

# **Performance of FRM PM Samplers in Rural Environments – An Update**

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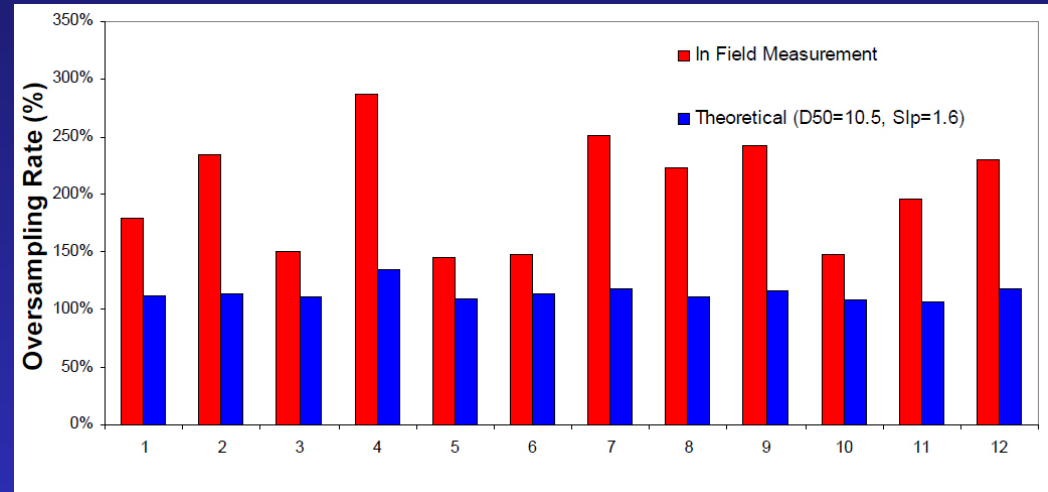
**February 7, 2012**

# Rural v. Urban Environments

- **Urban**
  - Largely secondary PM
  - Two primary modes (USEPA, 1996)
    - Coarse: MMD ~ 5.7  $\mu\text{m}$ ; GSD ~ 2.25
    - Accumulation: MMD ~ 0.32  $\mu\text{m}$ ; GSD ~ 2.16
- **Rural**
  - Largely primary/crustal PM

