CONTINUOUS PM2.5 ANALYZER PERFORMANCE IN NJ

Comparison of PM2.5 data from Thermo 5014i PM2.5 analyzer and Thermo 2025i FRM sampler in New Jersey in 2015

PM2.5 Monitors in NJ

- 17 FRM samplers, 3 samplers with daily sampling
  - All FRMs are Thermo 2025 or 2025i
- 12 continuous analyzers, 8 collocated with FRMs
  - 11 Thermo 5014i, 1 R&P TEOM
- NJ has a PM2.5 filter weighing system
- FRMs are still Primary PM2.5 monitor
- Generally use continuous analyzers for AQI
- 2015 Annual averages range: 7.0 - 11.4 ug/m3
- 2015 Max 24-hour averages range: 24.3 - 37.3 ug/m3

Pros/Cons with Continuous PM2.5

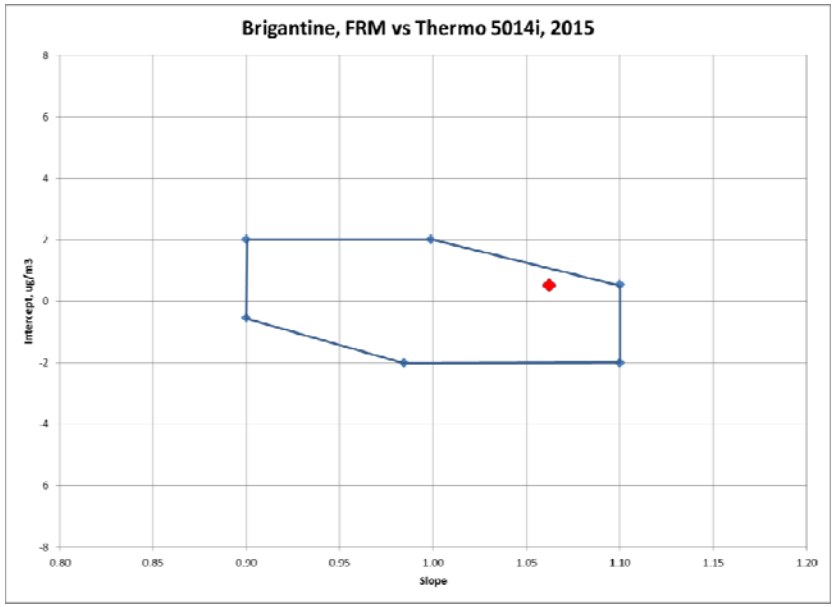
- Hourly and 1-minute data
- Data submitted to Airnow and NJ website
  - Issues with NowCast – overestimating PM2.5
- FEM - data can be compared to NAAQS
- Saves resources over FRM sampling
  - Reduce or eliminate FRM samplers
  - Reduce or eliminate PM2.5 weighing system
- FEM designation does not guarantee performance in the "real world"
- Caution when design value sites are near NAAQS
- Thermo 5014i requires shelter

Pros/Cons with Thermo 5014i

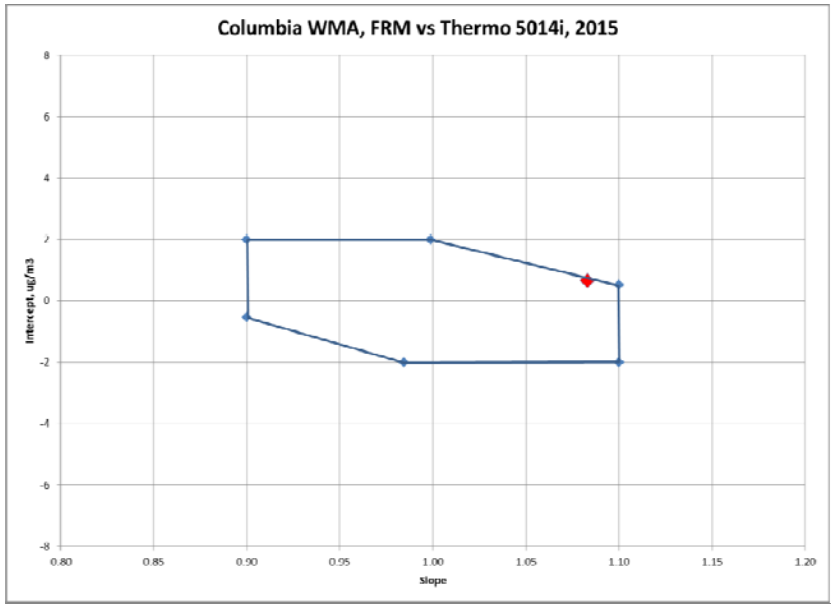
- Similar user interface as other Thermo products
- Regular service is simple, few consumables
- Pressure Sensor Board issues
- Leak check issues
- Apparent invalid data, but no status codes
- Sensitive to shelter temperature
- Erratic/invalid data after tape advance/power reset
- Quality control
- Problems can be difficult to diagnose

