San Joaquin Valley Air Pollution Control District

Attainment Determination Request for the Revoked 1-hour Ozone Standard

July 13, 2015

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

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EXECUTIVE SUMMARY

Subsequent to the Valley's historic achievement of zero exceedances of the federal 1-hour ozone standard in 2013, the District in May 2014 submitted an official request to EPA through the State Air Resources Board to formally find the Valley in attainment and lift the Section 185 nonattainment penalty. To date, the District has not received a formal response from EPA.

Based on 2012-2014 data, the Valley recorded minimal violations of the 1-hour standard and the District can now be found to attain the standard without the need to account for exceptional events or transboundary ozone impacts. Therefore, the District requests for the second time that EPA formally determine that the Valley has reached attainment of the 1-hour ozone standard. The Valley will be the first and only region in the nation to attain a standard after being classified as "extreme" nonattainment by EPA. This reaffirms the effectiveness of the investment and commitment by Valley businesses and residents to reduce emissions and improve public health.

Currently, the Valley is subject to Section 185 nonattainment penalties of approximately $30 million dollars per year due to nonattainment of the federal 1-hour ozone standard. This matter is currently under litigation with certain environmental groups seeking to increase non-attainment penalties charged to Valley businesses. EPA determining that the Valley has attained the 1-hour ozone standard would remove exposure by Valley businesses to additional penalties and return full local control to the Valley for decisions regarding the need, the magnitude, and the expenditure of Department of Motor Vehicle (DMV) dollars.

Penalties notwithstanding, the Valley's businesses and residents have already made significant investments over the past couple of decades in cleaner technologies and practices yielding tremendous air quality benefits. Since 1992, the District has developed and implemented numerous attainment plans and has adopted over 600 of the most stringent rules in the nation to obtain the significant emission reductions needed to demonstrate attainment. The California Air Resources Board (ARB) has also adopted and implemented the nation's toughest mobile source regulations. Businesses and residents have also invested beyond what is required to comply with regulations to accelerate the adoption of cleaner technologies and practices through voluntary efforts, including in partnership with the District through its various incentive programs.

This document supports both a clean data finding and a finding that attainment is due to permanent and enforceable emissions reductions. The clean data finding shows that air monitoring data from the relevant three-year period (2012-2014) meets the federal 1-hour ozone standard. As regularly documented in annual monitoring network plans, and as recently confirmed in an ozone saturation study in the Arvin area, the Valley's ozone monitoring network meets monitoring requirements with Arvin-Di Giorgio as a suitable replacement for the Arvin-Bear Mountain site.

The District and ARB have adopted the nation's most stringent regulations, and these regulations achieve significant reductions in ozone precursor emissions. Meteorological analysis shows that 2012-2014 ozone season meteorology was neither unusual nor the cause of attainment. The District also analyzed vehicle miles traveled and state fuel sales, both considered indicators of economic activity, and found that that there wasn't a decrease in economic activity during these years. Each of these elements supports a finding that attainment is due to permanent and enforceable emissions reductions.

Many air quality challenges remain for the Valley under existing and more stringent upcoming EPA standards. An EPA finding of 1-hour ozone attainment will enable the Valley to better focus its efforts and investments on these upcoming challenges.

If the EPA determines that the District did not meet either the Clean Data Finding or that the District's monitoring network is inadequate, the District requests that EPA makes a finding that the District would have been in attainment but for emissions emanating from outside North America under Clean Air Act Section 179B which will remove the sanctions and penalties associated with missing the attainment deadline (Section 185 nonattainment penalties). This will not excuse the District, ARB, or EPA from their duties to reduce emissions from sources under their regulatory authority; but the goal is to ensure that Valley residents and business are not penalized for pollution emanating from outside North America.

I. ATTAINMENT DETERMINATION REQUEST

Ground-level ozone is produced when sunlight triggers a photochemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOCs). The Valley's geography and meteorology exacerbate the formation and retention of high levels of ozone, particularly on hot, sunny summer days.

EPA has established several ozone standards over the years to address the health impacts associated with this pollutant. The first ozone standard, established in 1979, was set at 124 parts per billion (ppb) over a 1-hour exposure. The Clean Air Act (CAA) Amendments of 1990 established attainment planning requirements and attainment deadlines for the 1979 1-hour ozone standard, and the District subsequently adopted various 1-hour ozone plans and plan amendments, including the *2004 Extreme Ozone Attainment Demonstration Plan*.

EPA revoked the 1-hour ozone standard effective June 15, 2005, maintaining that the 84 ppb 8-hour ozone standard adopted in 1997 was more health protective. In response, the District and other agencies nationwide shifted their ozone efforts to 8-hour ozone. However, subsequent litigation and regulatory actions have reinstated many of the revoked 1-hour ozone requirements. The District adopted the *2013 Plan for the Revoked 1-Hour Ozone Standard* in September 2013 to address remaining requirements under the 1-hour ozone standard.

During 2012-2014, the Valley recorded minimal violations of the federal 1-hour ozone standard. Subsequently, the "expected number of exceedance days" among all ozone monitors in the Valley for 2012-2014 is less than one (1), therefore the District requests that EPA formally determine that the Valley has reached attainment of the 1-hour ozone standard. The Valley will be the first and only region in the nation to attain a standard after being classified as "extreme" nonattainment by EPA.

This report provides supporting documentation to request a formal attainment determination for the 1-hour ozone National Ambient Air Quality Standards (NAAQS) for the Valley. According to EPA guidance, an attainment determination by EPA is needed to revoke the CAA §185 penalty fee program obligations.[1] This document meets the requirements for 1-hour ozone attainment findings set forth by EPA in its 1992

[1] Page, Stephen D. Guidance on Developing Fee Programs Required by Clean Air Act Section 185 for the 1-hour Ozone NAAQS, OAQPS, U.S. EPA Memorandum, January 5, 2010.

Redesignation Guidance[2] as well as its recent finding that the Sacramento Metro Area was no longer required to collect Section 185 fees.[3] Specifically, this document supports both a clean data finding and a finding that attainment is due to permanent and enforceable emissions reductions:

Clean data finding:

- **Monitoring data:** Air monitoring data from the relevant three-year period (2012-2014) meets the 1-hour ozone standard via the "expected exceedance days" test.
- **Monitoring network:** As regularly documented in the District's annual monitoring network plans, the Valley's ozone monitoring network meets all applicable monitoring requirements.
- **Saturation study confirms monitoring approach:** A recent saturation study in Arvin shows that the current Arvin-Di Giorgio monitoring site location is an appropriate replacement for the Arvin-Bear Mountain (Bear Mtn.) site.

Permanent and enforceable emissions reductions:

- **Regulations and emissions reductions:** The District and ARB have adopted the nation's most stringent regulations, and these regulations achieve significant ozone precursor emissions reductions.
- **No unusually favorable meteorology:** Meteorological analysis shows that 2012-2014 ozone season meteorology was neither unusual nor the cause of attainment.
- **No decrease in economic activity:** Analyses of vehicle miles traveled and state fuel sales, indicators of economic activity, shows that there wasn't a decrease in economic activity that is responsible for attainment.

[2] Calcagni, John. *Procedures for Processing Requests to Redesignate Areas to Attainment*. OAQPS, U.S. EPA Memorandum, September 4, 1992.
[3] EPA, Proposed Rule: Approval and Promulgation of Air Quality Implementation Plans; California; Determination of Termination of Section 185 Fees. 76 FR 28696. http://www.gpo.gov/fdsys/pkg/FR-2011-05-18/pdf/2011-12063.pdf. Finalized as 77 FR 64036, http://www.gpo.gov/fdsys/pkg/FR-2012-10-18/pdf/2012-25547.pdf.

II. CLEAN DATA FINDING

A. 2012-2014 DATA MEETS THE 1-HOUR OZONE STANDARD

Expected Number of Exceedances of the Federal 1-hour Ozone Standard

To demonstrate attainment of the 1-hour ozone standard, the District calculated the expected exceedances at each site for 2012-2014. EPA has defined calculation procedures for calculating the expected number of exceedances in 40 CFR 50 Appendix H[4] and the 1979 document, "Guideline for the Interpretation of Ozone Air Quality Standards."[5] Simply put, the average number of exceedances for three consecutive years is based on summing the number of exceedances each year and dividing by three. If a site has an average of 1.0 or fewer expected exceedance days per year (i.e. a site averages three (3) or fewer exceedance days over three (3) years), then that site meets the federal 1-hour ozone standard. However, this simple equation only works when the air monitoring site has 365 valid measurements for the year, i.e. one (1) for each day. EPA recognizes that agencies do not collect 365 samples per year, due to occasional power outages, maintenance, audits, and other issues. EPA guidance thus clarifies the attainment test as:

$$\frac{\#\ of\ exceedances}{\#\ of\ valid\ sample\ days} * (\#\ of\ days\ in\ the\ year) = \#\ of\ expected\ exceedances$$

The result of this calculation must be equal to or less than 1.0 days per year when averaged over three consecutive years. The following Table 1 shows the average number of expected exceedance days per year, per monitoring site in the Valley. This data shows that all Valley sites meet the 1-hour ozone standard based on 2012-2014 data. The 1-hour ozone NAAQS is 0.12 ppm rounded to the closest one hundredth. Thus, 1-hour ozone concentrations at or greater than 0.125 ppm exceed the standard, and 1-hour ozone concentrations at or lower than 0.124 ppm meet the standard. If any hour in a day exceeds the standard, then that day is counted as one (1) exceedance day. The highest hourly concentration on a given day is recorded as the 1-hour ozone concentration for that day (though all hourly concentrations are kept on record and analyzed as well).

[4] 40 CFR 50 Appendix H. http://www.ecfr.gov/cgi-bin/text-idx?SID=649e6c9a12e70461eaa84f163fad1ccf&node=40:2.0.1.1.1.0.1.19.9&rgn=div9.
[5] http://www.epa.gov/ttn/naaqs/ozone/ozonetech/guide-o3.htm

The EPA's Air Quality System (AQS) database serves as the official repository of ambient ozone data collected by the monitoring network.[6] All 2014 data is preliminary and the necessary calculations where conducted by the District.

Table 1. Average Expected Exceedance Days and Attainment Test

Station ID	Station Name	Measured Exceedances			Expected Exceedances[7]			Average Expected Exceedances	Pass Test?
		2012	2013	2014	2012	2013	2014		
Bakersfield (San Joaquin Valley Air Pollution Control District portion only)									
0007	Edison	0	0	0	0.00	0.00	0.00	0.0	Yes
0008	Maricopa	0	0	0	0.00	0.00	0.00	0.0	Yes
0014	Bakersfield-California	0	0	0	0.00	0.00	0.00	0.0	Yes
0232	Oildale	0	0	0	0.00	0.00	0.00	0.0	Yes
2012	Bakersfield-Muni	--	0	0	--	0.00	0.00	0.0	Yes
5002	Arvin-Di Giorgio	0	0	0	0.00	0.00	0.00	0.0	Yes
6001	Shafter	0	0	0	0.00	0.00	0.00	0.0	Yes
Fresno									
0007	Fresno-Drummond	1[8]	0	0	1.00	0.00	0.00	0.3	Yes
0008/0011	Fresno-First/Garland	1	0	0	1.00	0.00	0.00	0.3	Yes
0242	Fresno-Sierra Sky Park	1	0	1[9]	1.00	0.00	1.10	0.7	Yes
2009	Tranquility	0	0	0	0.00	0.00	0.00	0.0	Yes
4001	Parlier	1	0	0	1.00	0.00	0.00	0.3	Yes
5001	Clovis	0	0	0	0.00	0.00	0.00	0.0	Yes
Hanford—Corcoran									
1004	Hanford	0	0	0	0.00	0.00	0.00	0.0	Yes
Madera									
0004	Madera-Pump	0	0	0	0.00	0.00	0.00	0.0	Yes
2010	Madera-City	0	0	0	0.00	0.00	0.00	0.0	Yes

[6] U.S. Environmental Protection Agency: Technology Transfer Network (TTN), Air Quality System (AQS): *AQS Web Application.* (2013). Available at http://www.epa.gov/ttn/airs/airsaqs/aqsweb/

[7] All values are from http://www.epa.gov/airdata/ad_rep_mon.html unless noted. 2014 data is based on preliminary data and calculated by the District.