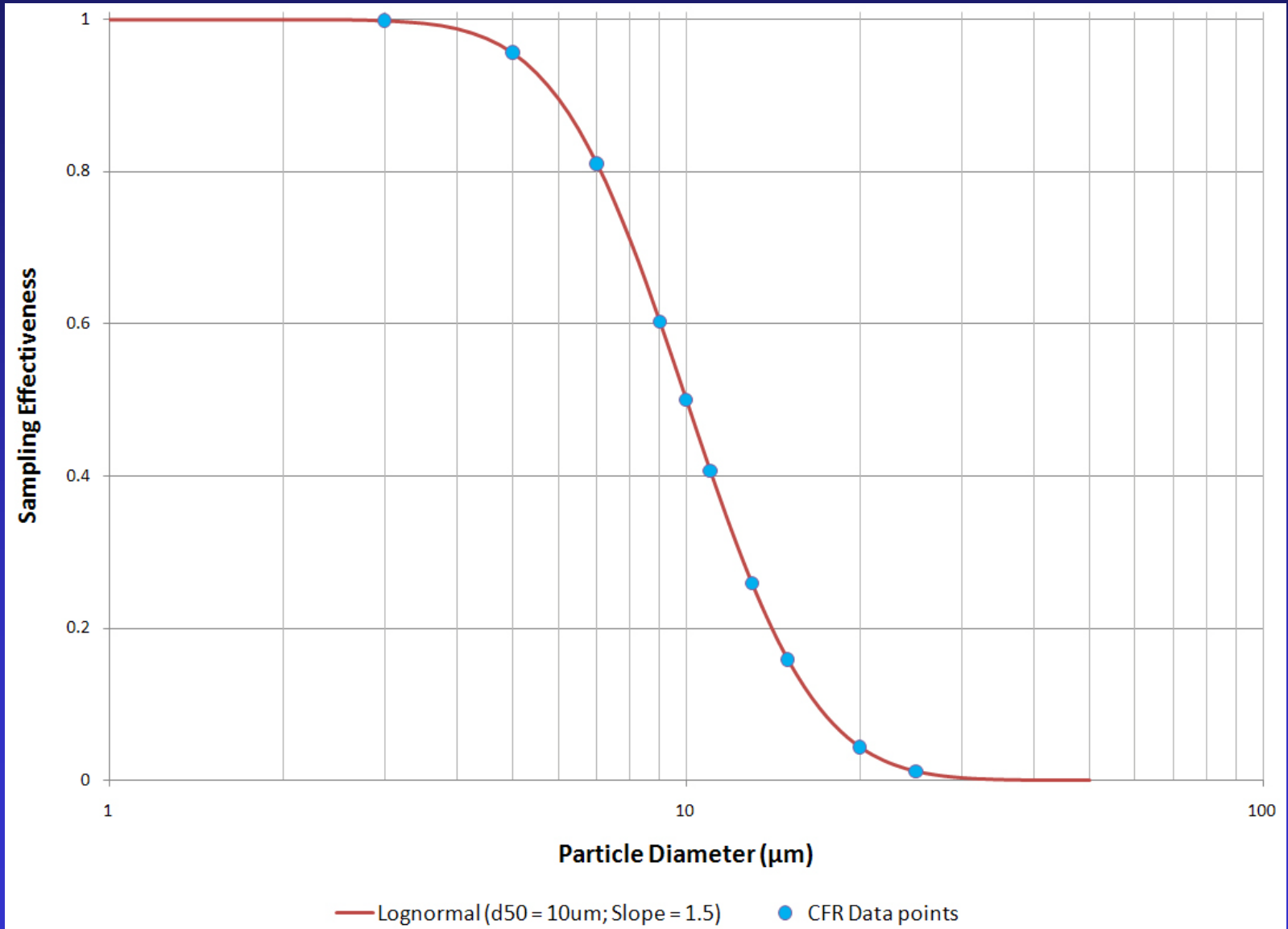
# Observed Oversampling

- Beef feedyards
- Dairies
- Poultry houses
- Swine houses
- Almond harvest
- Cotton harvest
- Cotton gins

