



Florida Department of Environmental Protection

Florida PQAO Manual PM_{2.5} Network Analysis

April 26, 2017





Overview

- Existing FRM/FEM PM_{2.5} network
- PM_{2.5} network modification proposals
- Florida DEP's PM_{2.5} Gravimetric Laboratory updates
- FRM versus FEM Data trends/comparisons



PM_{2.5} FRM/FEM Network Requirements

4.7 Fine Particulate Matter (PM_{2.5}) Design Criteria.

4.7.1 General Requirements. (a) State, and where applicable local, agencies must operate the minimum number of required PM_{2.5} SLAMS sites listed in Table D-5 of this appendix. The NCore sites are expected to complement the PM_{2.5} data collection that takes place at non-NCore SLAMS sites, and both types of sites can be used to meet the minimum PM_{2.5} network requirements. Deviations from these PM_{2.5} monitoring requirements must be approved by the EPA Regional Administrator.

TABLE D-5 OF APPENDIX D TO PART 58—PM_{2.5} MINIMUM MONITORING REQUIREMENTS

MSA population ¹ ₂	Most recent 3-year design value ≥85% of any PM _{2.5} NAAQS ³	Most recent 3-year design value <85% of any PM _{2.5} NAAQS ^{3,4}
>1,000,000	3	2
500,000-1,000,000	2	1
50,000-<500,000 ⁵	1	0

¹Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).

²Population based on latest available census figures.

³The PM_{2.5} National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR part 50.

⁴These minimum monitoring requirements apply in the absence of a design value.

⁵Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

4.7.2 Requirement for Continuous PM_{2.5} Monitoring. The State, or where appropriate, local agencies must operate continuous PM_{2.5} analyzers equal to at least one-half (round up) the minimum required sites listed in Table D-5 of this appendix. At least one required continuous analyzer in each MSA must be collocated with one of the required FRM/FEM/ARM monitors, unless at least one of the required FRM/FEM/ARM monitors is itself a continuous FEM or ARM monitor in which case no collocation requirement applies. State and local air monitoring agencies must use methodologies and quality assurance/quality control (QA/QC) procedures approved by the EPA Regional Administrator for these required continuous analyzers.

40 CFR Part 58 Appendix D

Minimum Monitoring Requirements for Florida MSAs:

- 4 large MSAs = 8 sites
- 5 medium = 4 sites

Currently all sites with a design value are < 85 % of the NAAQS

Continuous PM_{2.5} analyzers also required, equal to one-half the Table D-5 req's, with at least one per MSA collocated with an FRM/FEM monitor



PM_{2.5} FRM/FEM Network Requirements

3.2.3 *Collocated Quality Control Sampling Procedures for PM_{2.5}*. For each pair of collocated monitors, designate one sampler as the primary monitor whose concentrations will be used to report air quality for the site, and designate the other as the quality control monitor. There can be only one primary monitor at a monitoring site for a given time period.

3.2.3.1 For each distinct monitoring method designation (FRM or FEM) that a PQAQ is using for a primary monitor, the PQAQ must have 15 percent of the primary monitors of each method designation collocated (values of 0.5 and greater round up); and have at least one collocated quality control monitor (if the total number of monitors is less than three). The first collocated monitor must be a designated FRM monitor.

3.2.3.2 In addition, monitors selected for collocation must also meet the following requirements:

(a) A primary monitor designated as an EPA FRM shall be collocated with a quality control monitor having the same EPA FRM method designation.

(b) For each primary monitor designated as an EPA FEM used by the PQAQ, 50 percent of the monitors designated for collocation, or the first if only one collocation is necessary, shall be collocated with a FRM quality control monitor and 50 percent of the monitors shall be collocated with a monitor having the same method designation as the FEM primary monitor. If an odd number of collocated monitors is required, the additional monitor shall be a FRM quality control monitor. An example of the distribution of collocated monitors for each unique FEM is provided below. Table A-2 of this appendix demonstrates the collocation procedure with a PQAQ having one type of primary FRM and multiple primary FEMs.

