PM Continuous Monitoring with the TAPI 640

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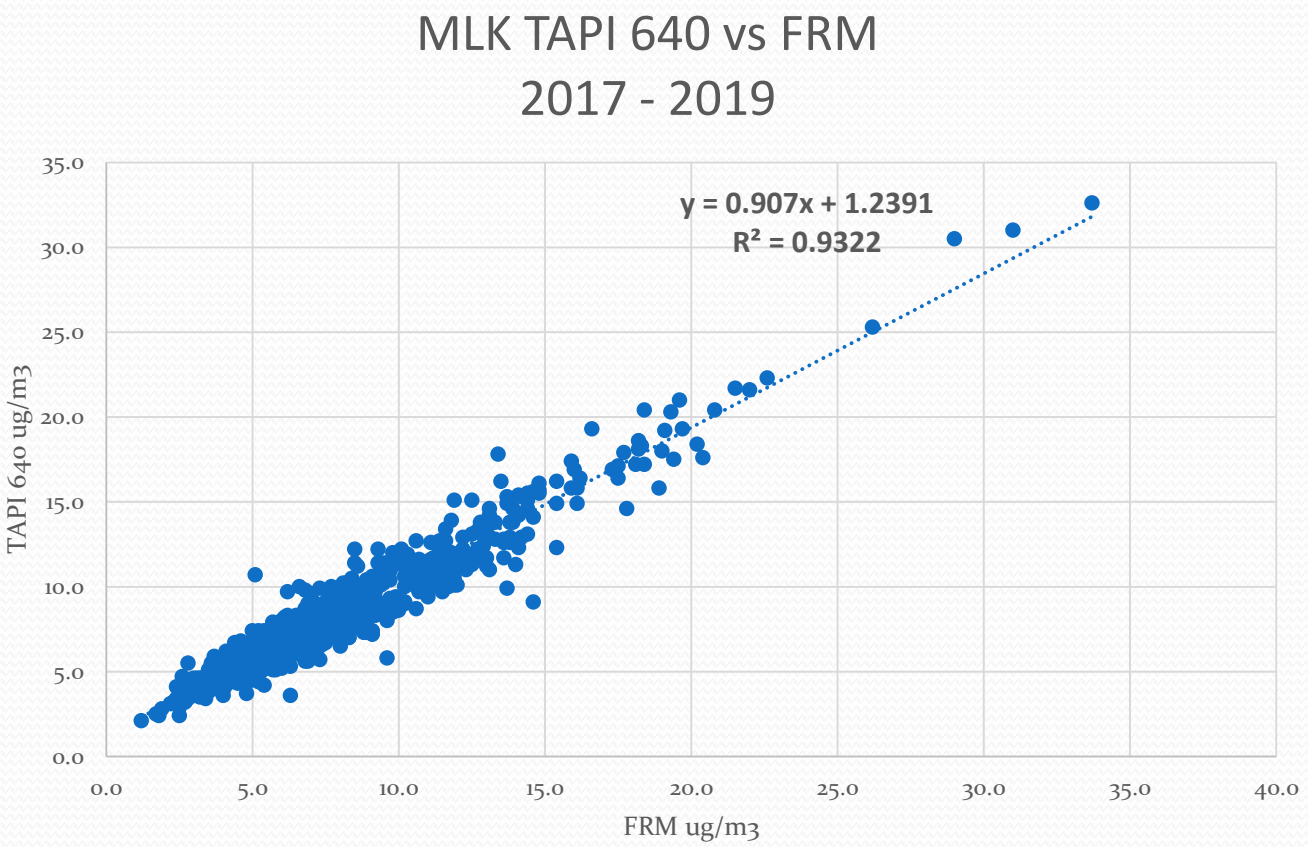
Teledyne API Model T640