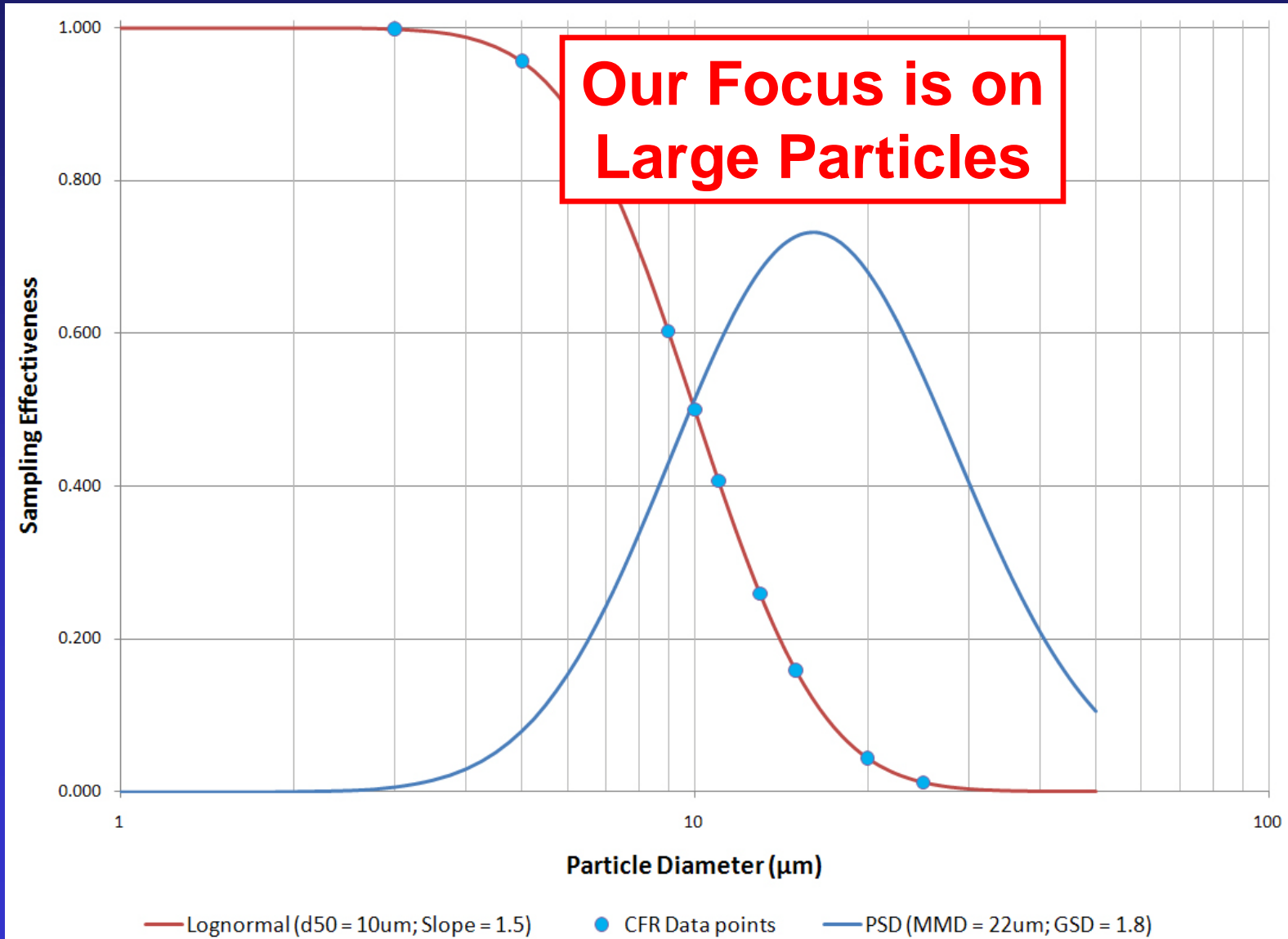


**Samplers are not performing as intended in rural environments.**

# Potential Causes



# Potential Causes



# Cooperative Efforts with EPA

- Research Plan
  - Testing of **PM<sub>10</sub> inlet** with emphasis on reducing uncertainty in large particle measurements
  - Testing of **low-volume TSP inlet**

# Cooperative Efforts with EPA

- **Research Plan**
- **Sharing of resources**
  - **Equipment**
  - **SOPs and QAQC Procedures**
  - **Data**

# Next Steps (from Sept.)

- **Finalize wind tunnel performance validation (September 2011)**
  - **Velocity uniformity**
  - **Concentration uniformity**
    - **Temporal**
    - **Spatial**

