UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

September 25, 2015

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Summary of Final Photochemical Assessment Monitoring Stations (PAMS) Network Design

FROM: Kevin A. Cavender (EPA, OAQPS)

TO: Ozone NAAQS Review Docket (EPA-HQ-OAR-2008-0699)

The purpose of this memorandum is to summarize the PAMS network design being finalized as part of the ozone (O_3) National Ambient Air Quality Standards (NAAQS) review. This memorandum provides a brief background on the PAMS program, discusses the final PAMS network design requirements, and presents estimates of the size and locations for the resulting final network.

BACKGROUND

Section 182 (c)(1) of the CAA required the EPA to promulgate rules for enhanced monitoring to obtain more comprehensive and representative data on O_3 air pollution. In addition, Section 185 (b) of the CAA required EPA to work with the National Academy of Sciences (NAS) to conduct a study on the role of O_3 precursors in tropospheric O_3 formation and control. In 1992, the NAS issued the report entitled "Rethinking the Ozone Problem in Urban and Regional Air Pollution" (National Academy of Sciences, 1992).[1]

In response to the CAA requirements and the recommendations of the NAS report, on February 12, 1993 (58 FR 8452), the EPA revised the ambient air quality surveillance regulations to require PAMS in each O_3 non-attainment area classified as serious, severe, or extreme ("PAMS areas"). The original PAMS requirements called for between two to five PAMS sites per PAMS area depending on the PAMS area's population. Four types of PAMS sites were identified including upwind (Type 1), maximum precursor emission rate (Type 2), maximum O_3 (Type 3), and extreme downwind (Type 4) sites.

In 2011, the EPA initiated an effort to re-evaluate the PAMS requirements in light of changes in the needs of PAMS data users and the improvements in monitoring technology. The EPA consulted with the Clean Air Science Advisory Committee

[1] A copy of the NAS report can be obtained at here - http://www.nap.edu/catalog/1889/rethinking-the-ozone-problem-in-urban-and-regional-air-pollution

(CASAC), Air Monitoring and Methods Subcommittee (AMMS) to seek advice on potential revisions to the technical and regulatory aspects of the PAMS program. Based on the findings of the PAMS evaluation and the consultations with the CASAC AMMS and National Association of Clean Air Agencies (NACAA) Monitoring Steering Committee (MSC), the EPA proposed revisions to the network design requirements for the PAMS network as part of the ozone NAAQS review (79 FR 75234). Based on the comments received, the EPA is finalizing revisions to the PAMS network design requirements.

FINAL NETWORK DESIGN REQUIREMENTS

The EPA is finalizing changes to the network design requirements to better serve both national and local objectives. The EPA is finalizing a two part network design. The first part of the design includes a network of fixed sites ("required PAMS sites") intended to support O_3 model development and the tracking of trends of important O_3 precursor concentrations. These sites will be located at NCore sites in Core Based Statistical Areas (CBSA) with a population of 1,000,000 or more. Monitoring agencies will have until July 1, 2019 to begin making PAMS measurements.

The second part of the network design requires states with moderate or above O_3 non-attainment areas and states in the Ozone Transport Region (OTR) to develop and implement Enhanced Monitoring Plans (EMPs) which are intended to provide monitoring agencies the needed flexibility to implement additional monitoring to suit the needs of their area. Monitoring agencies will have until October 1, 2019, or two years after designations are effective, whichever is later, to submit their EMPs.

ESTIMATE OF NETWORK SIZE AND LOCATIONS OF REQUIRED PAMS SITES

This section summarizes the estimated number and location of the required PAMS sites. To estimate the locations of the required PAMS sites, the EPA used the locations of the current NCore sites and information available on Census.gov[1] to identify NCore sites in CBSAs with a population of 1,000,000 or more.

Table 1 and Figure 1 summarize the NCore sites projected to be required to make PAMS measurements based on current Census information. Based on these estimates, the EPA believes the final network design requirements will result in approximately 40 required PAMS sites, 13 of which are existing PAMS sites. Note that the final requirements also provide a waiver provision to allow monitoring agencies to make PAMS measurements at alternative locations such as existing PAMS sites or existing National Air Toxics Trends sites (NATTS), and a second waiver option to avoid being required to make PAMS measurements in areas with historically low O_3 concentrations. Therefore the final locations and network size may differ from those identified in Table 1 and Figure 1.