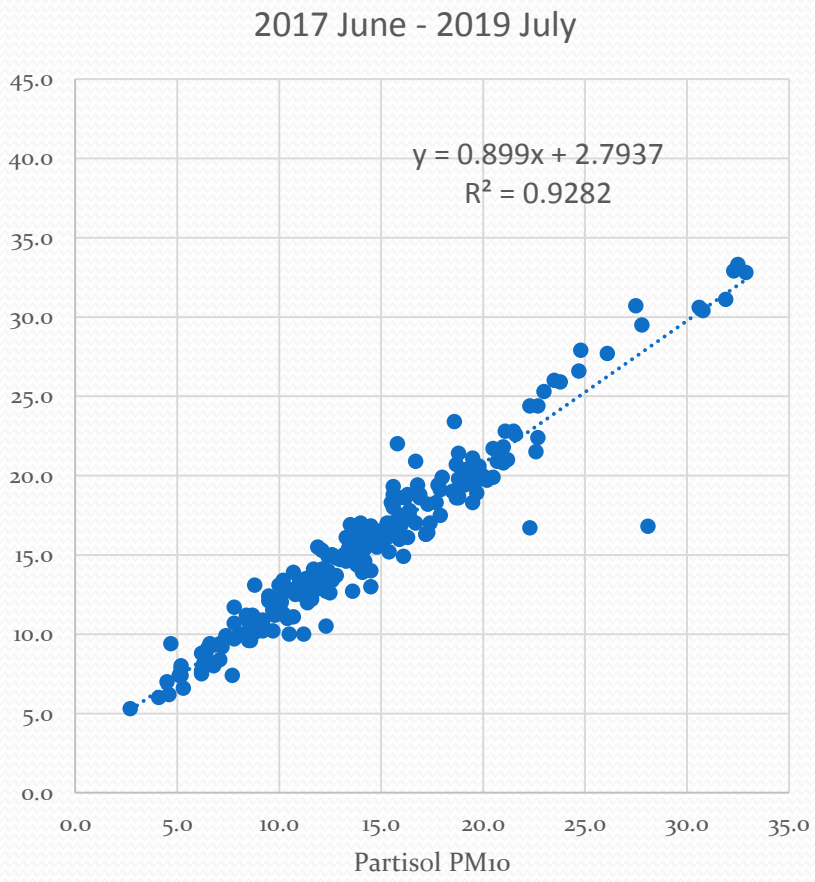
- Method – continuous PM monitoring using real-time scattered light spectrometry
  - T640 approved FEM for $PM_{2.5}$ but also measures PM_{10} and $PM_{10-2.5}$
  - Flow rate 5.0 lpm
- Can be installed inside a walk-in shelter or in a stand-alone enclosure
- T640 inlet not size selective