#Primary FEMS of a unique method designation	#Collocated	#Collocated with an FRM	#Collocated with same method designation
1-9	1	1	0
10-16	2	1	1
17-23	3	2	1
24-29	4	2	2
30-36	5	3	2
37-43	6	3	3

3.2.3.3 Since the collocation requirements are used to assess precision of the primary monitors and there can only be one primary monitor at a monitoring site, a site can only count for the collocation of the method designation of the primary monitor at that site.

3.2.3.4 The collocated monitors should be deployed according to the following protocol:

(a) Fifty percent of the collocated quality control monitors should be deployed at sites with annual average or daily concentrations estimated to be within plus or minus 20 percent of either the annual or 24-hour NAAQS and the remainder at the PQAQs discretion;

(b) If an organization has no sites with annual average or daily concentrations within ± 20 percent of the annual NAAQS or 24-hour NAAQS, 50 percent of the collocated quality control monitors should be deployed at those sites with the annual mean concentrations or 24-hour concentrations among the highest for all sites in the network and the remainder at the PQAQs discretion.

40 CFR Part 58 Appendix A

Collocation Requirements for Florida PQAQ:

- 15% of primaries of each method type
- First collocated monitor must be an FRM
- One of the first nine FEM's must be collocated with an FRM; tenth FEM must be collocated with the same type FEM, and so on...
- We will never eliminate all FRMs! But we can reduce the workload...