[1] http://www.census.gov/popest/data/index.html

ESTIMATE OF STATES REQUIRED TO DEVELOP AND IMPLEMENT AN EMP

States that will be required to develop and implement EMPs cannot be identified with certainty for several reasons. For states outside of the OTR, the requirement for a state to develop and implement an EMP is triggered when a state has an area that has been classified as Moderate or above O_3 non-attainment. However, designations are not expected to be completed until approximately 2 years after the final rule is signed. In addition, the thresholds for classification as a Moderate or higher non-attainment area are not being established as part of the O_3 NAAQS review process, and will be established during the designation process.

Therefore, a number of assumptions are made in this memorandum in an attempt to identify which states may be required to develop EMPs. In 2008, the EPA established the threshold for Moderate non-attainment at 115% of the NAAQS, or 0.086 ppm, which was consistent with how the threshold for Moderate non-attainment for the 1-hour O_3 standard had been established (77 FR 30160). As such, for the purpose of estimating which states may be required to develop an EMP, it is assumed the EPA will use the same basis for establishing the threshold for Moderate non-attainment, and have here based the projections of which states may be required to develop and implement an EMP on a threshold of 115% of the NAAQS (i.e., an 8-hour design value of >80 ppb, assuming a final level of 70 ppb).

In addition, the projections presented in this memorandum are based on current O_3 design values.[1] These design values are based on monitoring data collected from 2012 to 2014. Since designations will not occur for at least two more years (expected in October, 2017), it is likely that designations will be based on data from 2014 to 2016. If ozone concentrations decline, it is possible that one or more of the states will contain areas projected to be classified as Moderate O3 non-attainment areas will in fact be classified Marginal non-attainment, or designated as attainment. Similarly, if O_3 concentrations increase, it is possible that additional states may have nonattainment areas classified Moderate or above.

Table 2 provides a summary of the highest O_3 design value by state, sorted by decreasing design value. As can be seen, based on the assumptions discussed above, 6 states (California, Connecticut, Michigan, Colorado, Texas, and Wisconsin) may be required to develop and implement an EMP based on O_3 design values.

In addition, the twelve states comprising the OTR would also be required to develop EMPs. These states include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia.

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[1] Available at - http://www.epa.gov/airtrends/pdfs/Ozone_DesignValues_20122014_FINAL_08_03_15.xlsx