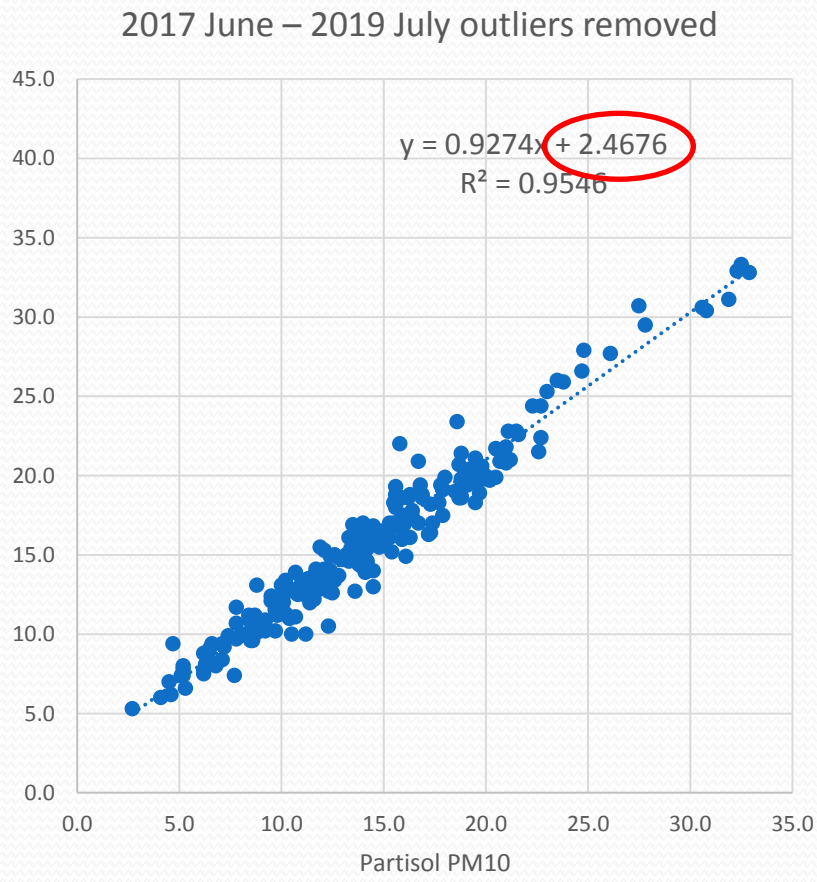
Model 640x

TAPI 640 $PM_{2.5}$ Assessment



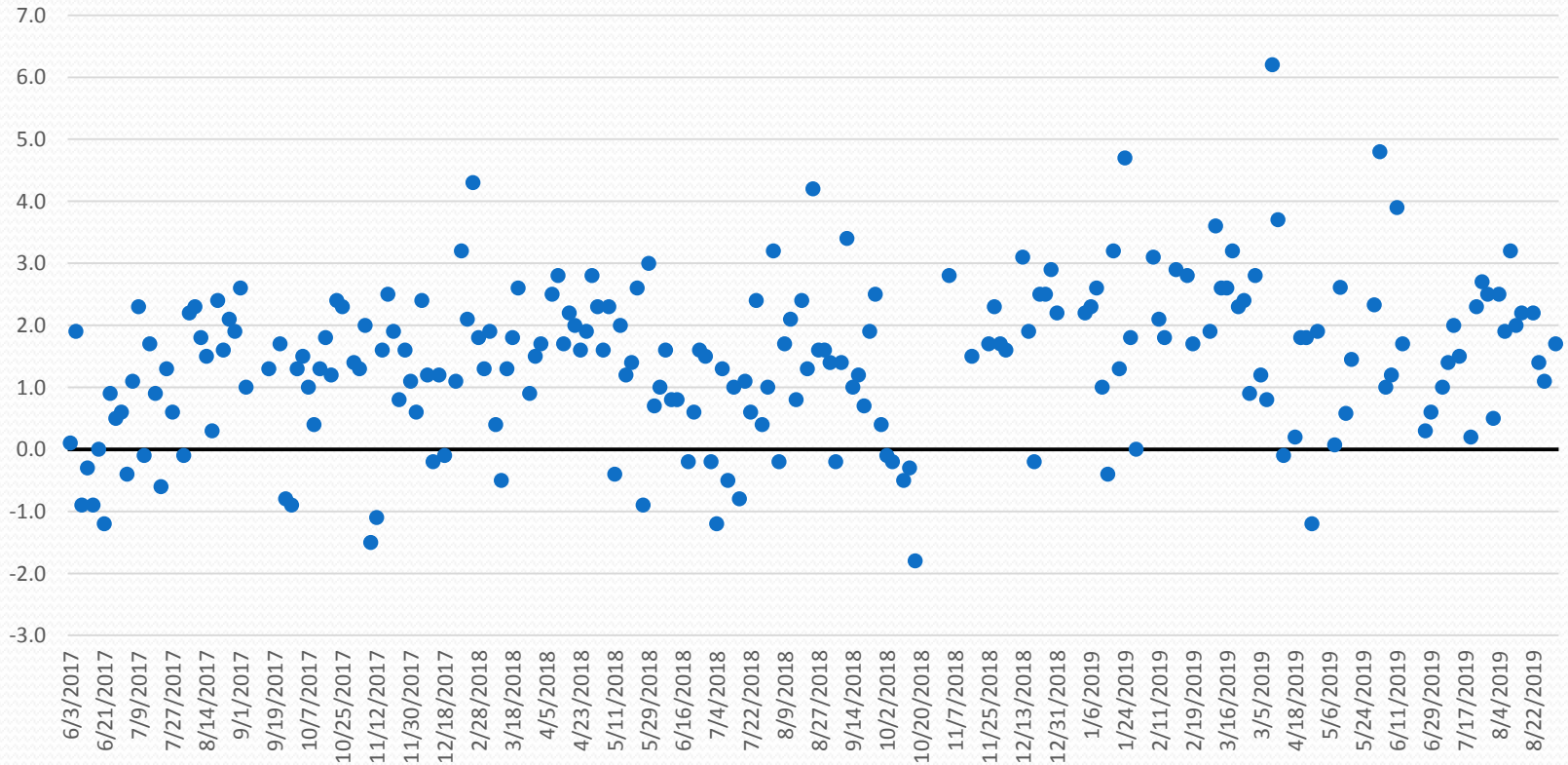
TAPI 640 PM_{10} Assessment





Difference in ug/m^3

TAPI – Partisol PM_{10}



Walk in shelter installations

Roof inlet

- Rain cap to prevent water intrusion

Inside installation, inlet through shelter roof

Modification to top of outer heater tube (Aerosol Sample Conditioning “ASC” tube) to allow easier installation of inlet tube.