[8] Exceedance at Fresno-Drummond in 2012 was due in part to an exceptional event and transboundary ozone impacts, as detailed in the previously submitted 1-hour ozone clean data finding request in 2014.

[9] As of 2014, the Fresno-Sierra Skypark site is failing to meet federal siting criteria, and therefore much of the ozone data recorded at this site during 2014, including the exceedance value, is suspect and not believed to be representative of true ozone concentrations in the area. Comparing the ozone monitor against a NIST traceable standard revealed that the monitor was biased high during the period when the exceedance was recorded.

Merced									
0003	Merced-Coffee	0	0	0	0.00	0.00	0.00	0.0	Yes
Modesto									
0005	Modesto	0	0	0	0.00	0.00	0.00	0.0	Yes
0006	Turlock	0	0	0	0.00	0.00	0.00	0.0	Yes
Stockton									
1002	Stockton	0	0	0	0.00	0.00	0.00	0.0	Yes
3005	Tracy	0	0	0	0.00	0.00	0.00	0.0	Yes
Visalia—Porterville									
2002	Visalia	0	0	0	0.00	0.00	0.00	0.0	Yes
2010	Porterville	0	0	0	0.00	0.00	0.00	0.0	Yes

Missing Data Analysis

The number of valid sample days must meet or exceed a completeness level established by EPA. The data completeness level for the federal 1-hour ozone standard is defined as collecting 75% of the hourly data between 9 AM and 9 PM during ozone season. The District's data capture rate exceeded the mandated levels during 2012 and 2014, and had only one exception in 2013. The Tracy-Airport site had a data completeness of 71% in 2013, as the analyzer was non-functional from May 10 to July 17. The District is confident that this site did not exceed during this time period because this site has not exceeded the federal 1-hour ozone standard since it was established in 2006. Additionally, the last time any site exceeded the 1-hour ozone standard in San Joaquin County was 1999.

Even though the District satisfied the data completeness requirements for the rest of the ozone monitors in the District's network, an occasional hour or day was missed. EPA recognizes that many of the non-sampled days would not have exceeded the standard, and so agencies should not be unfairly penalized for missing a sampling day when there was a minimal chance of an exceedance during the non-sampling period. For example, an ozone analyzer could be taken offline for multiple days for extensive maintenance, typically performed when ozone levels are expected to be low. Additionally, the analyzer may malfunction, experience an extended power outage, or other events out of the District's control. To accommodate these situations, EPA allows the clean data finding documentation to include a meteorological analysis and/or a missing data analysis that shows that no exceedances would have occurred during time periods when monitoring data is not available.[10]

[10] Section 2.2, Guideline for the Interpretation of Ozone Air Quality Standards (EPA, 1979), http://www.epa.gov/ttn/naaqs/ozone/ozonetech/guide-o3.htm

Towards that end, the District examined sites with missing days to show that exceedances would not have occurred on days when insufficient data was collected. The ozone season for California is defined from January to December, but for practical purposes, the District's peak ozone readings are in the afternoon from May through October. When considering incomplete data, one scenario involves having an overall incomplete day while collecting enough afternoon data to either capture an exceedance or show that an exceedance did not happen on that day. Another likely possible scenario that must be considered is when data is not collected during the peak afternoon on a given day even though 75% of the data was collected during the hours between 9:00 AM and 9:00 PM. These scenarios were considered when completing the following missing data analysis.

The District examined peak ozone sites in Fresno and Kern counties for missing data during afternoon hours to ensure that the site would have not exceeded the standard if the data was collected. Since exceedances of the 1-hour ozone standard have only occurred at Fresno County and Kern County monitors in recent past years, this missing data analysis is focused on these counties only.

Fresno County

For 2012, the peak sites of Clovis, Fresno-First/Garland, Fresno-Drummond, and Fresno-Sierra Sky Park only missed an occasional hour in the afternoon from May through October. The Parlier air monitoring site, in addition to missing the occasional hour, missed about 36 hours from June 4-5. Peak measurements at that site on June 3 and 6 were 75 and 53 ppb, respectively. Additionally, peak measurements in the rest of Fresno County were 81 and 87 ppb for June 4 and 5. Because ozone levels were low throughout the county and at the site on the day before and after the missing days, it was concluded that these two days would not have exceeded the standard. Data completeness for all sites in Fresno County was 90% or greater for 2012. All sites operated by ARB and the District met or exceeded the 75% requirement.

During 2013, a number of sites in Fresno County were down for a few days during peak ozone season. Table 2 summarizes missed measurements during peak ozone hours from May-October. The maximum value columns show the maximum value the day before and the day after the missing data period. The county maximum column shows the highest measured value in Fresno County during the missing data periods, which in this case are considerably lower than the federal 1-hour ozone standard. Based on this, it can be concluded that these sites would have reported values well below the standard if the analyzers were operating. Even with these missing days, the District collected a

minimum of 86% of the required data in Fresno County which is far above the required 75%.

Table 2. 2013 Missing Data Analysis for Fresno County

Site	Date	Maximum Value Day Before Outage (ppb)	Maximum Value Day After Outage (ppb)	County Maximum During Outage (ppb)
Fresno-Sierra Sky Park	6-Jun	73	92	95
Fresno-Sierra Sky Park	6-Sept through 8-Sept	70	93	108
Parlier	5-May through 6-May	92	56	59
Parlier	23-May through 30-May	61	73	73
Clovis	26-Jun through 03-Jul	56	100	114
Clovis	08-Jul through 09-Jul	85	105	109
Clovis	6-Aug	77	60	79

The data capture rate in 2014 for Fresno County was excellent with no missing data at the Fresno-Drummond site and only a few days missing from the other peak sites in the county. Table 3 summarizes missed measurements during peak ozone hours from May-October. In all cases, the county maximums are considerably lower than the 1-hour ozone standard. Again, these sites would have measured values well below the standard if the analyzers were operating.

Table 3. 2014 Missing Data Analysis for Fresno County[11]

Site	Date	Maximum Value from Day Before Outage (ppb)	Maximum Value from Day After Outage (ppb)	County Maximum During Outage (ppb)
Parlier	July 20	65	70	82
Parlier	Aug 16-Aug 23	73	59	97
Clovis	May 20-May 28	51	63	101
Fresno-Garland	Aug 2-Aug 3	86	50	100

[11] Since 2014 data is preliminary, some of the missing data shown in the table may be recovered through standard quality control and quality assurance processes.

Fresno-Sierra Sky Park	May 23-June 8	101	103	72
Fresno-Sierra Sky Park	Sep 25-Oct 5	79	90	108

Kern County

During 2012, three ozone analyzers in Kern County were not operating for a few days during peak ozone season. Table 4 below summarizes missed measurements during peak ozone hours from May-October. In all cases, the county maximums are considerably lower than the 1-hour ozone standard. These sites would have measured values well below the standard if the analyzers were operating. Even with these missing days, the District and ARB collected a minimum 81% of the required data at each site in Kern County for the entire year 2012, which is far above the required 75%.

Table 4. Missing Data Analysis for 2012 for Kern County

Site	Date	Maximum Value Day Before Outage (ppb)	Maximum Value Day After Outage (ppb)	County Maximum During Outage (ppb)
Bakersfield-California	03-Oct through 04-Oct	66	47	76
Oildale	10-Aug through 15-Aug	94	71	114
Bakersfield-Muni	19-Jul	79	85	90
Bakersfield-Muni	04-Sep through 05-Sep	98	69	98
Bakersfield-Muni	25-Aug through 27-Aug	79	79	86

Likewise, during 2013, certain ozone analyzers in Kern County did not operate for a few days during the peak ozone season. Table 5 summarizes missed measurements during peak ozone hours from May-October. In all cases, the county maximums are considerably lower than the 1-hour ozone standard. These sites would have measured values well below the standard if the analyzers were operating. Even with these missing days, the District and ARB collected a minimum 80% of the required data at each site in Kern County for the entire 2013 year, which is above the required 75%.

Table 5. Missing Data Analysis for 2013 for Kern County

Site	Date	Maximum Value Day Before Outage (ppb)	Maximum Value Day After Outage (ppb)	County Maximum During Outage (ppb)
Bakersfield-California	22-Oct through 31-Oct (02-Dec)	76	42	93
Bakersfield-Muni	29-May through 06-June	44	98	99
Bakersfield-Muni	19-Aug	81	78	77
Bakersfield-Muni	10-Aug through 23-Aug	81	72	99
Arvin-Di Giorgio	2-Oct	68	49	68
Shafter	21-Sep through 29-Sep	74	51	90

Similarly, only a small amount of ozone data was missed in Kern County in 2014. The ozone analyzers at Edison and Arvin-Di Giorgio air monitoring sites did not have any missing data during the ozone season. Furthermore, all sites met the 75% data completeness requirements for the year. Three of the peak sites did miss a small amount of data as shown in Table 6.

Table 6. Missing Data Analysis for 2014 for Kern County[12]

Site	Date	Maximum Value from Day Before Outage (ppb)	Maximum Value from Day After Outage (ppb)	County Maximum During Outage (ppb)
Bakersfield-California	July 9-July 22	82	63	85
Bakersfield-California	Sept 10	63	94	98
Oildale	May 3-May 5	70	76	39
Bakersfield-Muni	Jun 3	54	87	58
Bakersfield-Muni	Sep 27	58	60	59

In summary, in the few instances that there is missing data at peak locations in the Valley, the District has shown that the County Maximum for those time periods were well under the 1-hour ozone standard. Additionally, the ozone concentrations measured for the days before and after the missing hours were well under the standard in all cases. Based on this, the missing ozone data during the peak ozone season at the maximum ozone monitors in the Valley should not count against the District's request for attainment.

B. The Valley's Ozone Monitoring Network

The District, ARB, and other agencies monitor ozone concentrations throughout the Valley as regularly detailed in the District's *Annual Air Monitoring Network Plan*. The District completed the most recent network plan in early 2015 and submitted the plan to EPA on January 28, 2015.[13] This plan summarizes monitoring requirements for various pollutants and demonstrates how air monitoring in the Valley meets or exceeds all applicable requirements for State and Local Air Monitoring Stations (SLAMS).