# Completed

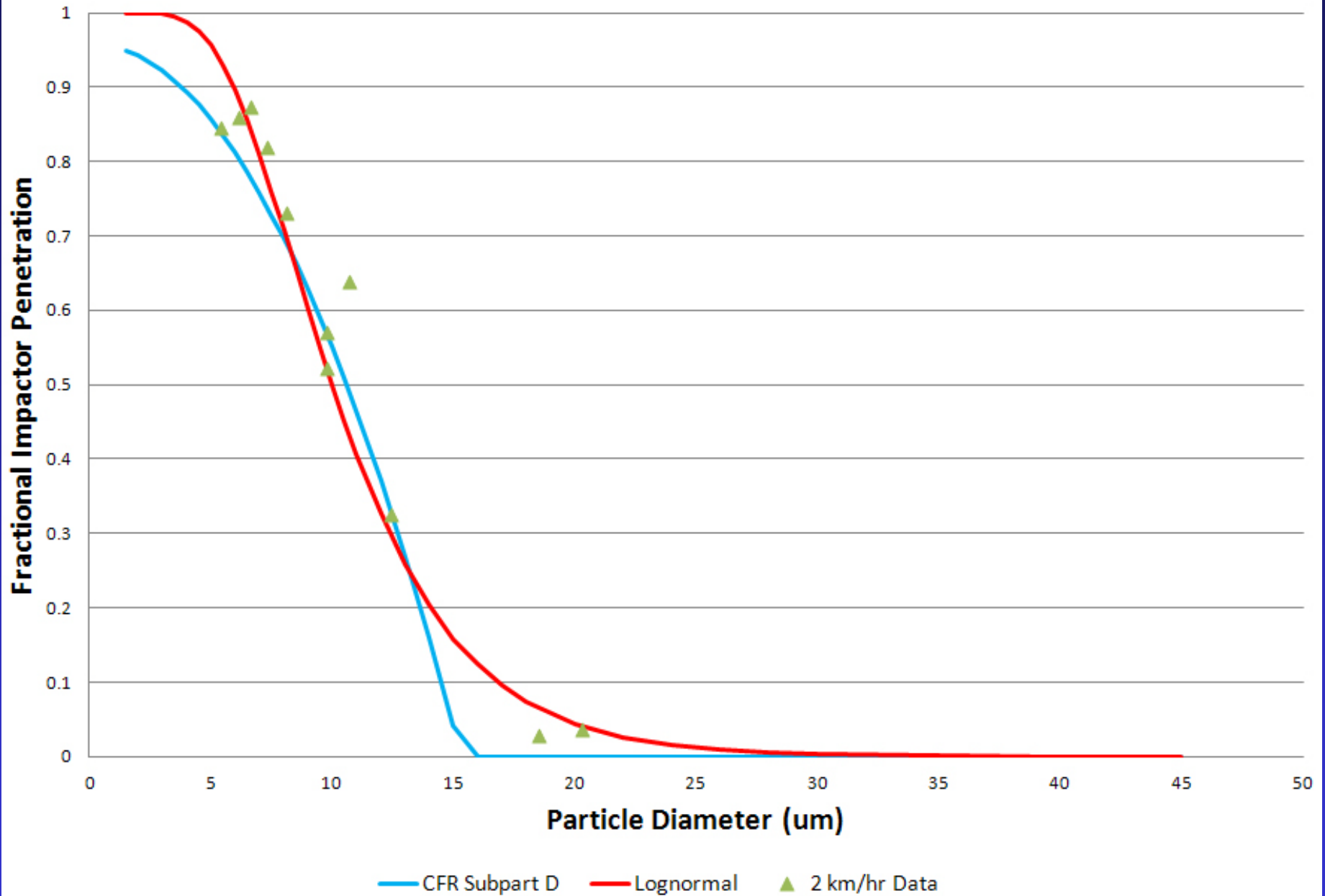


# Next Steps (from Sept.)

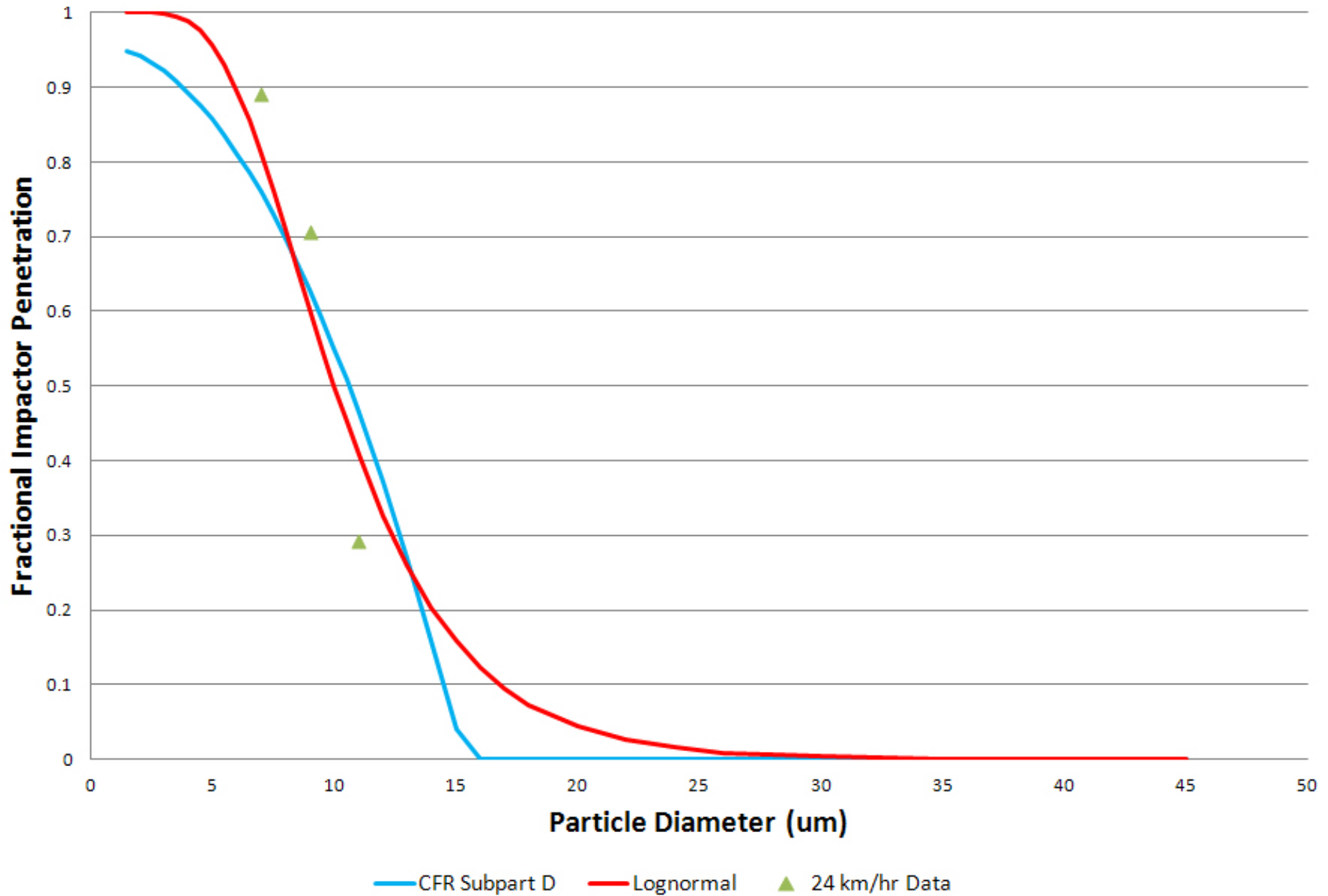
- Finalize wind tunnel performance validation (September 2011)
- Collect first round of data for PM<sub>10</sub> and LVTSP samplers using liquid aerosols (December 2011)