Regular QC checks

Without slip-coupler

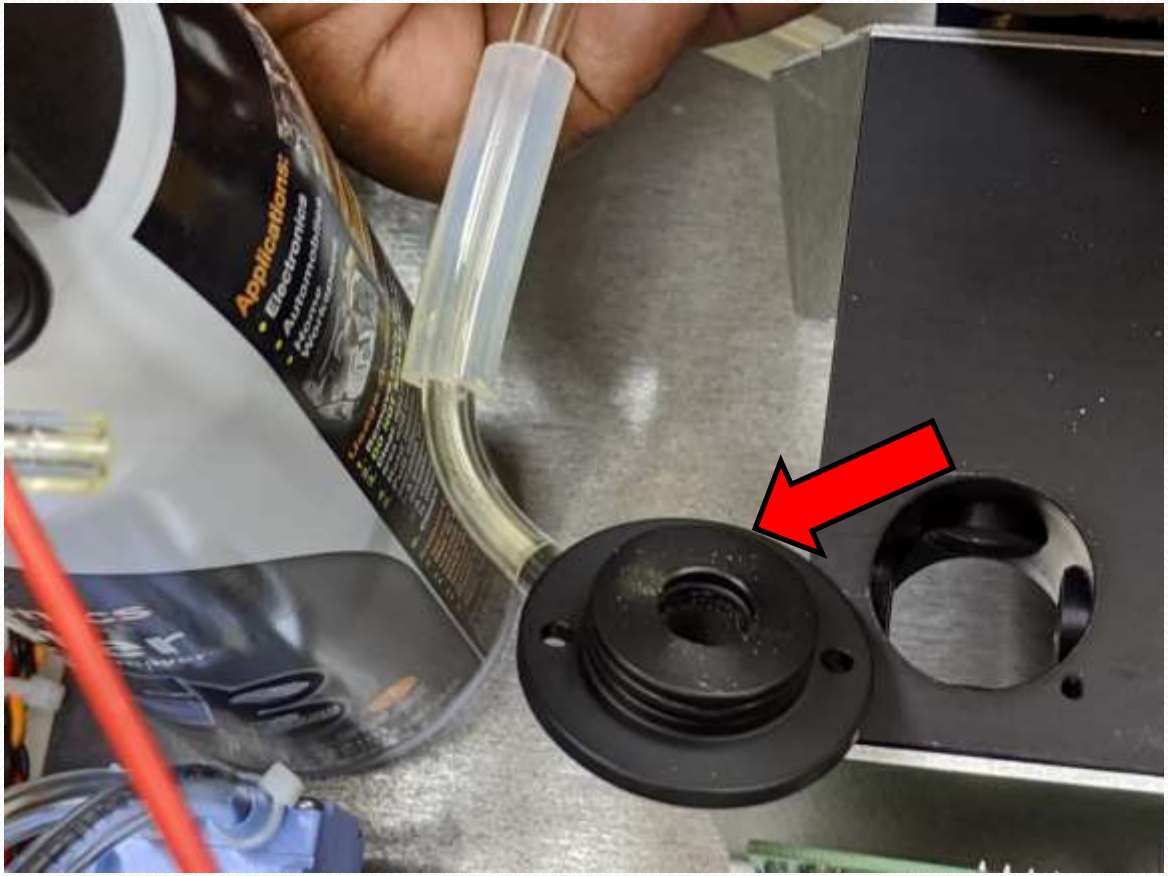
Magic pixie dust calibration/check

Flow check

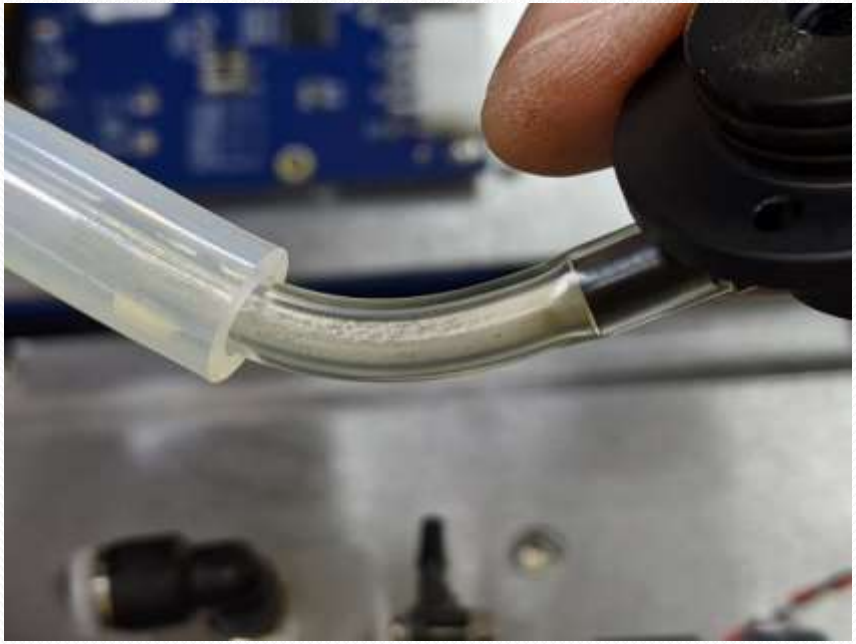
Things to pay attention to:

- Careful use of magic pixie dust during span check/calibration
  - *Avoid clogging – very slight tap on bottle is sufficient*
  - *Don't use dust if it is "clumping" or past expiration date*
- Clean optics at least every 6 months
- Operational checks that can result in data invalidation
  - *Example: Failed monthly flow check caused invalidation of one month of data. Now we perform **weekly** flow checks.*

Excessive dust (agricultural activities, too much magic pixie dust) can accumulate on cup (in optical chamber)