PM_{2.5} FRM Network

12-011-0034	Daniela Bana (NCore Site)	5300 S. Pine Island Rd., Davie, FL 33226; 26.0538889, -80.2569444	SLAMS	PM _{2.5}	1	Daily	Therma 2025i	POP EXP	NBH	NEEDED BY REGULATION	SU 1/1/2015; Collocated monitor
			SLAMS	PM _{2.5}	2	Every 6th Day	Therma 2025i	POP EXP	NBH	QA COLLOCATION	SU 1/1/2015; Collocated monitor
12-011-0003	Pampuna Highland Fire House	1951 NE 48th Street, Pampuna Beach, FL 33060; 26.290823, -80.245556	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	HI CONC	NBH	INTERPOLATION	SU 7/10/2010
12-011-5005	Cocanut Creek	4010 Winton Park Blvd, Cocanut Creek, FL	SLAMS	PM _{2.5}	1	Daily	Therma 2025i	POP EXP	NBH	NEEDED BY REGULATION	SU 9/30/2009
12-006-0033	Palm Spring Fire Station	7700 NW 156th St, Palm Springs, FL 33018; 25.949444, -80.3243889	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma 2025i	POP EXP	NBH	MONITORING GROWTH IMPACT	SU 5/4/2005
12-006-1016	Miami Fire Station	1200 NW 20th St, Miami, FL 33142; 25.794722, -80.245556	SLAMS	PM _{2.5}	1	Daily	Therma 2025i	HI CONC	NBH	NEEDED BY REGULATION	SU 2/4/1999
			SLAMS	PM _{2.5}	2	Every 6th Day	Therma 2025i	HI CONC	NBH	QA COLLOCATION	SU 2/4/1999; Collocated monitor
12-006-6001	Hamstead Fire Station	325 NW 2nd St, Hamstead, FL 32030;	SLAMS	PM _{2.5}	1	Daily	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 1/27/1999
12-009-2005	Dalray Beach	225 S. Ocean Ave, Dalray Beach, FL 33448; 26.454944, -80.092778	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 5/31/2001
12-057-3002	Sydney (NCore Site)	1167 N. Dover Rd., Dover, FL 33527; 27.965650, -82.330400	SLAMS	PM _{2.5}	1	Daily	Therma/R&P 2025i	POP EXP	URBAN	NEEDED BY REGULATION	SU 1/1/2004
			SLAMS	PM _{2.5}	2	Every 6th Day	Therma/R&P 2025	POP EXP	URBAN	QA COLLOCATION	SU 1/26/2010; Collocated monitor
12-103-0018	Azalea Park	7200-22 Ave N., St. Petersburg, FL 33701; 27.785866, -82.739875	SLAMS	PM _{2.5}	1	Daily	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 1/1/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	POP EXP	NBH	QA COLLOCATION	CLOSE SU 1/1/1999; Collocated monitor; SD EXPECTED 7/1/2017
12-103-1009	Sandy Lane	12603 Sandy Lane; Clearwater, FL 33755; 27.967222, -82.782222	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 9/12/2003
12-031-0032	Kaaker Park	Jackaraville, FL 32206; 30.264333, -84.435556	SPM	PM _{2.5}	1	Daily	Therma/R&P 2025	POP EXP	NBH	COMM RESPONSE	SU 7/15/2009
12-031-0098	Mandarin Rd Site	14932 Mandarin Rd., Jackaraville, FL 32223;	SLAMS	PM _{2.5}	1	Daily	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 6/1/1999
12-031-0099	Sunny Acora	1429 Merrill Rd., Jackaraville, FL 32225; 30.354722, -81.547778	SLAMS	PM _{2.5}	1	Daily	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 6/1/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	POP EXP	NBH	QA COLLOCATION	SU 6/1/1999; Collocated monitor
12-095-2002	Lake Irie Estator - Winter Park	213 S. Denning Ave, Winter Park, FL 32789; 28.596289, -81.362500	SLAMS	PM _{2.5}	1	Daily	Therma 2025i	POP EXP	NBH	NEEDED BY REGULATION	CLOSE SU 1/1/1999; SD 09/30/2016
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma 2025i	POP EXP	NBH	QA COLLOCATION	CLOSE SU 1/1/1999; Collocated monitor; SD 09/30/2016
12-117-1002	Seminole Community College	294-300 Broadmead Rd., Lake Mary, FL 32773; 28.746111, -81.310556	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP	NBH	MONITORING EXT COUNTY OF LARGE MET STAT AREA	SU 1/7/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	POP EXP	URBAN	QA COLLOCATION	CLOSE SU 1/7/1999; Collocated monitor; SD EXPECTED 7/1/2017
12-115-0013	Boo Ridge Park	4430 S. Lachuan Ridge Rd., Sarasota, FL 34231; 27.290556, -82.507222	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP/ HI CONC	NBH	NEEDED BY REGULATION	SU 1/6/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	POP EXP	NBH	QA COLLOCATION	CLOSE SU 1/3/1999; Collocated monitor; SD EXPECTED 7/1/2017
12-071-0005	Winkler Pump Station	1403 Princeton St., Ft. Myers, FL 33901; 26.602016, -81.877908	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP/ HI CONC	NBH	NEEDED BY REGULATION	SU 1/1/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	POP EXP	NBH	QA COLLOCATION	CLOSE SU 1/1/1999; Collocated monitor; SD EXPECTED 7/1/2017
12-105-6006	Baptist Childrens Home	1015 Silver Blvd., Lakeland, FL 33815; 28.028889, -81.972222	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	HI CONC	NBH	NEEDED BY REGULATION	SU 1/1/1999
12-127-5002	Daytona Blind Service	1185-A Dunn Ave, Daytona Beach, FL 32114; 29.272222, -81.516667	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma 2025i	HI CONC	URBAN	NEEDED BY REGULATION	SU 1/1/1999; SD 12/31/2007; SU 4/1/2009
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	HI CONC	NBH	NEEDED BY REGULATION	SU 3/1/2000
12-009-0007	Melbourne	400 West Florida Avenue, Melbourne, FL 32901; 28.072222, -80.583333	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma 2025i	HI CONC	NBH	TRANSPORT	SU 1/1/1999
12-033-0004	Ellyran Industrial Park	Captar Rd., Pensacola, FL 32504; 30.455556, -87.255556	SLAMS	PM _{2.5}	2	Every 12th Day	Therma 2025i	HI CONC	NBH	QA COLLOCATION	SU 1/2/1999; Collocated monitor
12-073-0012	Tallahassee Community College	110 Century Park Circle W., Tallahassee, FL 32304; 30.439722, -84.000000	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP	NBH	NEEDED BY REGULATION	SU 1/1/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma 2025i	POP EXP	NBH	QA COLLOCATION	SU 10/1/2004, Collocated monitor
12-001-0023	Millhopper	5400 NW 43rd St., Gainesville, FL 32653; 29.706111, -82.387778	SLAMS	PM _{2.5}	1	Every 3rd Day	Therma/R&P 2025	POP EXP	NBH	TRENDS MONITORING	SU 1/1/1999
			SLAMS	PM _{2.5}	2	Every 12th Day	Therma/R&P 2025	POP EXP	NBH	COLLOCATED	SU 1/6/1999; Collocated monitor