[12] Since 2014 data is preliminary, some of the missing data shown in the table will be recovered through standard quality control and quality assurance processes.
[13] San Joaquin Valley Air Pollution Control District [SJVAPCD]. (2015). *2014 Air Monitoring Network Plan.* Fresno, CA: January 28, 2015 submittal to EPA. Available at http://www.valleyair.org/aqinfo/Docs/2014-Air-Monitoring-Network-Plan.pdf

The number of ozone monitors required is determined by population and measured ozone concentrations in metropolitan statistical areas (MSA). There are eight (8) MSAs in the Valley, with each having the same boundaries as the county.[14] Table 7 shows that the Valley meets or exceeds the minimum number of ozone monitors required in each MSA. Figure 1 shows the location of all Valley air monitoring sites.

Ozone monitoring networks are designed to monitor areas with high population densities, areas with high pollutant concentrations, areas impacted by major pollutant sources, and areas representative of background concentrations. Most air monitoring sites in the District represent population exposures and/or maximum concentrations representative of neighborhood and regional scales. Among the ozone monitors operating in the Valley, the majority are suitably located to measure representative concentrations in areas of high population density. The remaining monitors are mostly located in high ozone concentration areas, regions intended to measure air moving into the District, air moving into the cities of Fresno and Bakersfield, and in remote areas to measure background ozone concentrations.

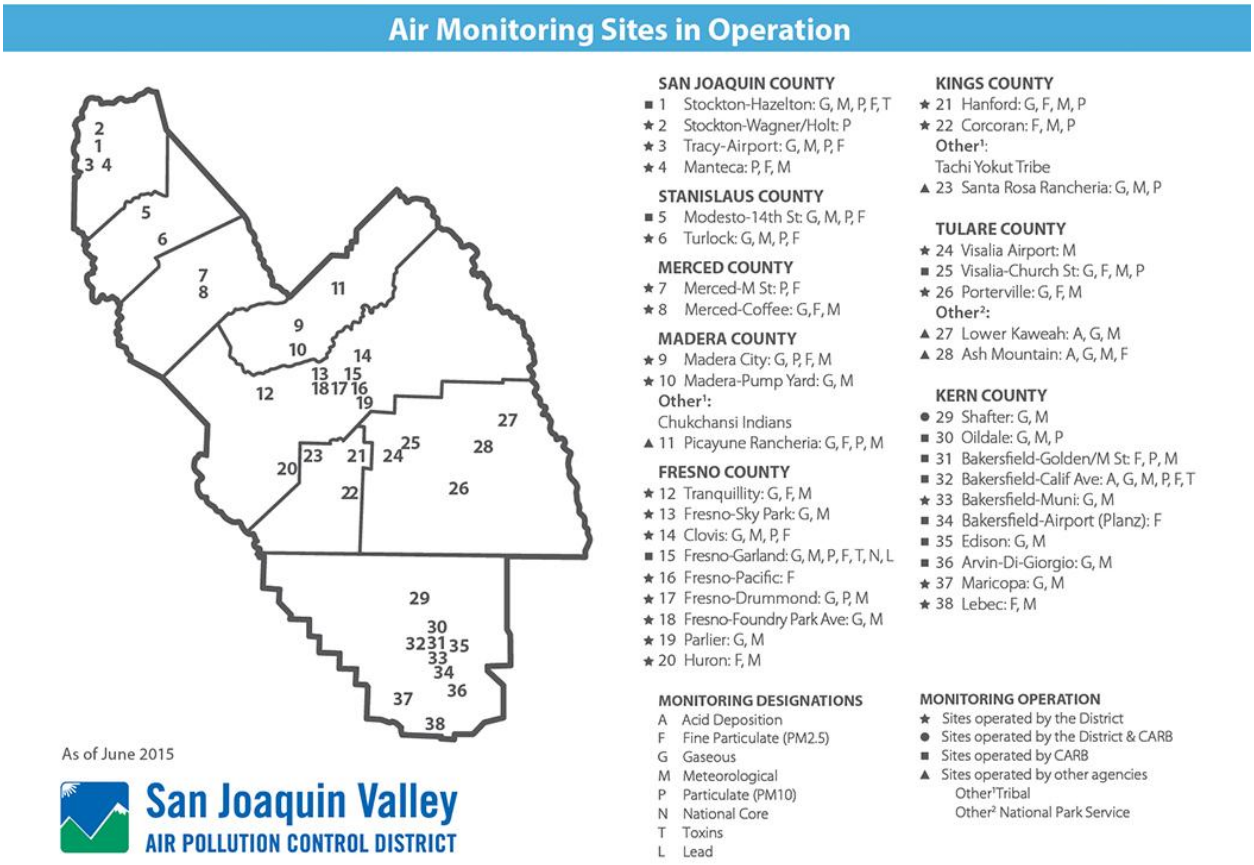
Table 7. Ozone Monitoring Requirements for the Valley

Metropolitan Statistical Area (MSA)	2014 Population	Highest 2013 8-hour Ozone Design Value in MSA (ppb)	≥85% of 2008 8-hour ozone NAAQS (75 ppb)	Number of monitors required	Number of active SLAMS ozone monitor sites
Bakersfield[15]	873,092	89	Yes	2	6
Fresno	964,040	94	Yes	2	5
Hanford–Corcoran	150,181	84	Yes	1	1
Madera	153,897	84	Yes	1	2
Merced	264,922	81	Yes	1	1
Modesto	526,042	86	Yes	2	2
Stockton	710,731	79	Yes	2	2
Visalia–Porterville	459,446	93	Yes	2	2

[14] 40 CFR 58 Appendix D, Table D-2. Available at http://www.ecfr.gov/cgi-bin/text-idx?SID=ad681fb521d783d9c2388bbb931138f7&node=40:6.0.1.1.6.7.1.3.37&rgn=div9.

[15] Air monitors in the Eastern Kern County Air Pollution Control District would count towards the monitors required for the Bakersfield MSA. However, the "Number of active ozone monitors" listed here includes those only in the Valley Portion of Kern County.

Figure 1. Air Monitoring Network in the Valley



C. Evaluation of Monitoring in Arvin

Starting in 1989, ARB operated an ozone monitoring station on leased property at the Arvin-Edison Water Storage District (Arvin-Edison), which was established as the Arvin-Bear Mountain air monitoring site. In July 2009, Arvin-Edison informed ARB that the agency was no longer willing to renew the property lease and asked ARB to vacate the site. The District's Executive Director/APCO appeared multiple times before the Arvin-Edison board and requested that ARB be allowed to return the monitoring station to the Arvin-Bear Mountain site. The APCO was successful getting the Arvin-Edison board to extend the lease one year which allowed ARB to conduct one year of parallel monitoring. ARB and EPA also made several attempts to force the private property owners at the old Bear Mountain location to continue the lease, however, they were unsuccessful.

Ultimately, ARB relocated the station to a new site in the Arvin area, shutting down the Arvin-Bear Mountain site in December 2010 and established a new ozone monitoring station at Di Giorgio Elementary School (19405 Buena Vista Blvd), Arvin, CA,

approximately 2.2 miles from the original location. An objective review of available data indicates that the new monitor at the Di Giorgio Elementary School is more representative of Arvin residents' exposure to ozone (see below). The current Arvin-Di Giorgio site is also in close proximity to children at the elementary school, thus providing for greater public health protection for sensitive populations in the area.

At the time that monitoring in the Arvin area moved from the Bear Mountain site to the Di Giorgio site, the ozone monitor at Arvin-Bear Mountain often recorded some of the peak concentrations in the Valley each year. Because this site move involved one of the peak ozone monitors in the District, conducting parallel monitoring was key to ensure that the replacement site would measure similar ozone readings to that of the original location. To demonstrate attainment of the federal 1-hour ozone standard for the Valley, an estimation of what the ozone readings at Arvin-Bear Mountain would have been during the 2012-2014 period was needed. This analysis is demonstrated in the following section.

Parallel Monitoring

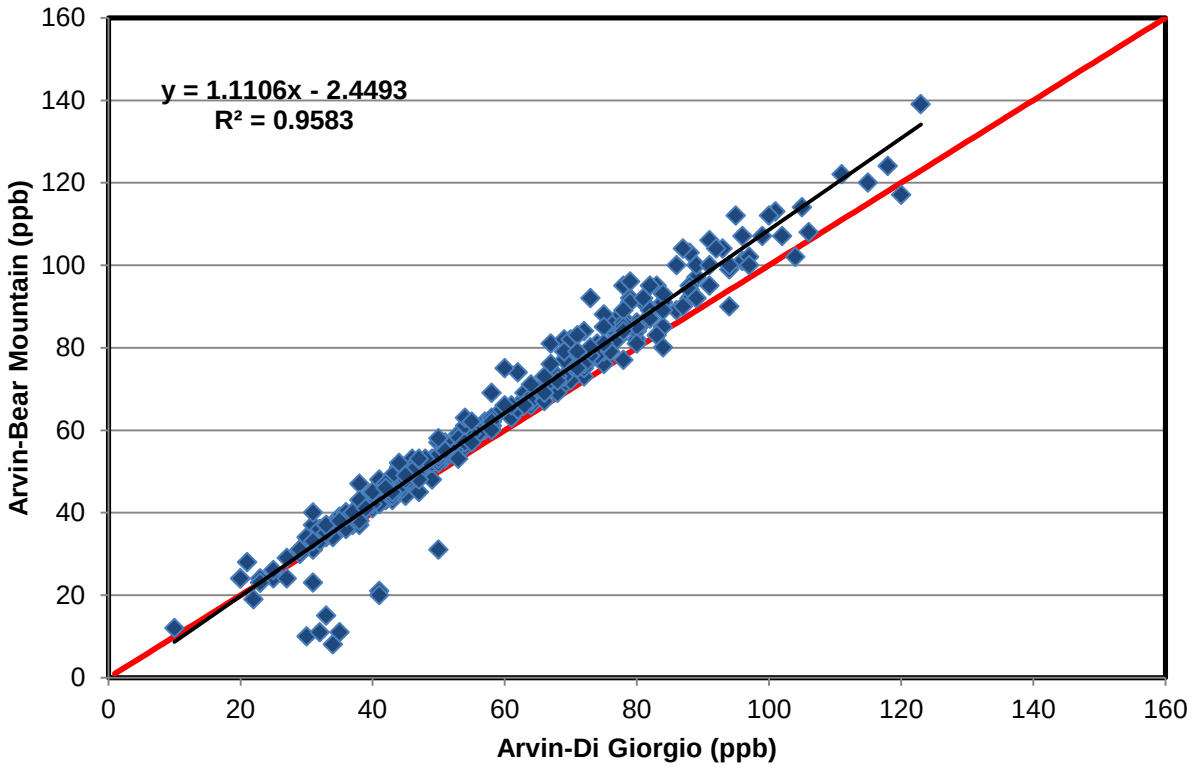
Conducting parallel monitoring is an important effort that provides the ability to compare the readings between the two sites in question. It is not necessary to have the air quality match exactly; however that data between the two sites should be comparable. Comparable means that the data from the new site can be used to accurately calculate air pollution levels at the old site with a given confidence level. During the parallel monitoring period, ARB ensured that both sites produced quality data and operated within EPA specifications as evidenced by the required audits, calibrations, and quality control procedures. The District conducted an analysis at the required confidence levels and developed equations that estimate the ozone levels at the Arvin-Bear Mountain site based on the readings from the Arvin-Di Giorgio site, which can be used to determine attainment of the standard at the Bear Mountain monitoring location. In addition, the District took the extra step to conduct a saturation study in and around the Arvin area that conclusively shows that the Arvin-Di Giorgio site is more than an adequate replacement site for Arvin-Bear Mountain.