Clogging from excessive pixie dust



Removing ASC

Sleeve should remain over nozzle

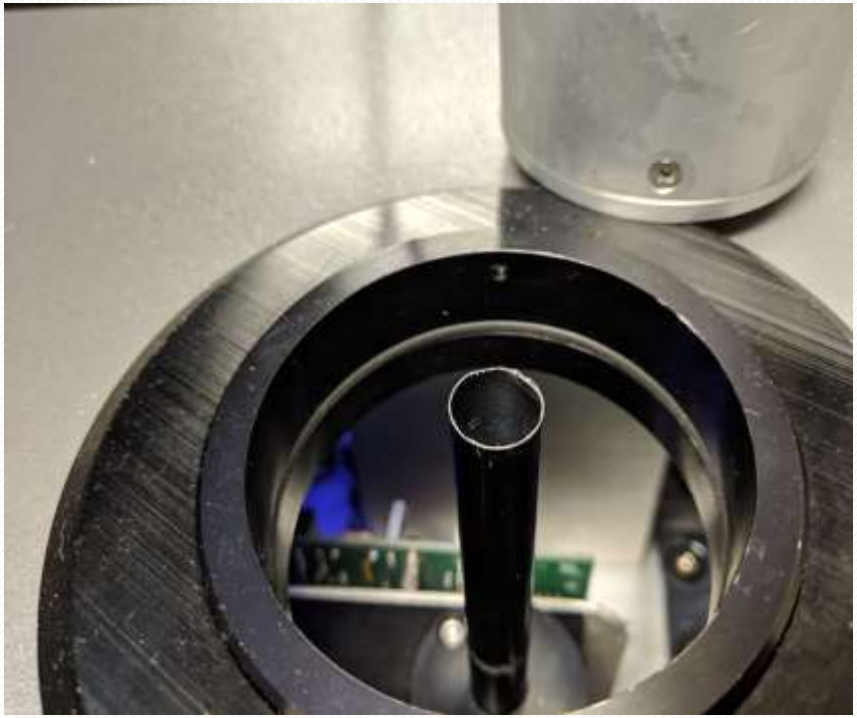
Sleeve may stay in ASC

Karl Dyer Sleeve Removal Tool
(patent pending)