Table 1. Existing NCore Sites in CBSAs with a Population Greater than 1,000,000

Region	State	AQS ID	CBSA	Population	Existing PAMS?
4	Alabama	01-073-0023	Birmingham-Hoover, AL	1,143,772	No
9	Arizona	04-013-9997	Phoenix-Mesa-Scottsdale, AZ	4,489,109	Yes
9	Arizona	04-019-1028	Tucson, AZ	1,004,516	No
9	California	06-037-1103	Los Angeles-Long Beach-Anaheim, CA	13,262,220	Yes
9	California	06-065-8001	Riverside-San Bernardino-Ontario, CA	4,441,890	Yes
9	California	06-073-0003	San Diego-Carlsbad, CA	3,263,431	Yes
9	California	06-067-0006	Sacramento--Roseville--Arden-Arcade, CA	2,244,397	Yes
9	California	06-085-0005	San Jose-Sunnyvale-Santa Clara, CA	1,952,872	No
8	Colorado	08-031-0025	Denver-Aurora-Lakewood, CO	2,754,258	No
3	Delaware	10-003-2004	Philadelphia-Camden-Wilmington, PA-NJ-DE	6,051,170	No
3	District Of Columbia	11-001-0043	Washington-Arlington-Alexandria, DC-VA-MI	6,033,737	Yes
4	Florida	12-011-0034	Miami-Fort Lauderdale-West Palm Beach, F	5,929,819	No
4	Florida	12-057-3002	Tampa-St. Petersburg-Clearwater, FL	2,915,582	No
4	Georgia	13-089-0002	Atlanta-Sandy Springs-Roswell, GA	5,614,323	Yes
5	Illinois	17-031-4201	Chicago-Naperville-Elgin, IL-IN-WI	9,554,598	Yes
5	Indiana	18-097-0078	Indianapolis-Carmel-Anderson, IN	1,971,274	No
7	Kansas	20-209-0021	Kansas City, MO-KS	2,071,133	No
4	Kentucky	21-111-0067	Louisville/Jefferson County, KY-IN	1,269,702	No
3	Maryland	24-033-0030	Washington-Arlington-Alexandria, DC-VA-MI	6,033,737	Yes
1	Massachusetts	25-025-0042	Boston-Cambridge-Newton, MA-NH	4,732,161	No
5	Michigan	26-163-0001	Detroit-Warren-Dearborn, MI	4,296,611	No
5	Michigan	26-081-0020	Grand Rapids-Wyoming, MI	1,027,703	No
5	Minnesota	27-003-1002	Minneapolis-St. Paul-Bloomington, MN-WI	3,495,176	No
7	Missouri	29-510-0085	St. Louis, MO-IL	2,806,207	No
9	Nevada	32-003-0540	Las Vegas-Henderson-Paradise, NV	2,069,681	No
1	New Hampshire	33-015-0018	Boston-Cambridge-Newton, MA-NH	4,732,161	No
2	New Jersey	34-013-0003	New York-Newark-Jersey City, NY-NJ-PA	20,092,883	No
2	New York	36-081-0124	New York-Newark-Jersey City, NY-NJ-PA	20,092,883	Yes
2	New York	36-055-1007	Rochester, NY	1,083,393	No
4	North Carolina	37-119-0041	Charlotte-Concord-Gastonia, NC-SC	2,380,314	No
4	North Carolina	37-183-0014	Raleigh, NC	1,242,974	No
5	Ohio	39-061-0040	Cincinnati, OH-KY-IN	2,149,449	No
5	Ohio	39-035-0060	Cleveland-Elyria, OH	2,063,598	No
10	Oregon	41-051-0080	Portland-Vancouver-Hillsboro, OR-WA	2,348,247	No
3	Pennsylvania	42-101-1002	Philadelphia-Camden-Wilmington, PA-NJ-DE	6,051,170	No
3	Pennsylvania	42-003-0008	Pittsburgh, PA	2,355,968	No
1	Rhode Island	44-007-1010	Providence-Warwick, RI-MA	1,609,367	Yes
4	Tennessee	47-157-0075	Memphis, TN-MS-AR	1,343,230	No
6	Texas	48-113-0069	Dallas-Fort Worth-Arlington, TX	6,954,330	Yes
6	Texas	48-201-1039	Houston-The Woodlands-Sugar Land, TX	6,490,180	Yes
8	Utah	49-035-3006	Salt Lake City, UT	1,153,340	No
3	Virginia	51-087-0014	Richmond, VA	1,260,029	No
10	Washington	53-033-0080	Seattle-Tacoma-Bellevue, WA	3,671,478	No