The parallel monitoring period in the Arvin area consisted of operating ozone analyzers at both the Arvin-Di Giorgio and Arvin-Bear Mountain sites from November 16, 2009 through October 31, 2010. Once the data was fully quality controlled to ensure accuracy, the data was placed in EPA's air quality data repository, Air Quality System. From this dataset, the District found the maximum value for each day for each site. Since the analysis requires a paired data set, any day that did not have a corresponding value from the other site was removed. Additionally, any day that had missing data

during the afternoon peak hours was removed if the District was not confident that the peak was captured for the day. This left the analysis with 333 sets of paired data, out of 350 possible days.

Figure 2 is a scatter plot showing how well the two sites compare during the parallel monitoring period. The red line marks the 1:1 scenario, where the measurements between the two sites would be exactly the same. The District performed a regression analysis using the Data Analysis Tool Pak in MS-Excel 2010. The Confidence Level was set at 95 percent. The black line is the regression line, with the equation and R^2 value reported in the upper left corner. The Standard Error is 4.95, and the regression line diverges only slightly from the 1:1 line, showing that Arvin-Bear Mountain tended to record higher readings than Arvin-Di Giorgio at the elevated range.

Figure 2. Arvin-Di Giorgio v. Arvin-Bear Mountain Daily Max 1-hour Ozone Using All Data Points



The regression line equation shown above can be used to calculate ozone values for Arvin-Bear Mountain based on ozone readings from Arvin-Di Giorgio. Based on this analysis, the calculated values for Arvin-Bear Mountain show attainment of the federal 1-hour ozone standard for the 2012-2014 period. Table 8 shows the five highest

measurements for each year in the three year period 2012-2014 and the corresponding design value for Arvin-Bear Mountain.

Table 8. 2012-2014 Design Value for Arvin-Bear Mountain

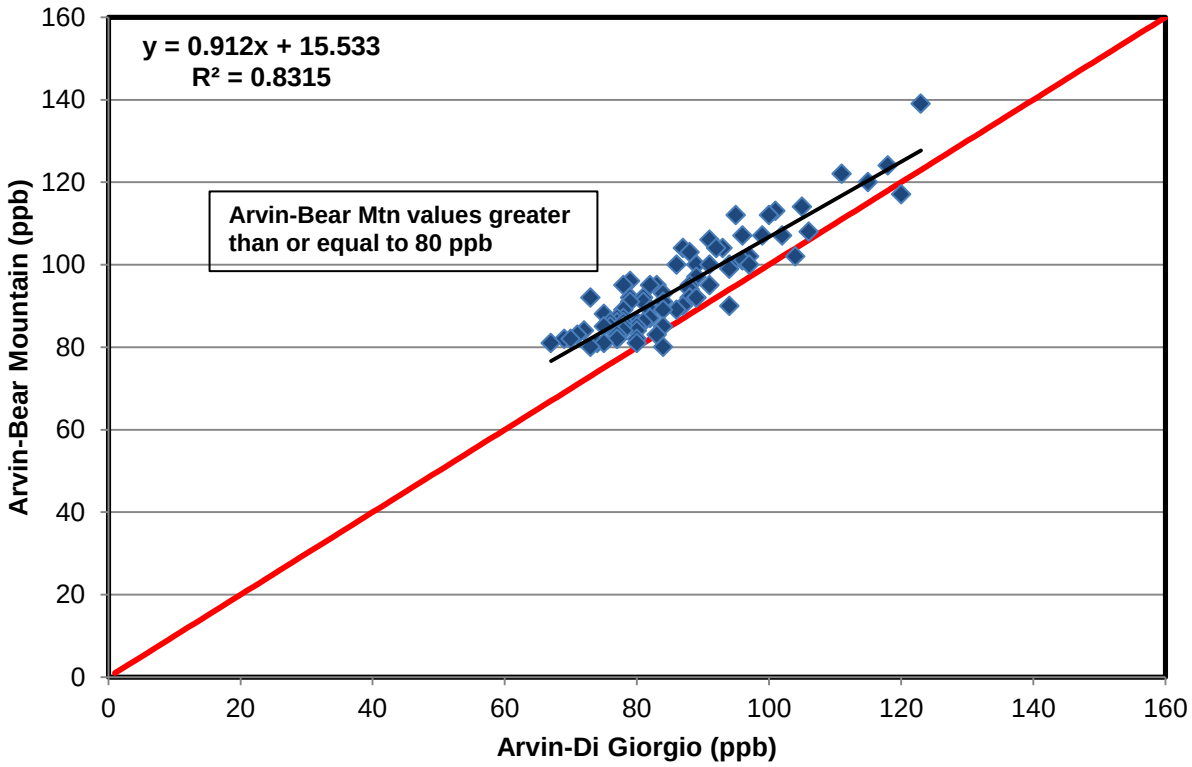
Year	Date	Arvin-Di Giorgio (observed)	Arvin-Bear Mountain (calculated)
2012	July 11	122	133
2012	August 28	113	123
2012	August 13	111	121
2012	June 01	109	119
2012	August 10	109	119
2013	July 20	109	119
2013	September 13	106	115
2013	July 09	103	112
2013	July 19	103	112
2013	June 07	100	109
2014	September 11	109	119
2014	September 12	109	119
2014	June 09	108	117
2014	July 25	108	117
2014	June 30	105	114
Design Value 2012-2014		109	119

With an estimated design value of 119 parts per billion (ppb) for the three year period of 2012-2014, the Arvin-Bear Mountain site is in attainment of the federal 1-hour ozone standard. Including the Standard Error of 4.95 ppb gives a design value range of 114 to 124 ppb, which are still below the federal standard.

In an effort to isolate this analysis to only the peak ozone values during the parallel monitoring period, another predicative equation was developed that only used paired data points where the ozone concentration at Arvin-Bear Mountain was at least 80 ppb. This approach produced a data set of 83 paired data points for comparison and regression.

Figure 3 is a scatter plot comparing the two sites using a lower bound of 80 ppb. Conducting the sample analysis with the new data set generates a new regression equation, R^2, and Standard Error. The R^2 is excellent and the Standard Error is improved at 4.90.

Figure 3. Arvin-Di Giorgio v. Arvin-Bear Mountain Daily Max 1-hour Ozone with 80 ppb Lower Limit



Conducting a similar calculation to that of the estimation using the full dataset, the equation shown in Figure 3 is used to calculate ozone values for Arvin-Bear Mountain based on data from Arvin-Di Giorgio for the 2012-2014 period. Based on this analysis, the calculated values for Arvin-Bear Mountain show attainment of the federal 1-hour ozone standard for the 2012-2014 period. Table 9 shows the five highest measurements for each year in the three year period 2012-2014 and the corresponding design value for Arvin-Bear Mountain.

Table 9. 2012-2014 Design Value for Arvin-Bear Mountain Using Only Values Greater Than or Equal to 80 ppb at Arvin-Bear Mountain

Year	Date	Arvin-Di Giorgio (observed)	Arvin-Bear Mountain (calculated)
2012	July 11	122	127
2012	August 28	113	119
2012	August 13	111	117
2012	June 01	109	115
2012	August 10	109	115
2013	July 20	109	115
2013	September 13	106	112
2013	July 09	103	109
2013	July 19	103	109
2013	June 07	100	107
2014	September 11	109	115
2014	September 12	109	115
2014	June 09	108	114
2014	July 25	108	114
2014	June 30	105	111
Design Value 2012-2014		109	115

With an estimated design value of 115 parts per billion (ppb) for the three year period of 2012-2014, the Arvin-Bear Mountain site is in attainment of the federal 1-hour ozone standard. Including the Standard Error of 4.9 ppb gives a design value range of 110 to 120 ppb, which are still below the federal standard.

To summarize, parallel monitoring between Arvin-Bear Mountain and Arvin-Di Giorgio was conducted for approximately one year and produced quality data for analysis, comparison, and development of regression equations allowing for the accurate assessment of the ozone values at Arvin-Bear Mountain during the 2012-2014 period. After using standard statistical procedures, the District has shown conclusively that the Arvin-Bear Mountain site is in attainment of the federal 1-hour ozone air quality standard for 2012-2014.

Arvin Saturation Study

In May 2013, the District contracted with Sonoma Technologies Inc. (STI) to conduct an ozone saturation study in the Arvin area. The purpose of this study was to measure the relative differences in ozone concentrations in Kern County with a focus on the Arvin area.

STI and their project partners (Providence Engineering and Environmental Group and Winegar Air Sciences) installed and operated a network of 23 temporary, small-scale ozone monitors (Aeroqual Series 500 ozone sensors) at 21 sites (see Figure 4) to collect ozone readings by the minute for approximately six weeks during the 2013 summer ozone season, beginning in mid-August until the end of September. The majority of the monitoring locations for this special study were clustered in and around the community of Arvin with a scattering of samplers farther from the community to examine ozone in the surrounding area. Three samplers were collocated at official air monitoring sites (including Di Giorgio) to continually ensure and verify accuracy of the samplers. Surface wind measurements were made at five sites: three permanent wind measurement locations at the ARB air monitoring stations (Bakersfield California Street, Edison, and Di Giorgio), and two temporary locations established for this study near the Bear Mtn. site and at a site in the City of Arvin.

The District contacted the Arvin-Edison Water District requesting authorization for placement of one of the temporary monitors precisely at the same location as the former regulatory site; however, this request was denied. To represent the former regulatory monitoring location at Bear Mountain Road, two locations were selected 0.4 km (440 yards) east of the old regulatory site, with one sensor near the roadway and a second north of the roadway (see Figure 4). Other sites were established to capture ozone concentrations (1) to the west, where the sites would often be upwind of Arvin; (2) in Arvin, where most people in the area live; and (3) in and around the Bear Mtn. and Di Giorgio sites.