**In Process**

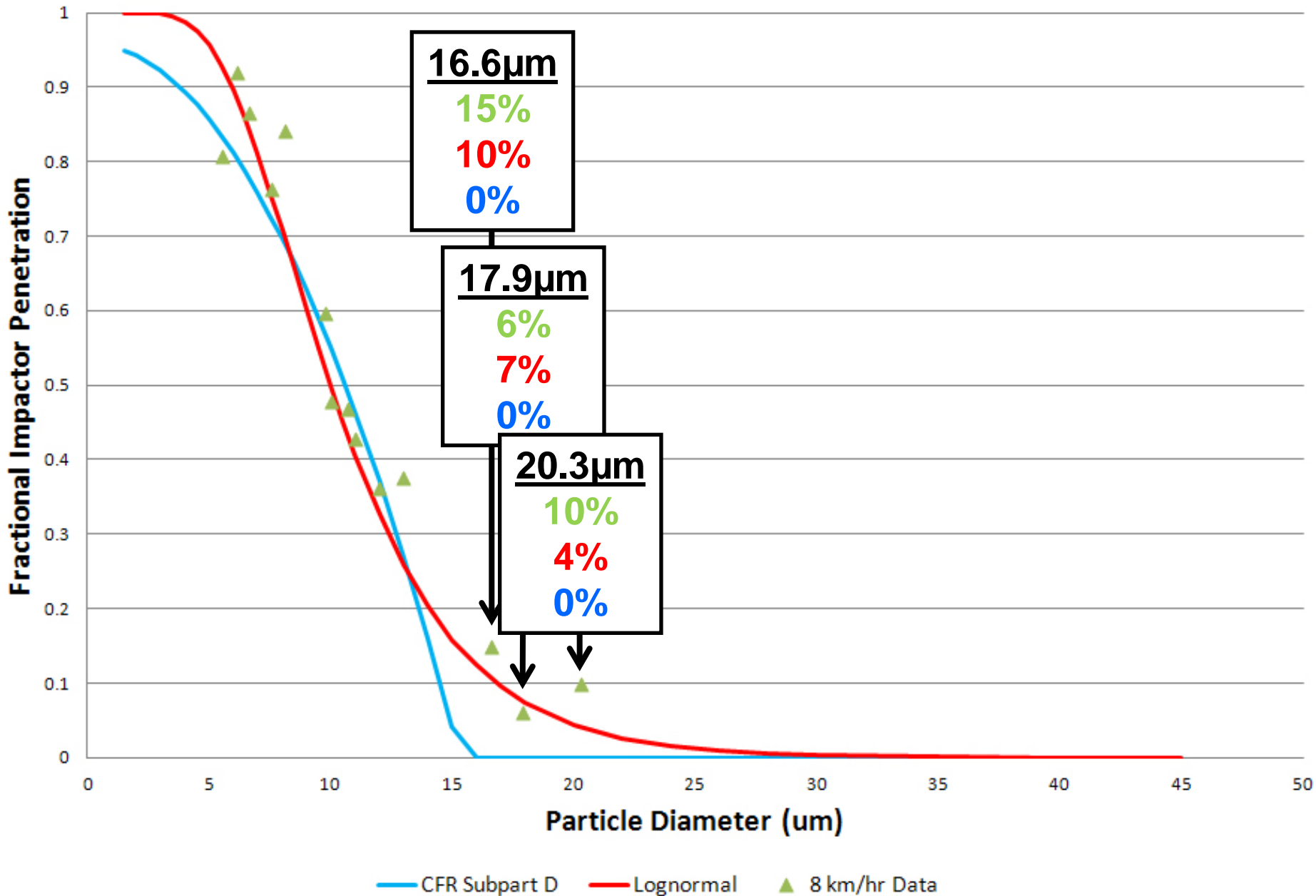
## 2 km/hr Penetration Curve

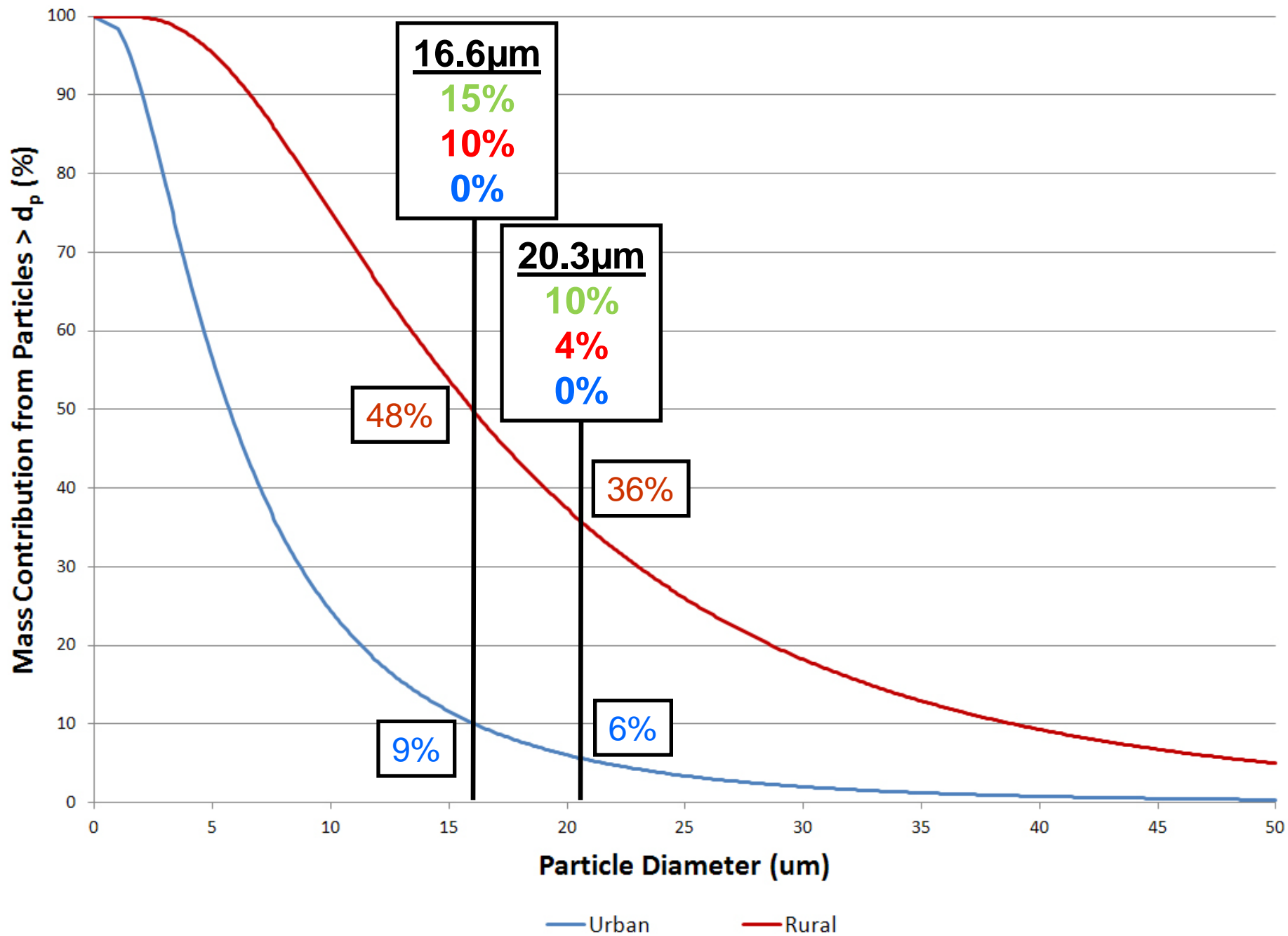


## 24 km/hr Penetration Curve



# 8 km/hr Penetration Curve