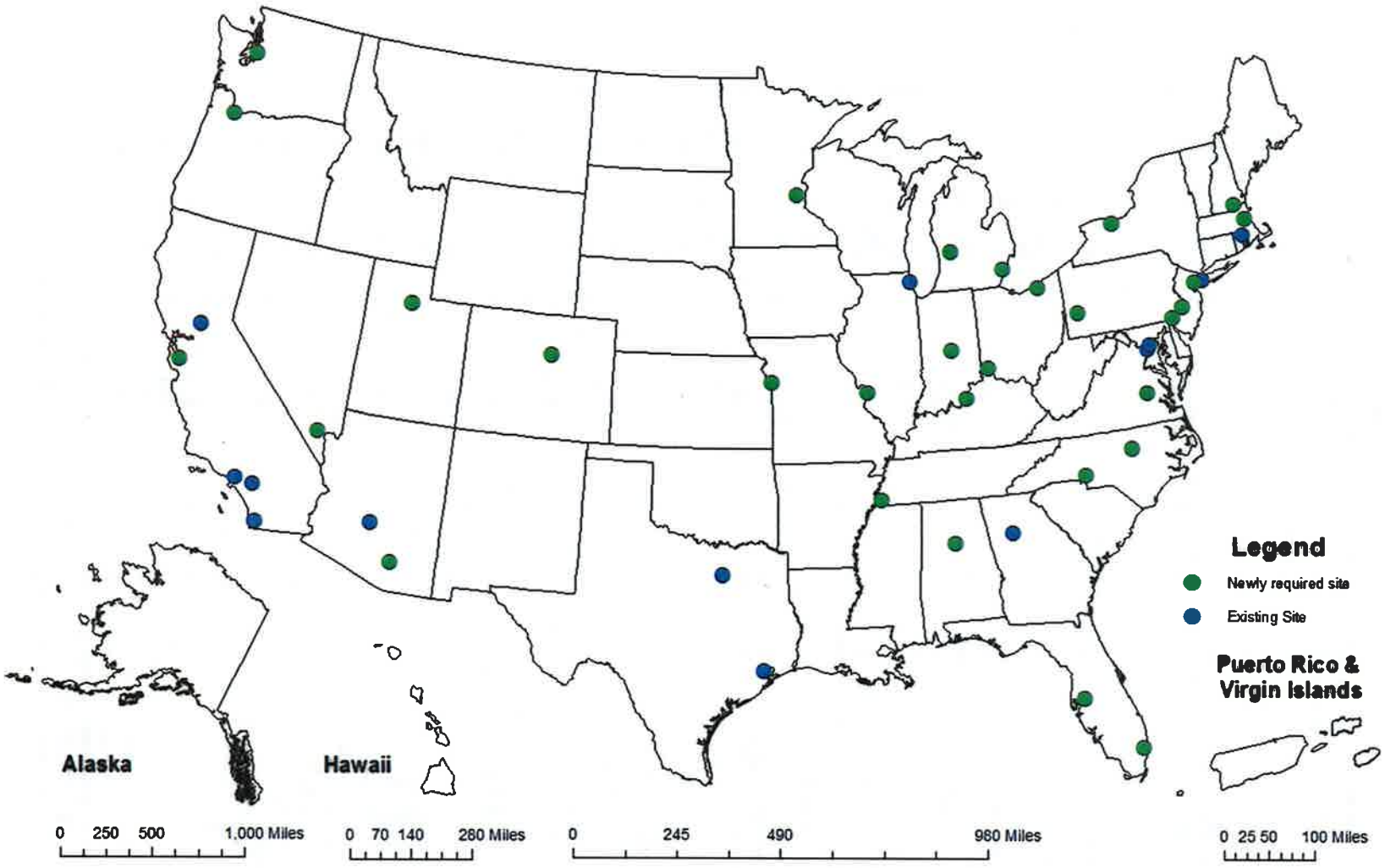

Figure 1. Estimated Locations of Required PAMS Sites Based on Final Network Design Requirements

Table 2. Projected States Impacted by EMP Requirement

State Name	EPA Region	Highest Design Value (ppm)[1,2]	In OTR?	Potential EMP State?
California	9	0.102	No	Yes
Connecticut	1	0.085	Yes	Yes
Michigan	5	0.083	No	Yes
Colorado	8	0.082	No	Yes
Texas	6	0.081	No	Yes
Wisconsin	5	0.081	No	Yes
Arizona	9	0.080	No	No
Illinois	5	0.079	No	No
Indiana	5	0.079	No	No
Missouri	7	0.078	No	No
Nevada	9	0.078	No	No
Ohio	5	0.078	No	No
Georgia	4	0.077	No	No
Maryland	3	0.077	Yes	Yes
Pennsylvania	3	0.077	Yes	Yes
Utah	8	0.077	No	No
New Jersey	2	0.076	Yes	Yes
Kentucky	4	0.075	No	No
New York	2	0.075	Yes	Yes
Delaware	3	0.074	Yes	Yes
New Mexico	6	0.074	No	No
Oklahoma	6	0.074	No	No
Rhode Island	1	0.074	Yes	Yes
Virginia	3	0.074	No	No
District Of Columbia	3	0.073	Yes	Yes
Kansas	7	0.073	No	No
Maine	1	0.073	Yes	Yes
North Carolina	4	0.073	No	No
Tennessee	4	0.073	No	No
Louisiana	6	0.072	No	No
Massachusetts	1	0.072	Yes	Yes
Arkansas	6	0.071	No	No
Mississippi	4	0.071	No	No
Alabama	4	0.070	No	No
New Hampshire	1	0.070	Yes	Yes
West Virginia	3	0.070	No	No
Florida	4	0.069	No	No
Idaho	10	0.069	No	No
Nebraska	7	0.068	No	No
South Dakota	8	0.068	No	No
Wyoming	8	0.068	No	No
Iowa	7	0.067	No	No
Minnesota	5	0.067	No	No
South Carolina	4	0.066	No	No
Washington	10	0.065	No	No
Oregon	10	0.064	No	No
Vermont	1	0.063	Yes	Yes
North Dakota	8	0.060	No	No
Montana	8	0.056	No	No
Alaska	10	0.054	No	No
Hawaii	9	0.049	No	No
Puerto Rico	2	0.039	No	No

1. Design values based on highest design value in the state for 2012-2014 data.
2. Data can be obtained from - http://www.epa.gov/airtrends/pdfs/Ozone_DesignValues_20122014_FINAL_08_03_15.xlsx