Figure 4. Saturation Study Monitor Locations

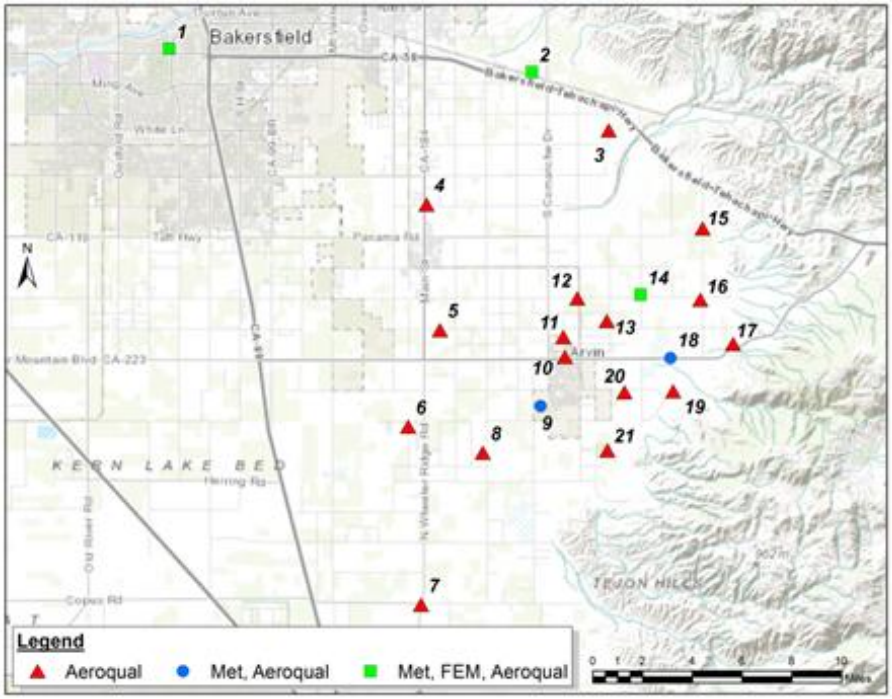
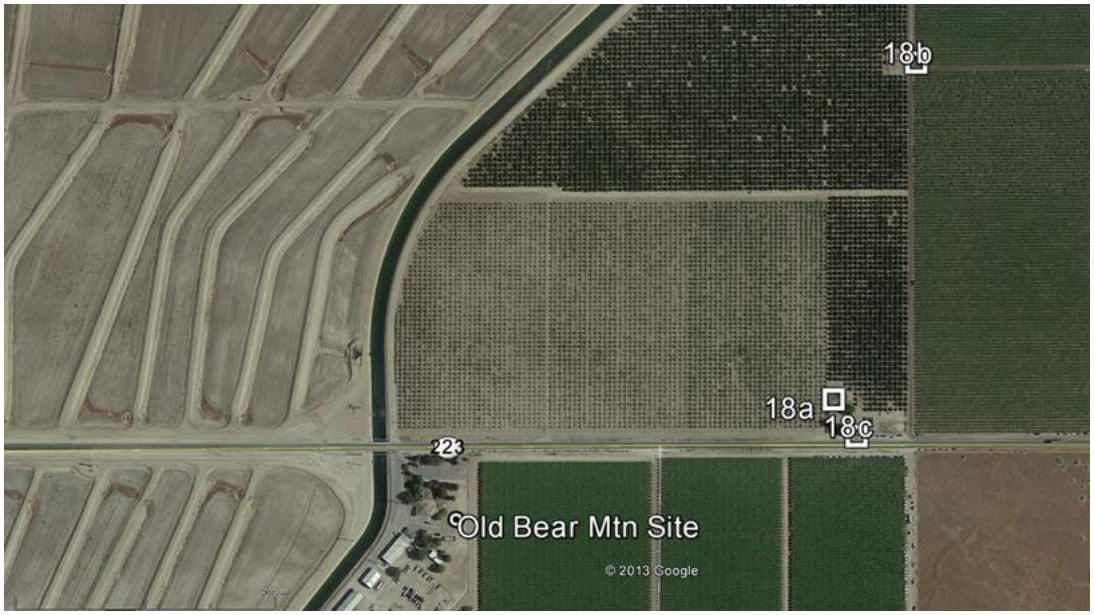


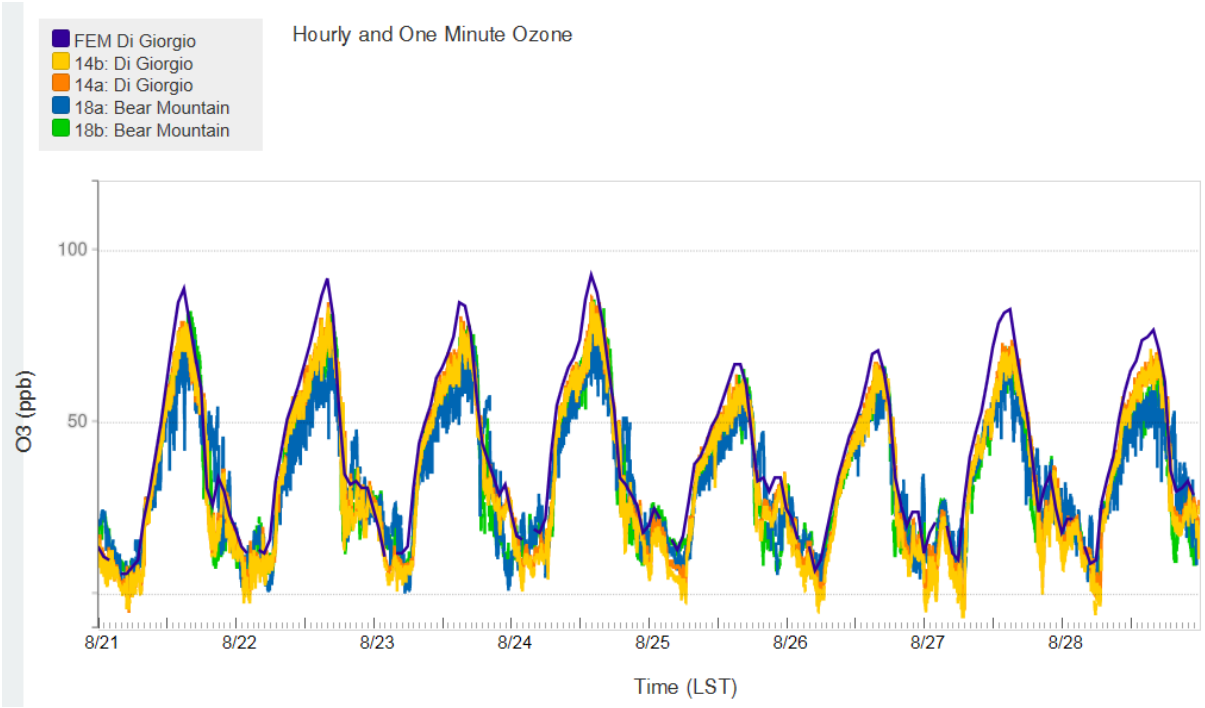
Figure 5. Bear Mountain Road Monitoring Sites



A close-up view of the area around the old Bear Mountain regulatory monitoring site. Site 18a is about 440 m from the old Bear Mountain site. Site 18b is recessed from the road by about 300 m. Site 18c is the meteorological tower and is about 20 m from Site 18a.

All one-minute sensor data were transmitted in real time to STI's office and posted to a password-protected website for daily data review (see Figure 6). STI assured the quality of the data by reviewing time-series plots of ozone concentrations and sensor quality assurance metadata. Ozone concentrations (1-hr and 8-hr) were then calculated from the quality-controlled 1-minute data. Using the collocation measurements, STI calibrated the data to be near regulatory quality. Overall, data recovery rates were excellent at all sites. The ozone samplers functioned admirably during the study period and recorded hundreds of hours of ozone measurements that were effectively identical to measurements at the official monitoring sites.

Figure 6. Saturation Study Data Screenshot



This special study identified that the peak 1-hour and 8-hour locations varied from site to site each day. No specific site observed the highest value each day; and therefore, no specific site could be selected that would always observe the highest value. A return to the old Arvin-Bear Mountain site would not be justified as "selected to observe the peak value" as the site would not be expected to observe the peak value each day. Additionally this special study showed that the old Arvin-Bear Mountain site was no longer the peak site in the area, even thought the study was conducted during the time period when peak 1-hour ozone levels are expected. The parallel monitoring that showed that Arvin-Bear Mountain had a higher value than the Arvin-Di Giorgio site may reflect emissions and air quality patterns that no longer exist or, with absolute certainty,

do not exist every year because emission levels have changed due to emission reduction strategies adopted by the District, ARB, and EPA.

In summary:

- If reductions of emissions have altered air quality to establish a situation where conditions for the old Arvin-Bear Mountain site to be the peak site no longer exist; then a return to the old site is not justified.
- If conditions are not as definitive and the old Arvin-Bear Mountain site may observe peak values on some years but not others; the case for return to the old Arvin-Bear Mountain site is not established because it would create an equivalent lack of monitoring for peak values at other sites which were shown to have higher values during the more recent year of special study monitoring.
- A wind shift of two (2) degrees from upwind areas, such as Bakersfield, will shift the peak by a one half of a mile (½) by the time the air parcel reaches either Arvin-Di Giorgio or Arvin-Bear Mountain. Since small variations in meteorology can create significant changes in how emissions are transported further downwind, the peak ozone location in the Arvin area is a moving target, and therefore the Arvin-Bear Mountain site is not expected to be the consistent peak.

The air quality improvement measured by this study in the Arvin area indicates that the federal 1-hour ozone standard is no longer exceeded at any of the sites in the study area. Therefore, site selection of an air monitoring station should be based on 8-hour maximums and the frequency of exceedances. This study indicates that Arvin-Di Giorgio is the site that better represents 8-hour exceedances and maximums than the old Arvin-Bear Mountain site.

Key Findings from the Study

With the successful completion of the saturation study, STI provided the District with a report that includes a number of findings and extensive supporting analysis (see Attachment A). Some of the key findings include:

1. The Arvin-Di Giorgio monitoring site is highly representative of worst-case high ozone concentrations in the Arvin area around the old Arvin-Bear Mountain monitor, and, in fact, generally measured higher concentrations than the Arvin-Bear Mountain sites.
    - On average, peak 1-hr ozone concentrations ranged from 3% - 15% higher at Arvin-Di Giorgio as compared to Arvin-Bear Mountain concentrations.

- Arvin-Bear Mountain sites experienced fewer days exceeding the 8-hr ozone standard than the Arvin-Di Giorgio site. Concentrations exceeded the 8-hr standard six times at Arvin-Bear Mountain; whereas, concentrations exceeded the 8-hr standard at Arvin-Di Giorgio 11 times.

2. The Arvin-Di Giorgio monitoring site is highly representative of ozone concentrations measured in the City of Arvin. They are well-correlated and of essentially the same magnitude.
   - Relationships for high concentrations of ozone between the Arvin temporary monitors and official station monitors (Bakersfield-California, Arvin-Di Giorgio, Edison) were evaluated, with the strongest correlation occurring between the City of Arvin and the Arvin-Di Giorgio monitoring station with an R^2 of 0.79.

3. Accurate equations were developed for predicting the City of Arvin's peak 1-hr and 8-hr ozone equations utilizing measurements from the air monitoring and meteorological network sites.
   - Predicted 1-hr and 8-hr ozone concentrations from the resulting equations versus the observed ozone were strongly correlated with an R^2 of about 0.92.

4. Accurate equations were developed for predicting Arvin-Bear Mountain's peak 1-hr and 8-hr ozone concentrations utilizing measurements from the air monitoring and meteorological network sites.
   - Predicted 1-hr and 8-hr ozone concentrations from the resulting equations versus the observed ozone were strongly correlated with an R^2 of about 0.90.

5. Strong gradients in peak 1-hr and 8-hr ozone concentrations are present within and around Arvin. Peak 1-hr ozone concentrations at each site on a given day can vary by as much as 30 ppb. This suggests complex local wind flow patterns in and around the saturation study area.

6. The Arvin Saturation Study helped establish a clearer understanding of the diurnal patterns of ozone throughout the day in the Arvin area.

7. The temporary, small-scale sensors used for the Arvin Saturation Study were sufficiently accurate and precise to measure peak ozone concentrations and assess differences in ozone concentrations in and around Arvin.

