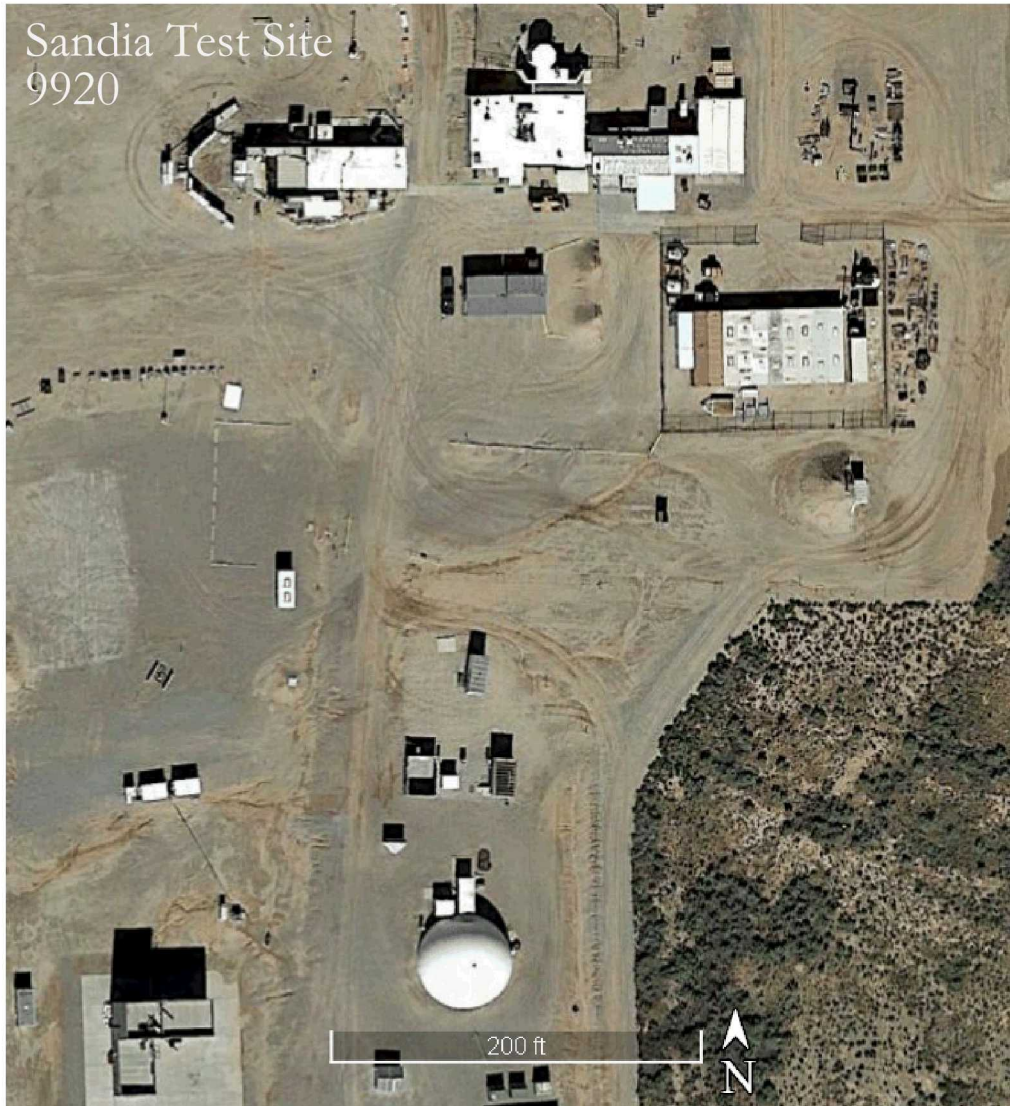


QUIC simulation by Mike Brown (LANL)