- 22 sites with FRM monitors
 - 22 Primary
 - 12 Collocated
- No single-monitor FRM sites
- >30 PM_{2.5} non-regulatory Continuous TEOM monitors, most collocated
 - Maintain spatial coverage, used for AQI
 - ~half older 1400AB models, no longer supported



FEM Network

12-011-0034	Daniela Banu (NCore Site)	5300 S. Pine Island Rd., Davie, FL 33328;	SLAMS	PM _{2.5}	3	Continuous	Thermo 5014i	POP EXP	NBH	NEEDED BY REGULATION		SU 7/1/2015; FEM
12-011-0035	Fort Lauderdale Near Road	799 N I-95, Ft. Lauderdale, FL 33311; 26.131256, -	SLAMS	PM _{2.5}	3	Continuous	Thermo 5014i	POP EXP	URBAN	NEEDED BY REGULATION		SU 8/1/2015; FEM
12-099-0022	Lamstein Lane	Lamstein Ln, Royal Palm Beach, FL 33411; 26.687606, -80.219619	SLAMS	PM _{2.5}	1	Continuous	Thermo 5014i	POP EXP	NBH	NEEDED BY REGULATION	ADD	SU EXPECTED 7/1/2017; FEM; Relocation from 099-0009
			SLAMS	PM _{2.5}	2	Continuous	Thermo 5014i	POP EXP	NBH	NEEDED BY REGULATION	ADD	SU EXPECTED 7/1/2017; Collocated monitor; FEM; Relocation from 099-0009
12-099-0008	Belle Glade	38754 State Rd 80, Belle Glade, FL 33430; 26.724786, -80.666447	NON-REG	PM _{2.5}	3	Continuous	MET One BAM 1020	POP EXP	NBH	USED FOR AQI		SU 5/1/2009; FEM
12-057-0113	Munro Street	1497 N. Munro Street, Tampa, FL 33607; 27.955550, -82.467140	SLAMS	PM _{2.5}	1	Continuous	Thermo 5014i	SOURCE	MICRO	NEEDED BY REGULATION		SU 2/1/2016; FEM; Relocation from 057-1111
12-057-3002	Sydney (NCore Site)	110 / N. Dover Rd., Dover, FL 33527; 27.963650, -82.230400	SLAMS	PM _{2.5}	3	Continuous	Thermo 5014i	POP EXP	URBAN	USED FOR AQI		SU 2/14/2014; FEM
12-031-0108	Pepsi Place	5895 Pepsi Place, Jacksonville, FL 32319;	SLAMS	PM _{2.5}	3	Continuous	Thermo 5014i	HI CONC	MIDDLE	NEEDED BY REGULATION		SU 2/14/2014; FEM
12-095-0009	I-4 Near Road	525 S. Division Ave, Orlando, FL 32805;	SLAMS	PM _{2.5}	3	Continuous	Thermo 5014i	SOURCE	MIDDLE	NEEDED BY REGULATION	ADD	SU EXPECTED 2/1/2017; FEM
12-095-2002	Lake Isle Estates -	213 S. Denning Ave, Winter Park, FL 32789;	SLAMS	PM _{2.5}	3	Continuous	Thermo 5014i	POP EXP	NBH	NEEDED BY REGULATION	ADD	SU 10/1/2016; FEM

- Currently running 2 types of FEM: BAM 1020 and 5014i
 - Waiver for BAM 1020: non-regulatory, so no collocation requirement at present
 - 9 (but only 5 set up) 5014i analyzers, meeting collocation requirement
- Anticipate adding 5+ new FEM T640 analyzers in the next year
 - The T640X version will have separate collocation requirements