The predictive equations that the Arvin Ozone Saturation Study produced can be used to calculate 1-hour ozone readings for Arvin-Bear Mountain, following the same

procedures that are described in Attachment A (Arvin Ozone Saturation Study). The error for this predictive equation is 1 ppb. The 2012-2014 1-hour ozone design value generated by the predictive equation for Arvin-Bear Mountain is 102 ppb, which is in attainment of the federal 1-hour ozone standard. See the following Table 10 for details.

Table 10. 2012-2014 Design Value for Arvin-Bear Mountain Using the Arvin Ozone Saturation Study Predictive Equation

Year	Date	Arvin-Di Giorgio (observed)	Arvin-Bear Mountain (calculated)
2012	July 11	122	110
2012	August 28	113	103
2012	August 13	111	102
2012	June 01	109	102
2012	August 10	109	99
2013	July 20	109	100
2013	September 13	106	99
2013	July 09	103	95
2013	July 19	103	95
2013	June 07	100	96
2014	September 11	109	101
2014	September 12	109	101
2014	June 09	108	101
2014	July 25	108	98
2014	June 30	105	not available[16]
Design Value 2012-2014		109	102

[16] The 12Z 500 mb height from Vandenberg Air Force Base, which is a key dependent variable, is missing for June 30, 2014.

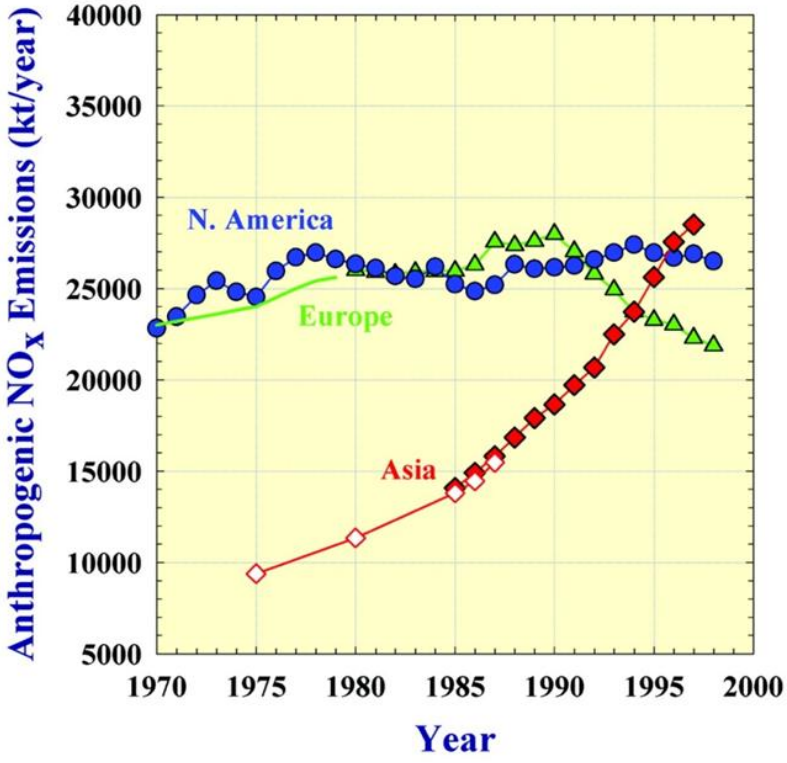
D. Influence of Transboundary Anthropogenic Background (TAB) Ozone on Attainment of the Ozone Standard

District compliance with ozone standards is affected not only by local emissions (natural and anthropogenic), but also by inflow of emissions from surrounding air districts and from beyond US borders. Although ozone precursors emitted by sources in the San Joaquin Valley and California sources have steadily declined over the past three decades, ozone generated by international anthropogenic sources (including emissions from Asia and South Asia in particular) are flowing into California and the SJVAB at an increasing rate, negatively impacting SJVAB ozone concentrations.

Several different terms and definitions are used to describe the impact of foreign air pollutant emissions on United States ozone readings. For this document, the ozone and ozone precursor contribution from foreign sources is referred to as "transboundary anthropogenic ozone" (TAO), highlighting the fact that the result of man-made emissions have crossed national boundaries to impact ground level ozone concentrations. The inflow of TAO thereby affects the District's ability to achieve and maintain compliance with the 1-hour and 8-hour ozone standards. The trend of increasing inflow of TAO from foreign sources to California is well documented and is making it more difficult for the District to maintain compliance with the 1-hour and 8-hour zone standards. Control measures instituted by the US and the European Union have resulted in a downward trend in their contribution to background ozone levels in the Northern Hemisphere. In contrast, a rapid increase in Asian emissions from energy production has resulted in a corresponding growth in TAO and ozone precursors to North America (see Figures 7a and 7b).

The effect of rising rates of TAO from Asia is particularly concerning in light of EPA's increasingly stringent air quality standards, which are nearing naturally-occurring background concentrations. That said, TAO is an issue even under existing standards, especially the 1-hour ozone standard.

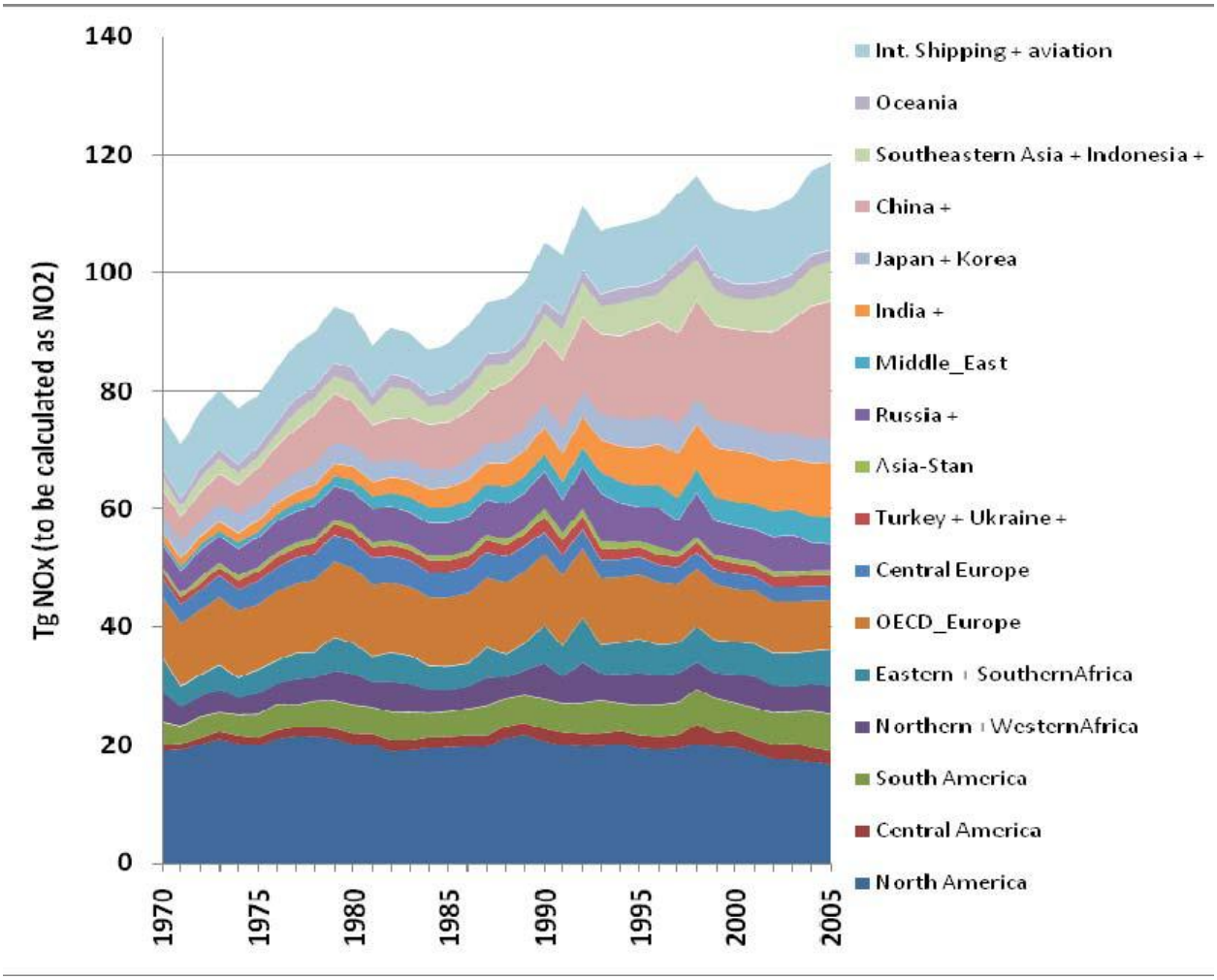
Figure 7a. Trends in Continental NOx Emissions, 1970-2000



Source: Akimoto, 2003, p. 1718.

Under CAA § 179B, a region that shows they would have attained an air quality standard by the applicable attainment date, but for emissions emanating from outside the United States, shall not be subject to the sanctions penalties ordinarily associated with missing an attainment deadline. This does not excuse local agencies from their duties to reduce emissions from sources under their regulatory authority; but the goal is to ensure that Valley residents and businesses are not penalized for pollution emanating from outside the United States. Therefore, even if EPA were to not concur with the 2012-2014 clean data finding, 1-hour ozone nonattainment penalties should be discontinued per CAA Section 179B. See Attachment B: Contribution of Transboundary Anthropogenic Background Ozone to the August 10, 2012 Exceedance at the Fresno Drummond Ave. Monitor for full details on TAB.

Figure 7b. International Trends in NOx Growth: 1970-2005



Source: Emission Database for Global Atmospheric Research (EDGAR) v4.1. http://edgar.jrc.ec.europa.eu/results_v41.php

III. ATTAINMENT IS DUE TO PERMANENT AND ENFORCEABLE EMISSIONS REDUCTIONS

A. Enforceable Regulations Have Achieved Significant Permanent Emissions Reductions

Since 1992, the District has adopted over 600 of the most stringent rules in the nation to obtain the significant emission reductions needed to demonstrate attainment. Table 11 shows the latest iteration of the adopted rules, including EPA approval dates. The ARB has also adopted and implemented the nation's toughest mobile source regulations. Correspondingly, the Valley's businesses and residents have made significant investments over the past couple of decades in cleaner technologies and practices. Through these investments, emissions of ozone precursors have been greatly reduced (see Figure 8). Emissions will continue to be reduced under the District's current and upcoming 8-hour ozone and PM2.5 plans.