Large particles will settle to the ground quickly

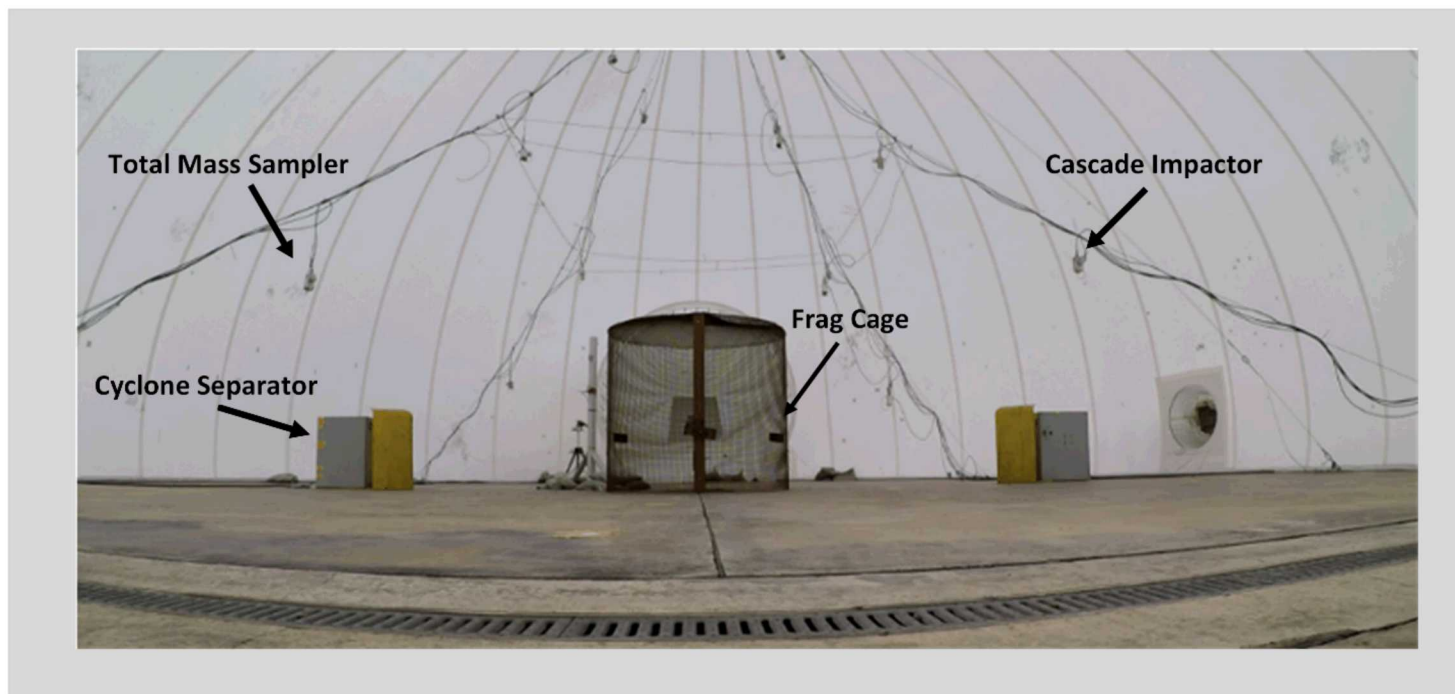
Air Building Used for Source Term Characterization



More than 1,000 RDD characterization tests have been performed at SNL in the last 30 years

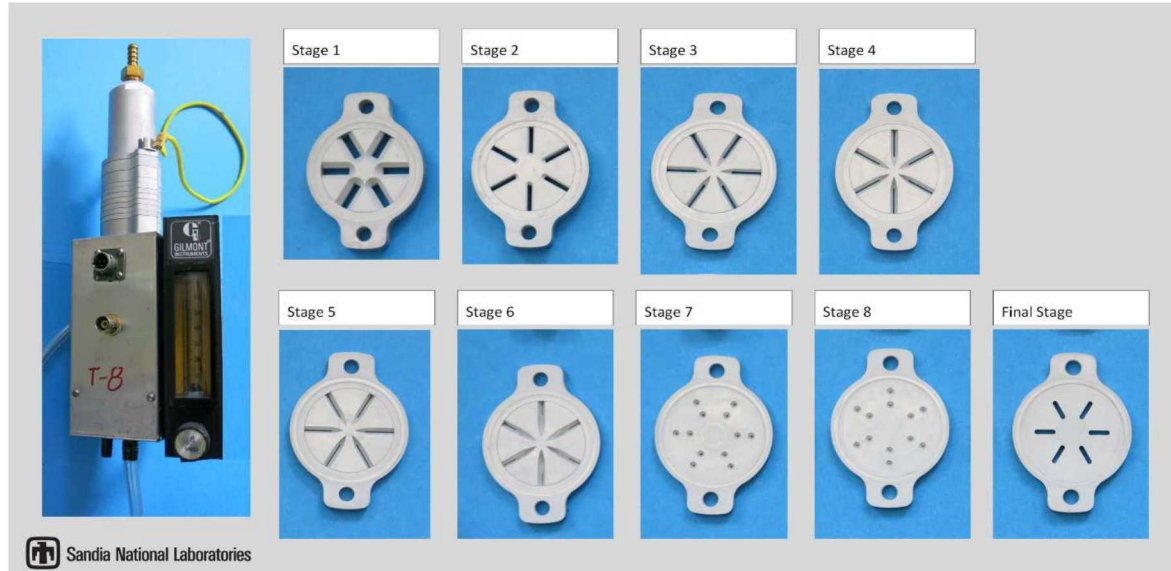
Size of particulate released depends on device geometry
material physical and chemical properties