PM_{2.5} Network Modification Proposals – Operating Schedules

40 CFR Part 58.12: Operating Schedules

- SLAMS sites without a collocated continuous monitor, 1-in-3 day
- SLAMS sites with a collocated continuous monitor may request approval for 1-in-6 day
- Some sites may remain on daily schedule until a valid design value is determined
- Current Network Plan proposes the following schedule changes:

AQS Site #	Site Name	Pollutant	Operating Schedule Change
12-031-0032	Kooker Park	PM _{2.5}	Daily to 1-in-3-day
12-031-0098	Mandarin Rd Site	PM _{2.5}	Daily to 1-in-3-day
12-031-0099	Sunny Acres	PM _{2.5}	Daily to 1-in-3-day
12-103-0018	Azalea Park	PM _{2.5}	Daily to 1-in-3-day
12-086-6001	Homestead Fire Station	PM _{2.5}	Daily to 1-in-3-day
12-086-1016	Miami Fire Station	PM _{2.5}	Daily to 1-in-3-day
		PM _{2.5} Collocated monitor	1-in-6-day to 1-in-12-day
12-011-0034	Daniela Banu (NCore Site)	PM _{2.5} Collocated monitor	1-in-6-day to 1-in-12-day
12-057-3002	Sydney (NCore Site)	PM _{2.5} Collocated monitor	1-in-6-day to 1-in-12-day



PM_{2.5} Network Modification Proposals - Removals

AQS Site #	Site Name	Monitor Type	Pollutant	Modification	Comments
12-105-6006	Baptist Children's Home (FDEP)	SLAMS	PM _{2.5}	CLOSE	Collocated monitor; Expected SD 07/1/2017. Monitor meets all requirements for removal per Section 4.1 of the AAMNAG. Collocation requirement still met.
12-117-1002	Seminole Community College (FDEP)	SLAMS	PM _{2.5}	CLOSE	Collocated monitor; Expected SD 07/1/2017. Monitor meets all requirements for removal per Section 4.1 of the AAMNAG. Collocation requirement still met.
12-115-0013	Bee Ridge Park (Sarasota)	SLAMS	PM _{2.5}	CLOSE	Collocated monitor; Expected SD 07/1/2017. Monitor meets all requirements for removal per Section 4.1 of the AAMNAG. Collocation requirement still met.
12-071-0005	Winkler Pump Station (FDEP)	SLAMS	PM _{2.5}	CLOSE	Collocated monitor; Expected SD 07/1/2017. Monitor meets all requirements for removal per Section 4.1 of the Ambient Air Monitoring Network Assessment Guidance (AAMNAG). Collocation requirement still met.
12-103-0018	Azalea Park (Pinellas)	SLAMS	PM _{2.5}	CLOSE	Collocated monitor; Expected SD 07/1/2017. Monitor meets all requirements for removal per Section 4.1 of the AAMNAG. Collocation requirement still met.

- 5 collocated monitors scheduled to shut down (SD), effective July 1
- AAMNAG = ?
 - Ambient Air Monitoring Network Assessment Guidance (EPA)
- “Collocation requirement still met.” = PQAQ req.
- All these sites have low design values and continuous monitors



Timeline

- Current Network Plan proposals – effective July 2017
 - Reduce schedule for 6 monitors from daily to 1-in-3, and for 3 collocated from 1-in-6 to 1-in-12
 - Shut down 5 “extra” collocated monitors – still leaves PQAO with 2X required number
- Further reduce FRM monitors and operating schedules over the next 3 years to minimum required, replacing as necessary with continuous FEM monitors



Florida DEP's PM_{2.5} Gravimetric Laboratory Updates

- Currently processing ~300 filters/week
- TSA F/C/O's:
 - Add received temperature to lab reports
 - Tweak lab qualifiers and comments – see DHDV SOP DEP 18-27 Section 12.5.5
 - Additional database calculation verification
- The PM_{2.5} lab is 'moving' from DEAR to DARM
 - ~2 month cross-training, starting next week
 - Complete transition by end of June
 - Maintain similar communications, schedules, lab reports
 - Navigate the FRM/FEM network changes
 - QAPP/SOP revisions due soon!