Table 11. Adopted District Regulations Achieving Permanent and Enforceable Emission Reductions

Adopted District Regulatory Control Measures	Date Last Adopted/ Amended	EPA Approval Date	FR citation	FR Link
Rule 4103 Open Burning	04/15/10	01/04/12	77 FR 214-217	http://www.gpo.gov/fdsys/pkg/FR-2012-01-04/pdf/2011-33660.pdf
Rule 4106 Prescribed Burning and Hazard Reduction Burning	06/21/01	02/27/02	67 FR 8894-8897	http://www.gpo.gov/fdsys/pkg/FR-2002-02-27/pdf/02-4526.pdf
Rule 4306 Boilers, Steam Generators, and Process Heaters-Phase 3	10/16/08	01/13/10	75 FR 1715-1716	http://www.gpo.gov/fdsys/pkg/FR-2010-01-13/pdf/2010-352.pdf
Rule 4307 Boilers, Steam Generators, and Process Heaters-2.0 MMBtu/hr to 5.0 MMBtu/hr	05/19/11	02/12/15	80 FR 7803-7805	http://www.gpo.gov/fdsys/pkg/FR-2015-02-12/pdf/2015-02854.pdf

Adopted District Regulatory Control Measures	Date Last Adopted/ Amended	EPA Approval Date	FR citation	FR Link
Rule 4308 Boilers, Steam Generators, and Process Heaters-0.075 MMBtu/hr to less than 2.0 MMBtu/hr	11/14/13	2/12/15	80 FR 7803-7805	http://www.gpo.gov/fdsys/pkg/FR-2015-02-12/pdf/2015-02854.pdf
Rule 4309 Dryers, Dehydrators, and Ovens	12/15/05	05/30/07	72 FR 29886-29889	http://www.gpo.gov/fdsys/pkg/FR-2007-05-30/pdf/E7-10236.pdf
Rule 4311 Flares	06/18/09	11/03/11	76 FR 68106-68107	http://www.gpo.gov/fdsys/pkg/FR-2011-11-03/pdf/2011-28391.pdf
Rule 4320 Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr	10/16/08	03/25/11	76 FR 16696-16697	http://www.gpo.gov/fdsys/pkg/FR-2011-03-25/pdf/2011-7090.pdf
Rule 4352 Solid Fuel Fired Boilers, Steam Generators and Process Heaters	12/15/11	11/06/12	77 FR 66548-66554	http://www.gpo.gov/fdsys/pkg/FR-2012-11-06/pdf/2012-26779.pdf
Rule 4354 Glass Melting Furnaces	05/19/11	01/31/13	78 FR 6740-6741	http://www.gpo.gov/fdsys/pkg/FR-2013-01-31/pdf/2013-02015.pdf
Rule 4565 Biosolids, Animal Manure, and Poultry Litter Operations	03/15/07	01/17/12	77 FR 2228-2233	http://www.gpo.gov/fdsys/pkg/FR-2012-01-17/pdf/2012-582.pdf
Rule 4566 Organic Material Composting Operations	08/18/11	11/29/12	77 FR 71129-71131	http://www.gpo.gov/fdsys/pkg/FR-2012-11-29/pdf/2012-28827.pdf

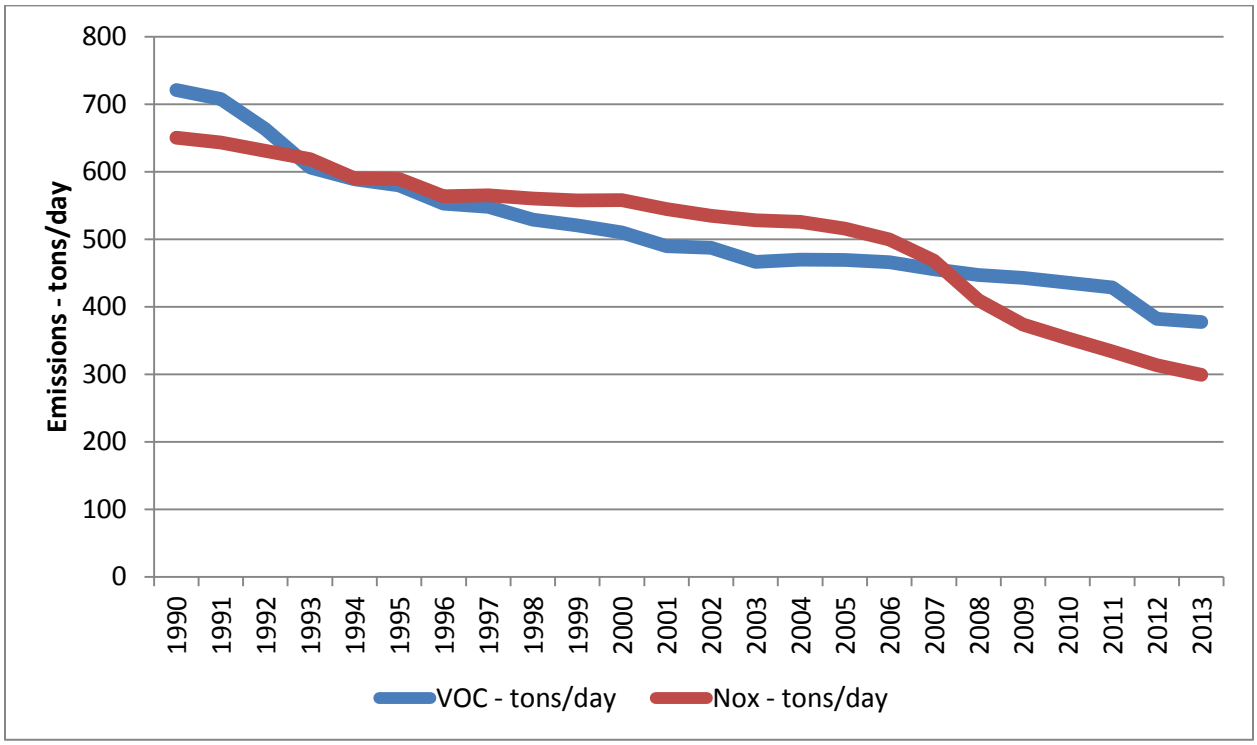
Adopted District Regulatory Control Measures	Date Last Adopted/ Amended	EPA Approval Date	FR citation	FR Link
Rule 4570 Confined Animal Facilities	10/21/10	01/17/12	77 FR 2228-2233	http://www.gpo.gov/fdsys/pkg/FR-2012-01-17/pdf/2012-582.pdf
Rule 4601 Architectural Coatings	12/17/09	11/08/11	76 FR 69135-69136	http://www.gpo.gov/fdsys/pkg/FR-2011-11-08/pdf/2011-28788.pdf
Rule 4603 Surface Coating of Metal Parts and Products, Plastic Parts and Products, and Pleasure Crafts	09/17/09	11/01/11	76 FR 67369-67370	http://www.gpo.gov/fdsys/pkg/FR-2011-11-01/pdf/2011-28251.pdf
Rule 4604 Can and Coil Coating Operations	09/20/07	01/19/10	75 FR 2796-2800	http://www.gpo.gov/fdsys/pkg/FR-2010-01-19/pdf/2010-747.pdf
Rule 4605 Aerospace Assembly and Component Coating Operations	06/16/11	11/16/11	76 FR 70886-70887	http://www.gpo.gov/fdsys/pkg/FR-2011-11-16/pdf/2011-29466.pdf
Rule 4606 Wood Products and Flat Wood Paneling Products Coating Operations	10/16/08	10/15/09	74 FR 52894-52895	http://www.gpo.gov/fdsys/pkg/FR-2009-10-15/pdf/E9-24687.pdf
Rule 4607 Graphic Arts and Paper, Film, Foil, and Fabric Coatings	12/18/08	10/15/09	74 FR 52894-52895	http://www.gpo.gov/fdsys/pkg/FR-2009-10-15/pdf/E9-24687.pdf
Rule 4612 Motor Vehicle and Mobile Equipment Coating Operations	10/21/10	02/13/12	77 FR 7536-7537	http://www.gpo.gov/fdsys/pkg/FR-2012-02-13/pdf/2012-3172.pdf

Adopted District Regulatory Control Measures	Date Last Adopted/ Amended	EPA Approval Date	FR citation	FR Link
Rule 4621 Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants	12/19/13	02/10/15	80 FR 7345-7347	http://www.gpo.gov/fdsys/pkg/FR-2015-02-10/pdf/2015-02612.pdf
Rule 4622 Gasoline Transfer into Motor Vehicle Fuel Tanks	12/19/13	02/10/15	80 FR 7345-7347	http://www.gpo.gov/fdsys/pkg/FR-2015-02-10/pdf/2015-02612.pdf
Rule 4624 Transfer of Organic Liquid	12/20/07	10/15/09	74 FR 52894-52895	http://www.gpo.gov/fdsys/pkg/FR-2009-10-15/pdf/E9-24687.pdf
Rule 4653 Adhesives and Sealants	09/16/10	02/13/12	77 FR 7536-7537	http://www.gpo.gov/fdsys/pkg/FR-2012-02-13/pdf/2012-3172.pdf
Rule 4661 Organic Solvents	09/20/07	05/05/10	75 FR 24406-24408	http://www.gpo.gov/fdsys/pkg/FR-2010-05-05/pdf/2010-10402.pdf
Rule 4662 Organic Solvent Degreasing Operations	09/20/07	07/30/09	74 FR 37948-37949	http://www.gpo.gov/fdsys/pkg/FR-2009-07-30/pdf/E9-18001.pdf
Rule 4663 Organic Solvent Cleaning, Storage, and Disposal	09/20/07	07/30/09	74 FR 37948-37949	http://www.gpo.gov/fdsys/pkg/FR-2009-07-30/pdf/E9-18001.pdf
Rule 4682 Polystyrene, Polyethylene, and Polypropylene Products Manufacturing	12/15/11	09/20/12	77 FR 58312-58313	http://www.gpo.gov/fdsys/pkg/FR-2012-09-20/pdf/2012-21218.pdf
Rule 4684 Polyester Resin Operations	08/18/11	02/06/12	77 FR 5709-5710	http://www.gpo.gov/fdsys/pkg/FR-2012-02-06/pdf/2012-2599.pdf

Adopted District Regulatory Control Measures	Date Last Adopted/ Amended	EPA Approval Date	FR citation	FR Link
Rule 4692 Commercial Charbroiling	09/17/09	11/03/11	76 FR 68103-68106	http://www.gpo.gov/fdsys/pkg/FR-2011-11-03/pdf/2011-28388.pdf
Rule 4694 Wine Fermentation and Storage Tanks	12/15/05	11/29/12	77 FR 71109-71111	http://www.gpo.gov/fdsys/pkg/FR-2012-11-29/pdf/2012-28826.pdf
Rule 4695 Brandy Aging and Wine Aging Operations	09/17/09	08/04/11	76 FR 47076-47077	http://www.gpo.gov/fdsys/pkg/FR-2011-08-04/pdf/2011-19384.pdf
Rule 4702 Internal Combustion Engines	11/14/13	*pending*		
Rule 4703 Stationary Gas Turbines	09/20/07	10/21/09	74 FR 53888-53889	http://www.gpo.gov/fdsys/pkg/FR-2009-10-21/pdf/E9-25173.pdf
Rule 4902 Residential Water Heaters	03/19/09	05/05/10	75 FR 24408-24409	http://www.gpo.gov/fdsys/pkg/FR-2010-05-05/pdf/2010-10404.pdf
Rule 4905 Natural Gas-Fired, Fan-Type Residential Central Furnaces	11/22/15	*pending*		
Rule 9310 School Bus Fleets	09/21/06	03/08/10	75 FR 10420-10438	http://www.gpo.gov/fdsys/pkg/FR-2010-03-08/pdf/2010-4752.pdf
Rule 9410 Employer-Based Trip Reduction	12/17/09	*pending*		
Rule 9510 Indirect Source Review (ISR)	12/15/05	05/09/11	76 FR 26609-26615	http://www.gpo.gov/fdsys/pkg/FR-2011-05-09/pdf/2011-11133.pdf

Adopted District Regulatory Control Measures	Date Last Adopted/ Amended	EPA Approval Date	FR citation	FR Link
Rule 9610 State Implementation Plan Credit for Emission Reductions Generated Through Incentive Programs	06/20/13	*Proposed Approval*	79 FR 28650-58658	http://www.gpo.gov/fdsys/pkg/FR-2014-05-19/pdf/2014-11481.pdf

Figure 8. Valley Summer NOx and VOC Emissions, 1990-2013



B. Attainment is Not Due to Unusually Favorable Meteorology

Ozone formation is strongly driven by several factors, horizontal and vertical ventilation, high pressure, and solar radiation. These factors lead to high temperatures on the valley floor. High temperatures can be used as a metric that shows ozone forming potential for a given summer and can be used to compare one ozone season to another. The analysis in this section shows that the average high temperatures over 2012-2014 were consistent or slightly higher than averages over the 1950-2011 time period. As such, 2012-2014 did not have lower ozone forming potential than other years.