Inside the Air Building

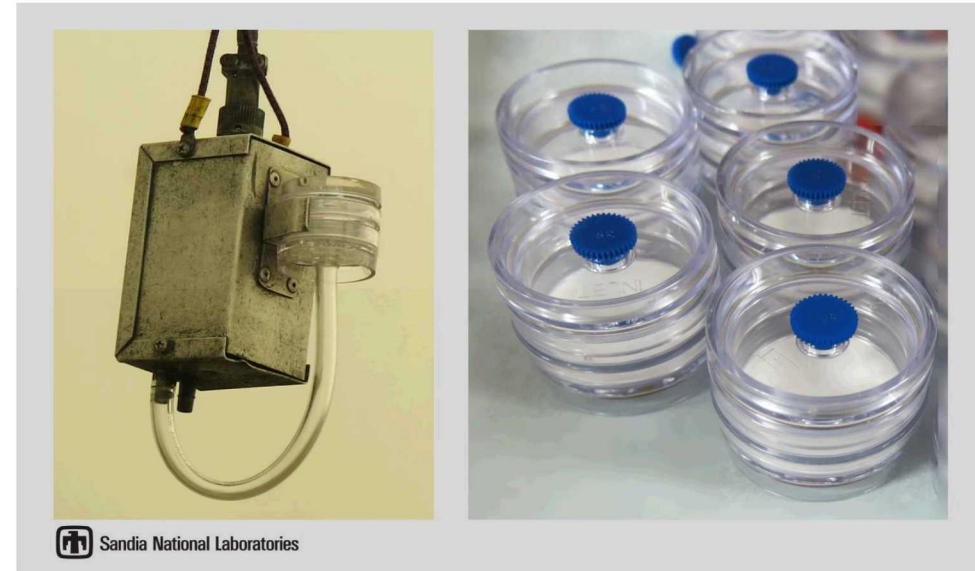


6 Particle Samplers

Marple Cascade Impactors 0-30 μm



Total Mass Samplers < 30 μm



Marple Cascade Impactors 0-30 μm



Particle Collection



7 Control Room View

Air Building Pump Control

LINE A - PUMP 1 GROUP 1	LINE B - PUMP 1 GROUP 1	LINE C - PUMP 1 GROUP 4	LINE D - PUMP 1 GROUP 4	LINE E - PUMP 1 GROUP 3
LINE A - PUMP 2 GROUP 4	LINE B - PUMP 2 GROUP 4	LINE C - PUMP 2 GROUP 1	LINE D - PUMP 2 GROUP 4	LINE E - PUMP 2 GROUP 2
LINE A - PUMP 3 GROUP 1	LINE B - PUMP 3 GROUP 1	LINE C - PUMP 3 GROUP 4	LINE D - PUMP 3 GROUP 4	LINE E - PUMP 3 GROUP 3
LINE A - PUMP 4 GROUP 4	LINE B - PUMP 4 GROUP 4	LINE C - PUMP 4 GROUP 4	LINE D - PUMP 4 GROUP 1	LINE E - PUMP 4 GROUP 2

GROUP AUTOMAN	TIME AFTER FIRE SETPOINT	TIME REMAINING	TIME RUN SETPOINT	TIME REMAINING
GROUP 1 AUTO	GROUP 1 TO DELAY 0.0 mins	0.00	GROUP 1 5.0 mins	4.85
GROUP 2 AUTO	GROUP 2 TO DELAY 10.0 mins	9.57	GROUP 2 10.0 mins	9.89
GROUP 3 AUTO	GROUP 3 TO DELAY 0.0 mins	0.00	GROUP 3 10.0 mins	9.93
GROUP 4 AUTO	GROUP 4 TO DELAY 15.0 mins	14.53	GROUP 4 5.0 mins	4.97