Replacing ASC – sleeve should go on first

Undamaged

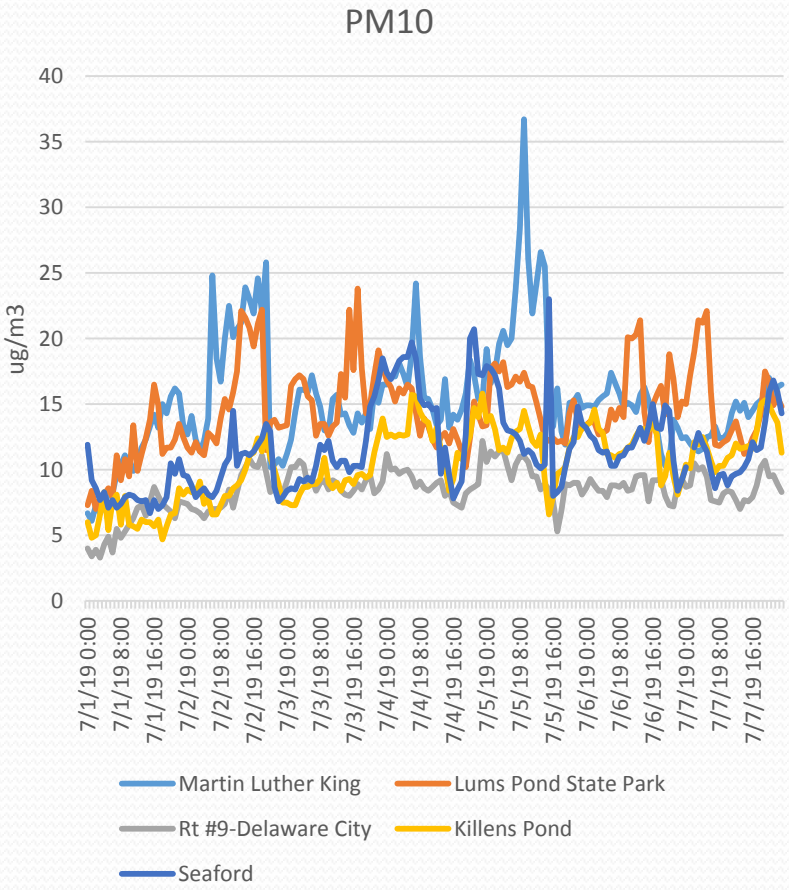
Damaged

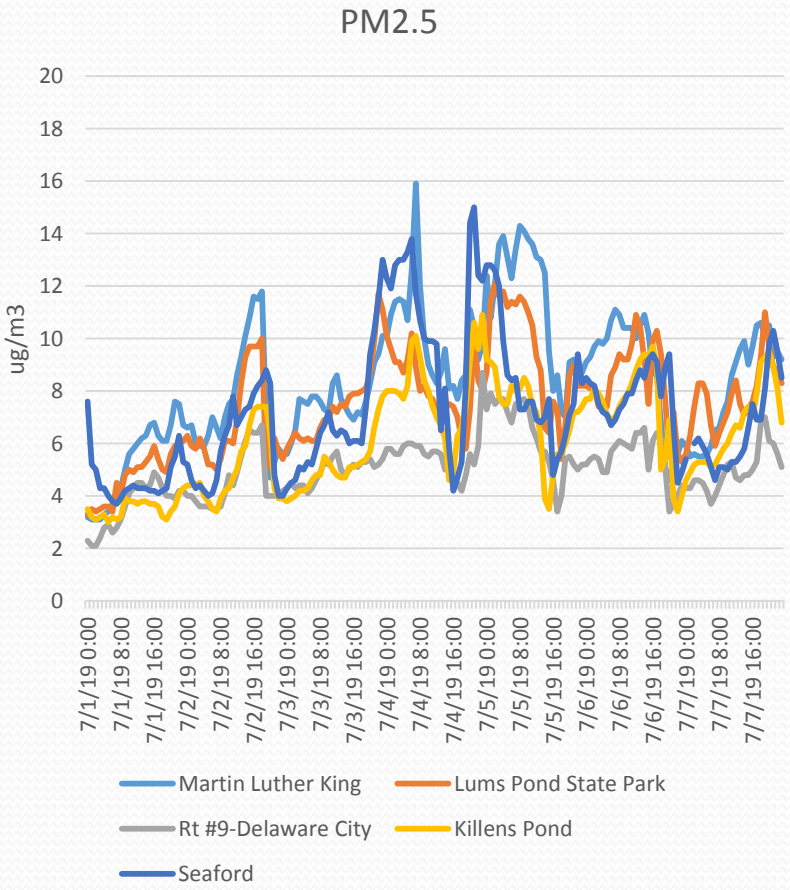


Data Validation

- Monthly field sheets: flow, zero, and leak checks
  - Follow EPA/TAPI suggested field forms, but
    - Less frequent magic pixie dust checks
    - More frequent flow checks
- Visual assessment – time-series graphs of hourly averages, compare sites
  - Look at both PM10 and PM2.5 data