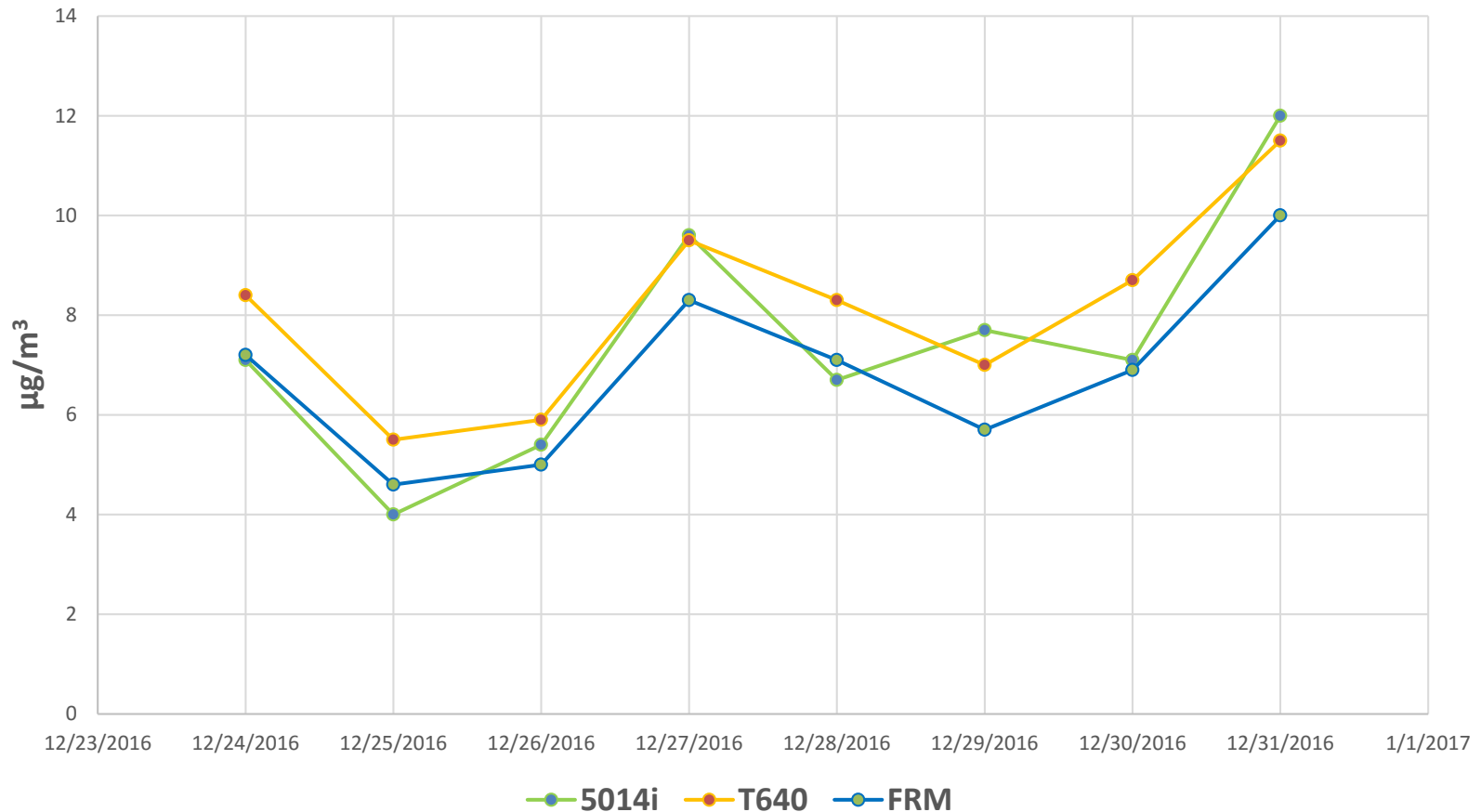




FRM versus FEM

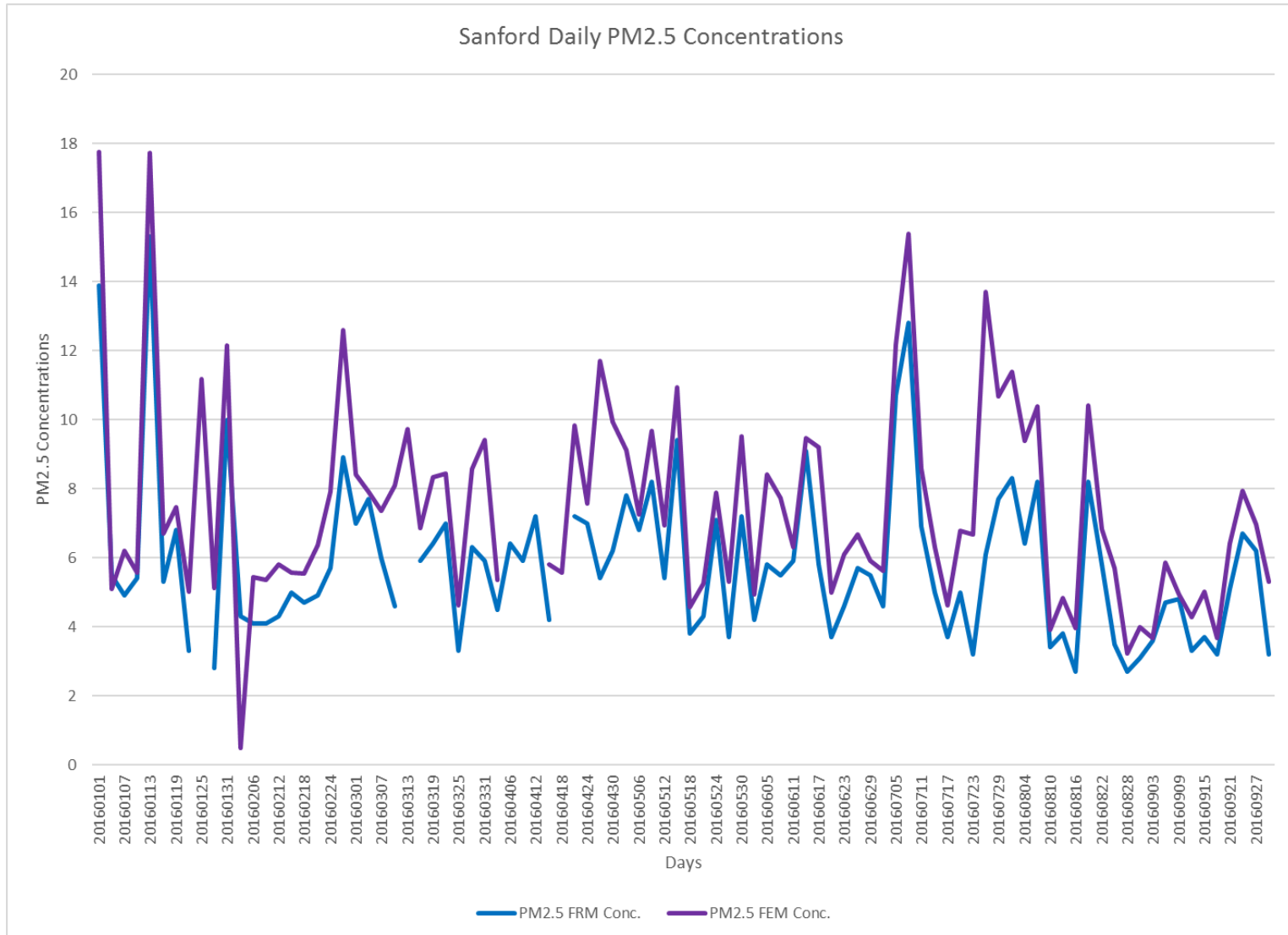
Data Trends & Comparisons

Sydney 057-3002
FEM/FRM Comparison - Daily averages



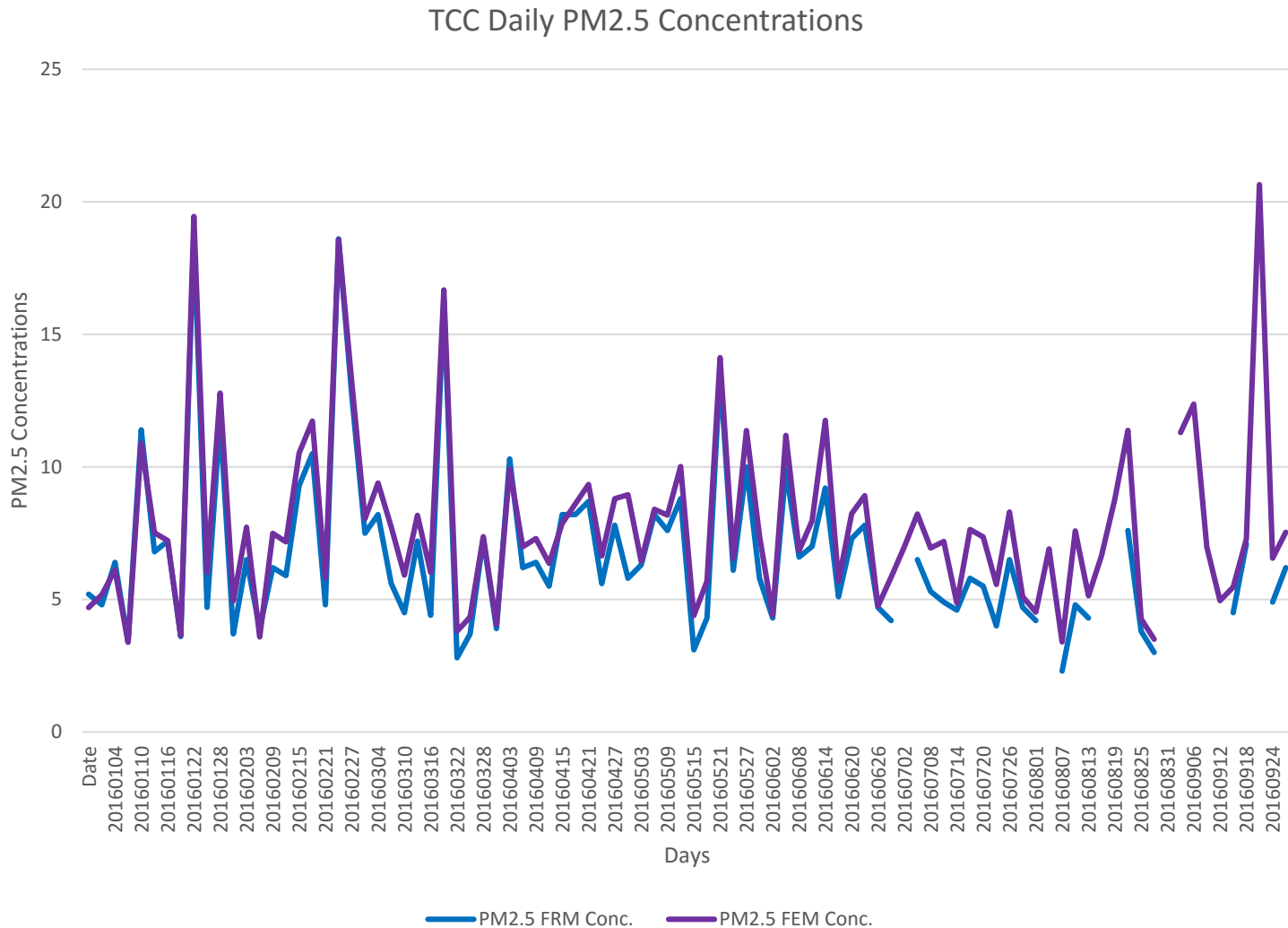


FRM versus FEM Data Trends & Comparisons





FRM versus FEM Data Trends & Comparisons





Summary

- Existing PM_{2.5} network
 - 40% FRM, 10% FEM, 40% non-regulatory
- PM_{2.5} network modification proposals
 - ▼FRM ▲FEM
 - Remove 5 collocated FRMs July 2017
 - Operation Schedule changes
 - SLAMS → SPM reassignments
- Florida DEP's PM_{2.5} Gravimetric Laboratory updates
 - Report and data qualifier updates
 - Lab transition May - June
- FRM versus FEM data trends & comparisons
 - ▼FRM ▲FEM





Questions?



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