ALARM
LIST

POWER SUPPLY
SCREEN

BACK TO
MAIN SCREEN

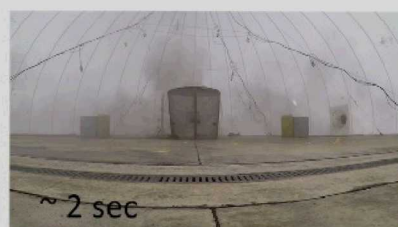
TIME SINCE TRIGGER
27:10

Programmer

8/9/2019 5:03:58 PM



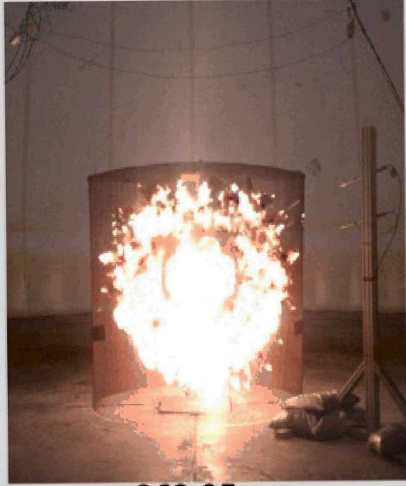
9



High Speed Video Images



280.62 μs



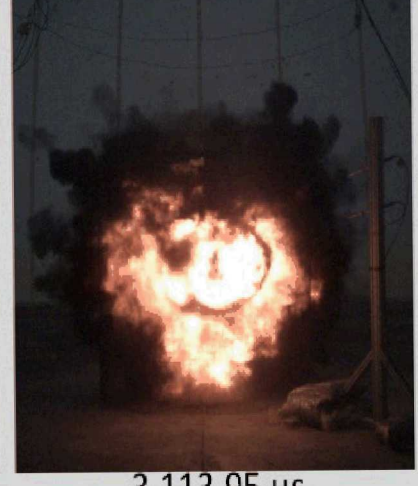
363.95 μs



863.95 μs



1,530.62 μs



3,113.95 μs



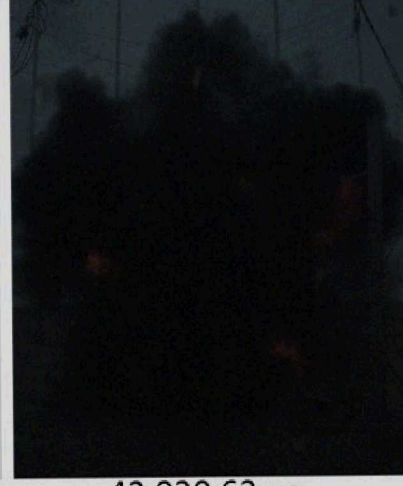
8,863.95 μs



16,780.62 μs



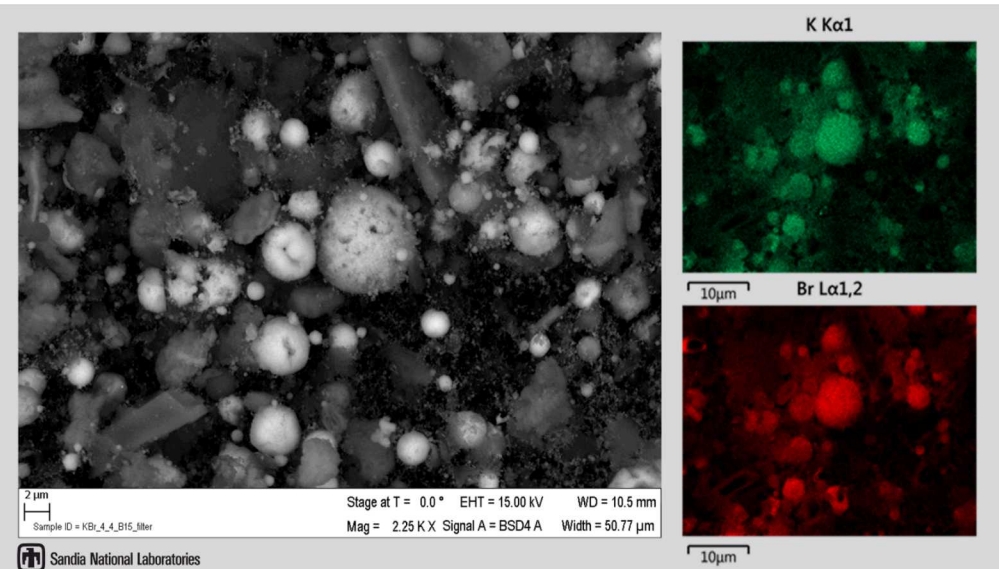
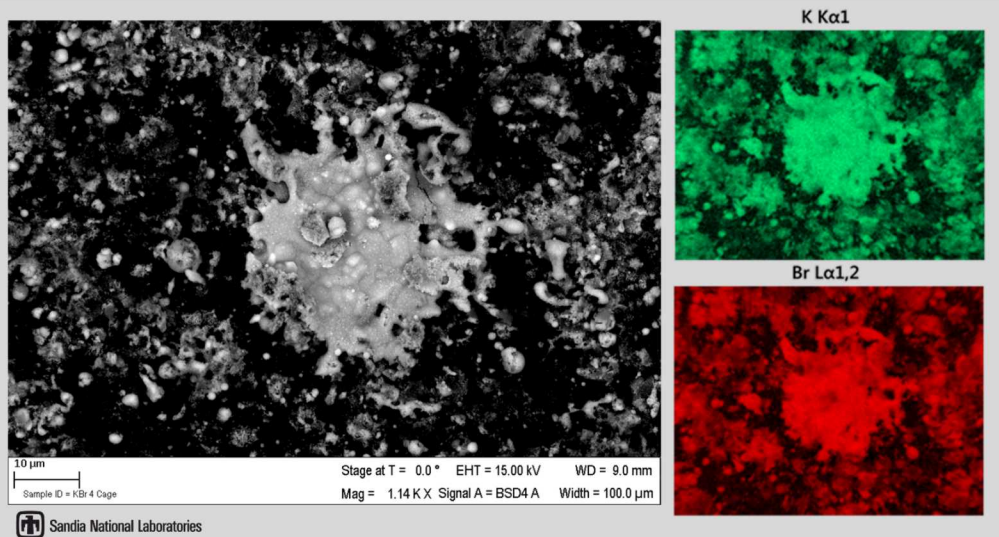
29,030.62 μs