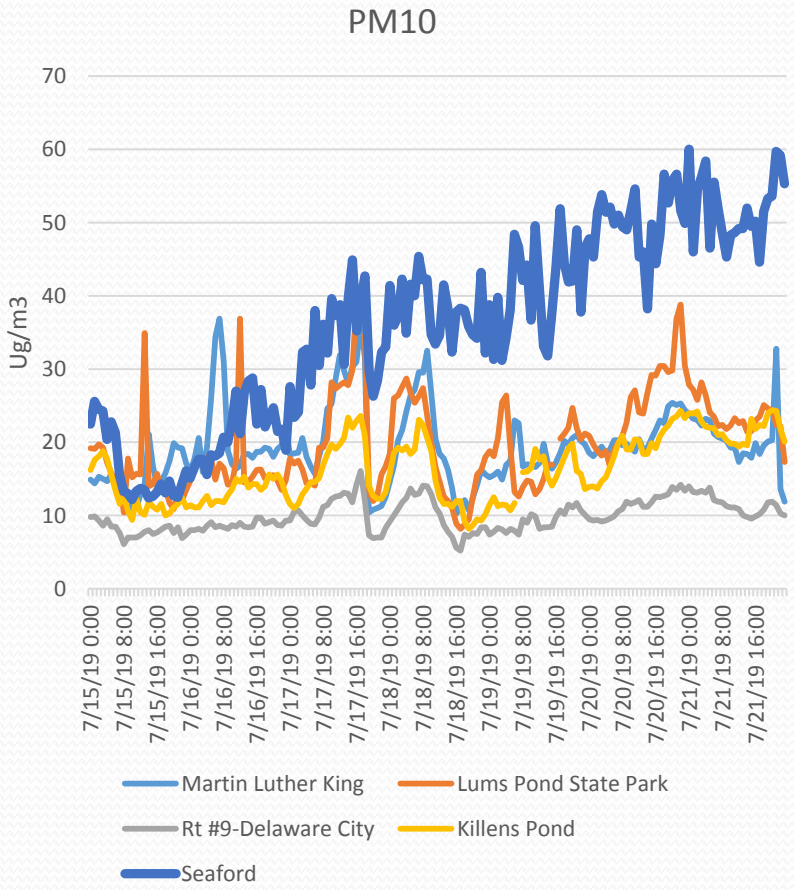
Typical Hourly Averages

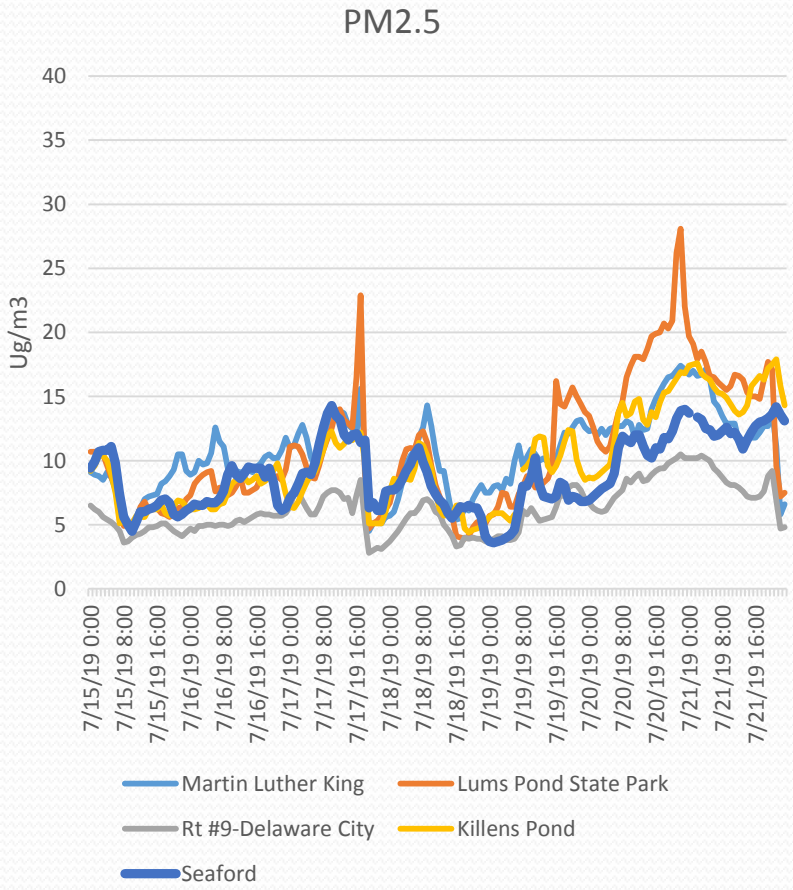




Not so typical

Operational checks were OK





Seaford PM_{10} problem resolved by:

- Clean inlet and down tube (found obstruction – piece of cleaning wipe)
- Clean optics
- Recalibrate with magic pixie dust

Lesson learned – look at both PM10 and PM2.5 data!

What’s next – stand-alone shelters

TAPI 640 – Happy TAPI!

- Easier QC checks and servicing than SHARP BAM, more reliable, better PM2.5 correlation with FRM
- PM10 data is precise but biased approx. 2 ug/m^3 high
  - PM10 can act as indicator of TSP
- Next phase is installing T640 in stand-alone shelters on platforms at 3 sites

P.S. Several slightly used SHARP monitors available FREE to good home, see Chuck Sarnoski.

Questions?