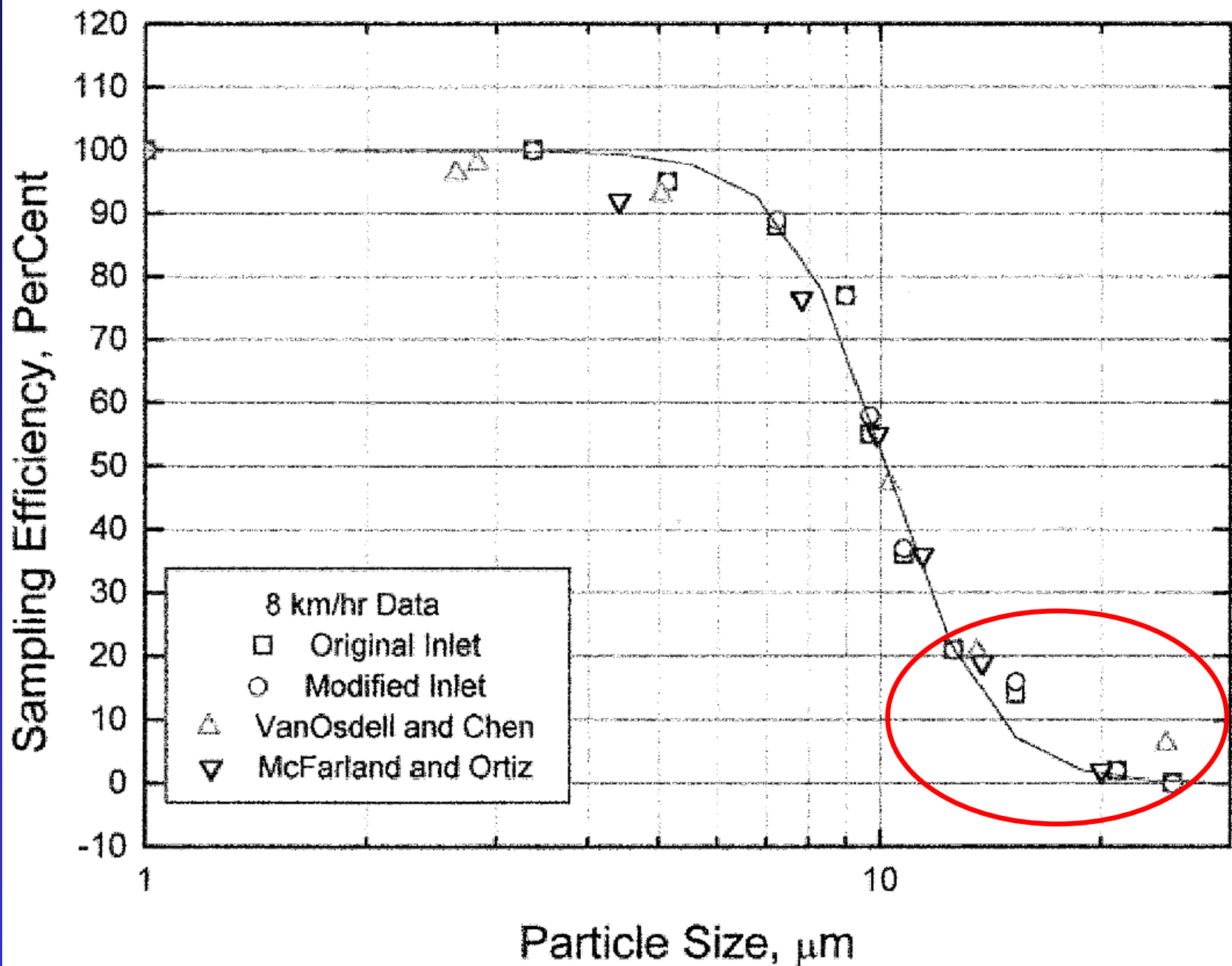


Figure 5 (8 kph) – Tolocka et al. (2001)

# Next Steps (from Sept.)

- Finalize wind tunnel performance validation (September 2011)
- Collect first round of data for PM<sub>10</sub> and LVTSP samplers using liquid aerosols (~~December 2011~~) **Now April 2012**
- Collect data with solid aerosols (~~February 2012~~) **Now May 2012**