Thermo 5014i Performance

Brigantine - Rural

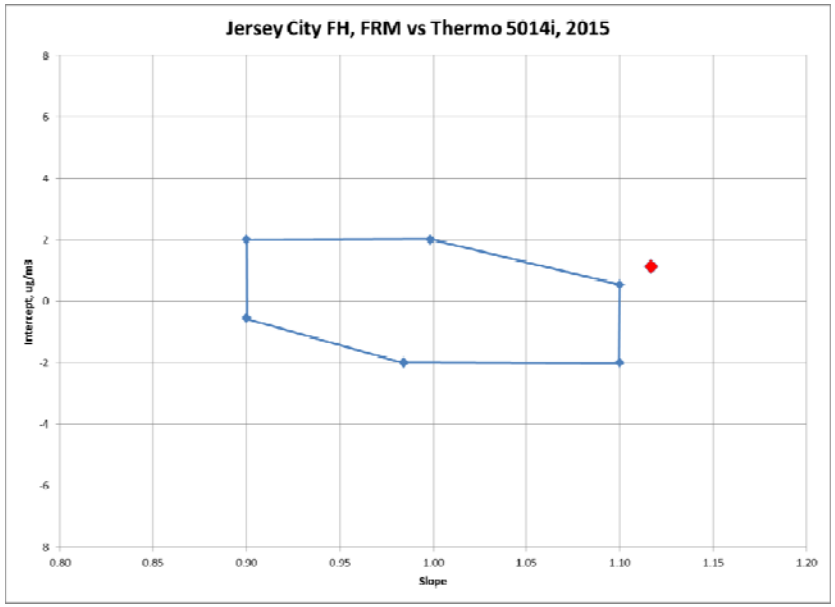


Columbia WMA - Rural

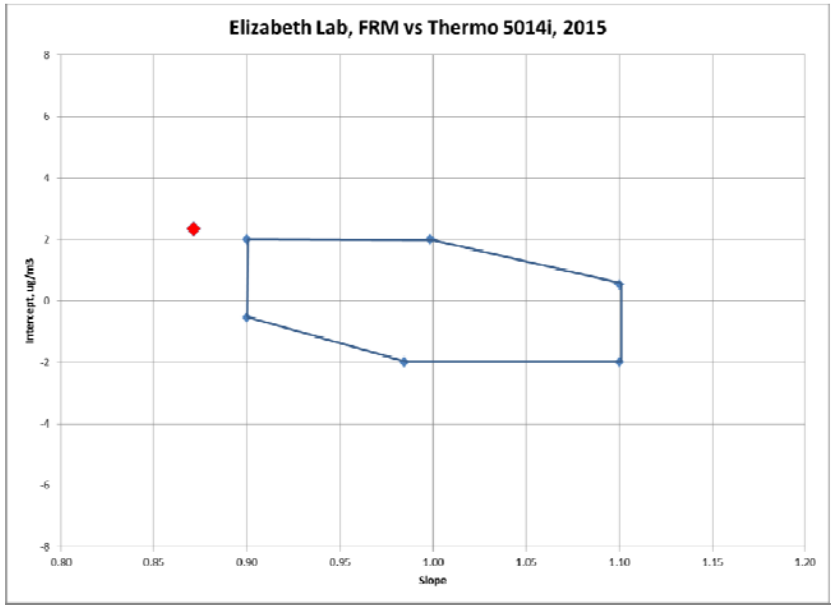


Thermo 5014i Performance

Jersey City FH - Urban

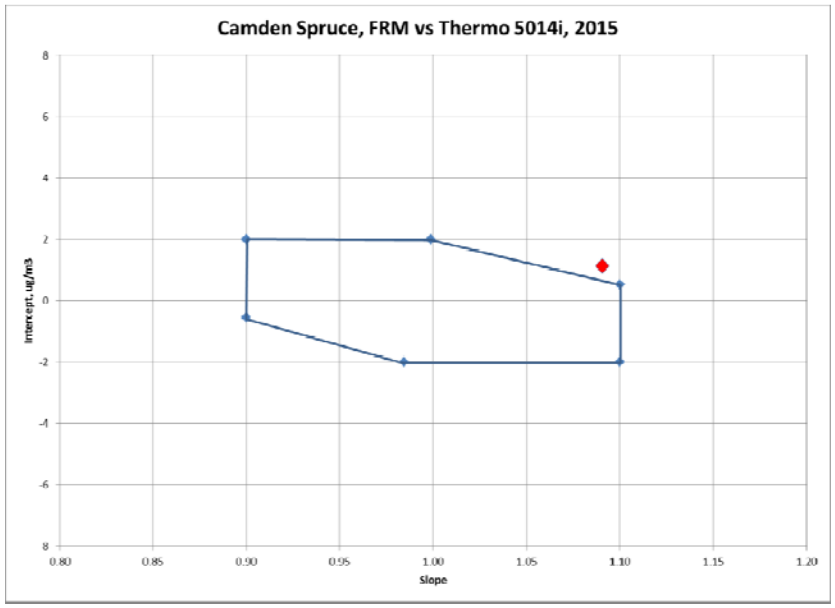


Elizabeth Lab Exit 13 - Urban

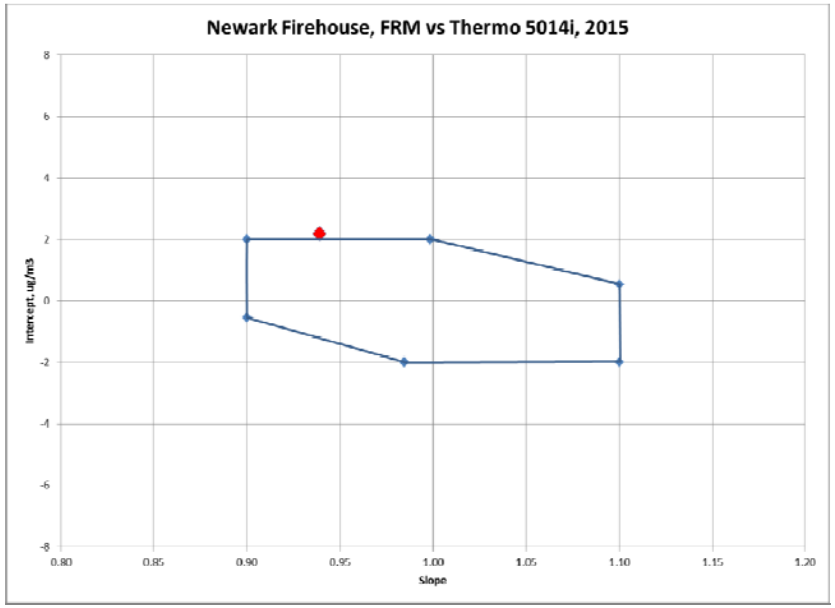


Thermo 5014i Performance

Camden Spruce - Urban

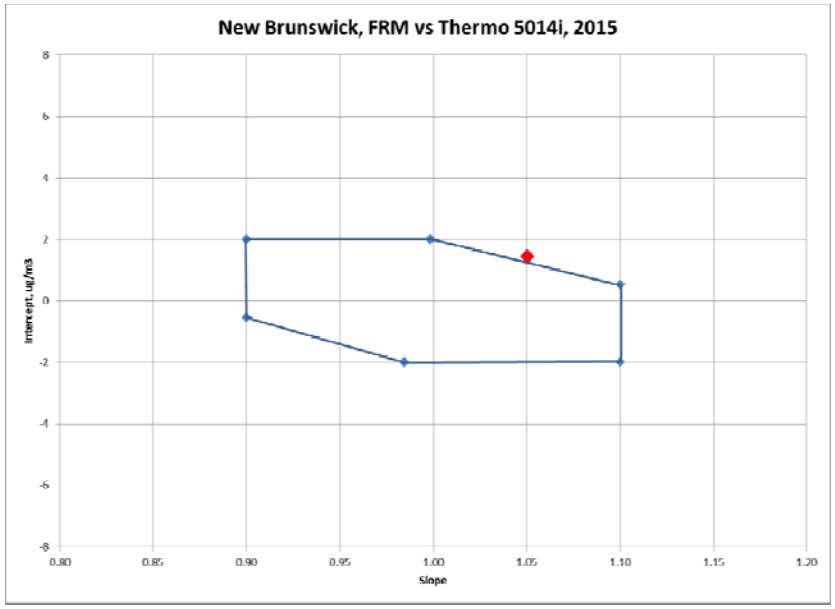


Newark Firehouse - NCore



Thermo 5014i Performance

New Brunswick - suburban



Performance Summary

	Difference in 2015 Annual Avg (ug/m3) over FRM	Intercept	Slope	Corr Coef
Brigantine	+1.0	0.523	1.062	0.943
Camden Spruce	+2.1	1.138	1.090	0.934
Columbia WMA	+1.4	0.661	1.083	0.951
Eliz Exit 13	+1.0	2.315	0.871	0.873
Jersey City	+2.2	1.140	1.117	0.957
New Brunswick	+1.9	1.454	1.050	0.926
Newark Firehouse	+1.6	2.186	0.939	0.930

What's Next

- NJ is not ready to migrate to an FEM network for compliance with NAAQS
- NJ started submitting all FEM data to AQS in 2016
- Look for operational issues with Thermo 5014i and 2025i that could be factor in the differences
- Test other FEMs
- Continue FRMs for at least another 10 years, especially at design value sites
- Implement FEMs as the primary PM2.5 monitor at lower PM2.5 concentration sites

Questions, Comments

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