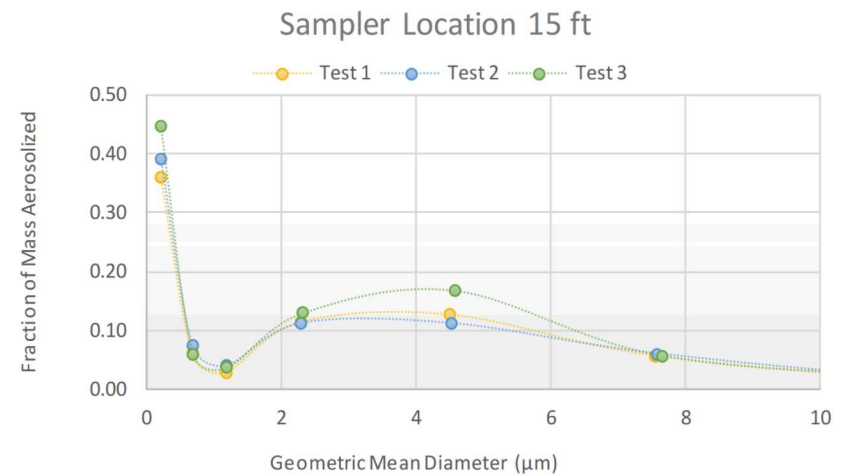
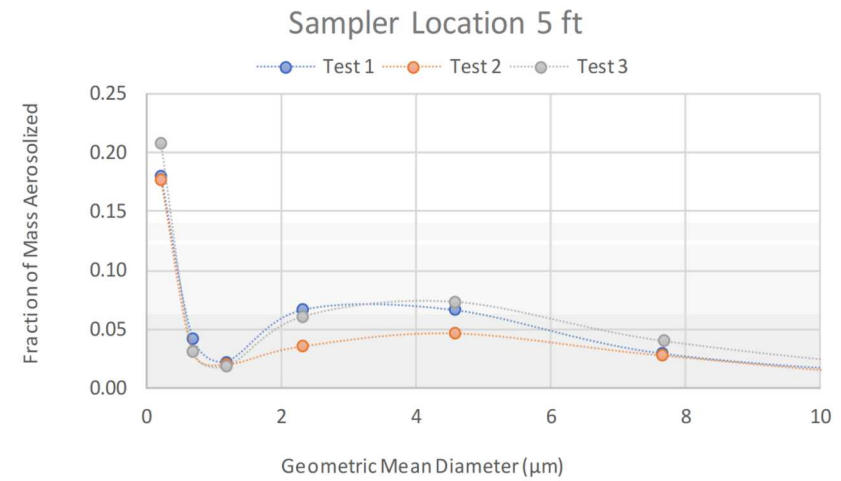
42,030.62 μs

Example Data

Scanning Electron Microscope (SEM) Results



Cascade Impactor Summary





Questions ?

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