This section also shows that peak temperature days at Stockton, Fresno, and Bakersfield are evenly and normally distributed throughout the May-October ozone season across 2012-2014, similar to the longer 2000-2014 period as shown in the charts below. Furthermore, even when average high temperatures increased, the 1-hour ozone concentrations have decreased. These results demonstrate that the Valley's improvement in ozone concentrations are not due to unusually favorable meteorology, and that the ozone forming potential during the 2012-2014 period was at least equal to or stronger than longer term averages. Finally, reduced ozone concentrations are not the result of decreased economic activity, as demonstrated through fuel sales analysis. It is therefore reasonable to conclude that the reduced ozone concentrations of 2012-2014 and attainment of the 1-hour ozone standard are the result of the District's, ARB's, and EPA's control programs.

Average High Temperatures, 1950-2014

To demonstrate that recent improvements in ozone concentrations are not caused by favorable temperatures, a comparison of daily and average high temperatures was conducted for two temperature data sets (1950-2011 and 2012-2014) over the ozone season each year (May-October). Table 12 reveals that average high temperature and range of daily maximum temperatures over the past three years are greater than or equal to the 62-year average preceding them. Figures 9-11 further illustrate that the 2012-2014 average daily maximum temperatures at the Stockton Airport, Fresno Yosemite International (FYI) Airport, and Bakersfield Meadows (BM) Airport are close to the 65-year average (1950-2014). The daily maximum temperatures in Stockton and Fresno have slightly increased over time, with Bakersfield remaining consistent, thus providing evidence that the 2012-2014 years were not unusually conducive to lower ozone concentrations.

During the 2012-2014 time period, it could be argued that even though the number of high temperature days were average, they would have lower ozone forming potential if those days mostly occurred early in the ozone season. To show this is not the case, the temporal distributions of high temperatures days (greater than or equal to 95^0F) are illustrated in Figures 12-14. In these figures, the maximum daily temperatures from 2012-2014 are distributed throughout the ozone season (May-October) similar to the ozone seasons in the previous years of 2000-2011. Since the distribution analysis shows a normal summer temperature distribution for all sites for all 15 years, it can be concluded that the chances for ozone formation for the 2012-2014 seasons were very similar to past seasons and therefore would not be a factor in reduced ozone concentrations.

Table 12. Summary of Average High Temperatures and Ozone Season Average Range of Daily Maximum Temperatures

	62-year (1950-2011)		2012-2014	
	Average high temperature	**Average range maximum temperatures**	**Average high temperature**	**Average range maximum temperatures**
Stockton	87.2^0F	84^0F to 90^0F	87.3^0F	86^0F to 88^0F
Fresno	90.0^0F	86^0F to 93^0F	92.4^0F	92^0F to 93^0F
Bakersfield	90.3^0F	86^0F to 93^0F	91.2^0F	90^0F to 92^0F
Average	89.2^0F	88.7^0F	90.3^0F	90.2^0F

Figure 9. Ozone Season Average Range of Daily Maximum Temperatures – Stockton Airport, Averaged May-October (1950-2014)

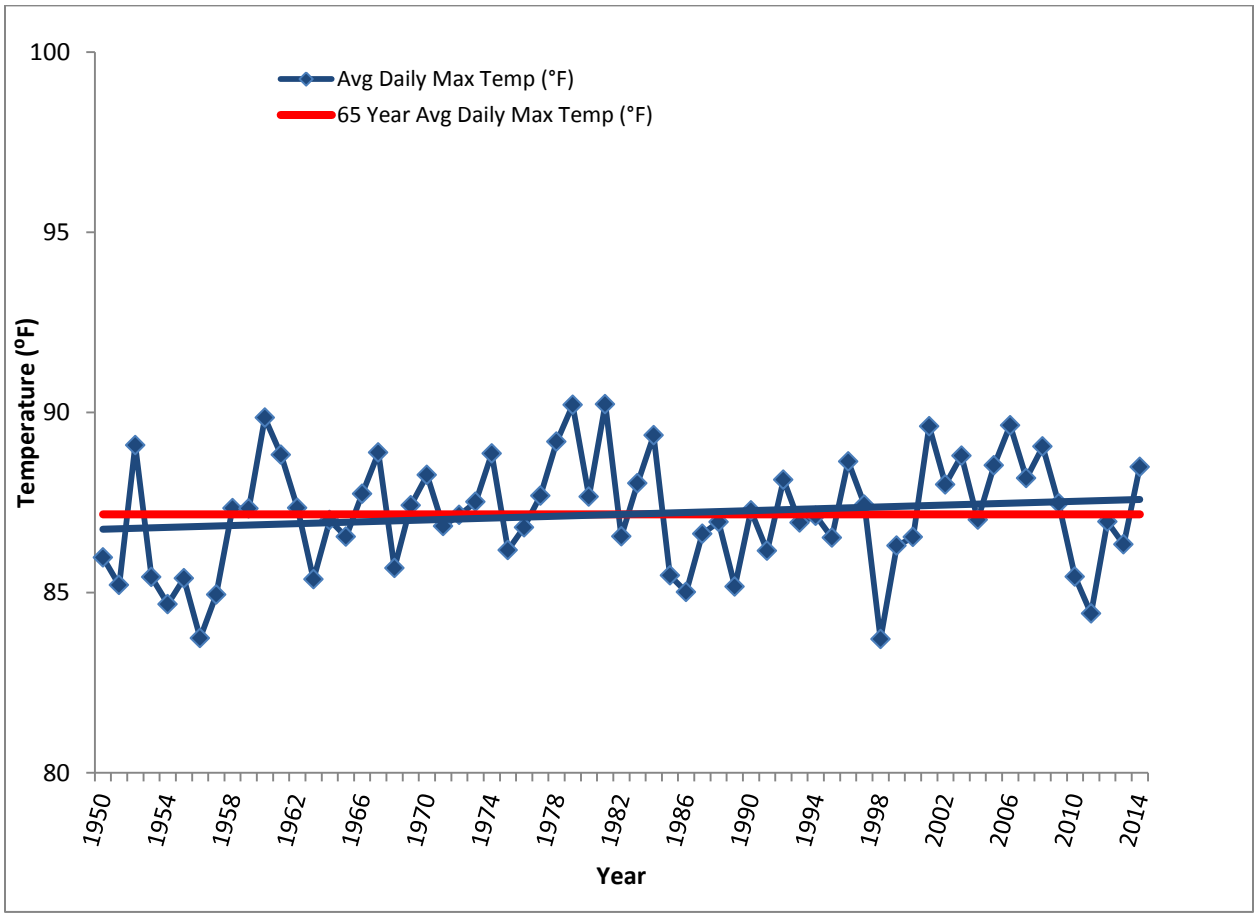


Figure 10. Ozone Season Average Range of Daily Maximum Temperatures – Fresno Yosemite International Airport, Averaged May-October (1950-2014)

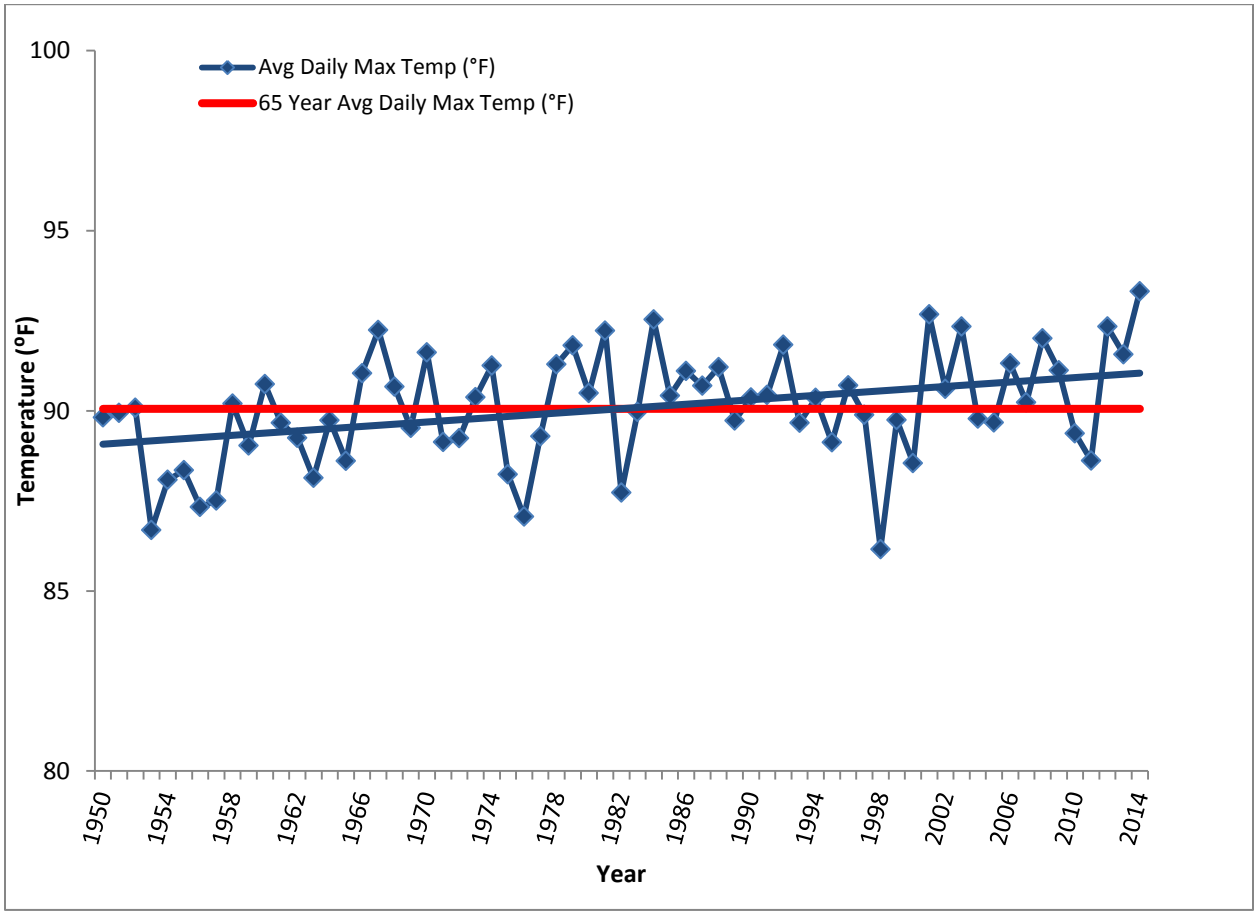
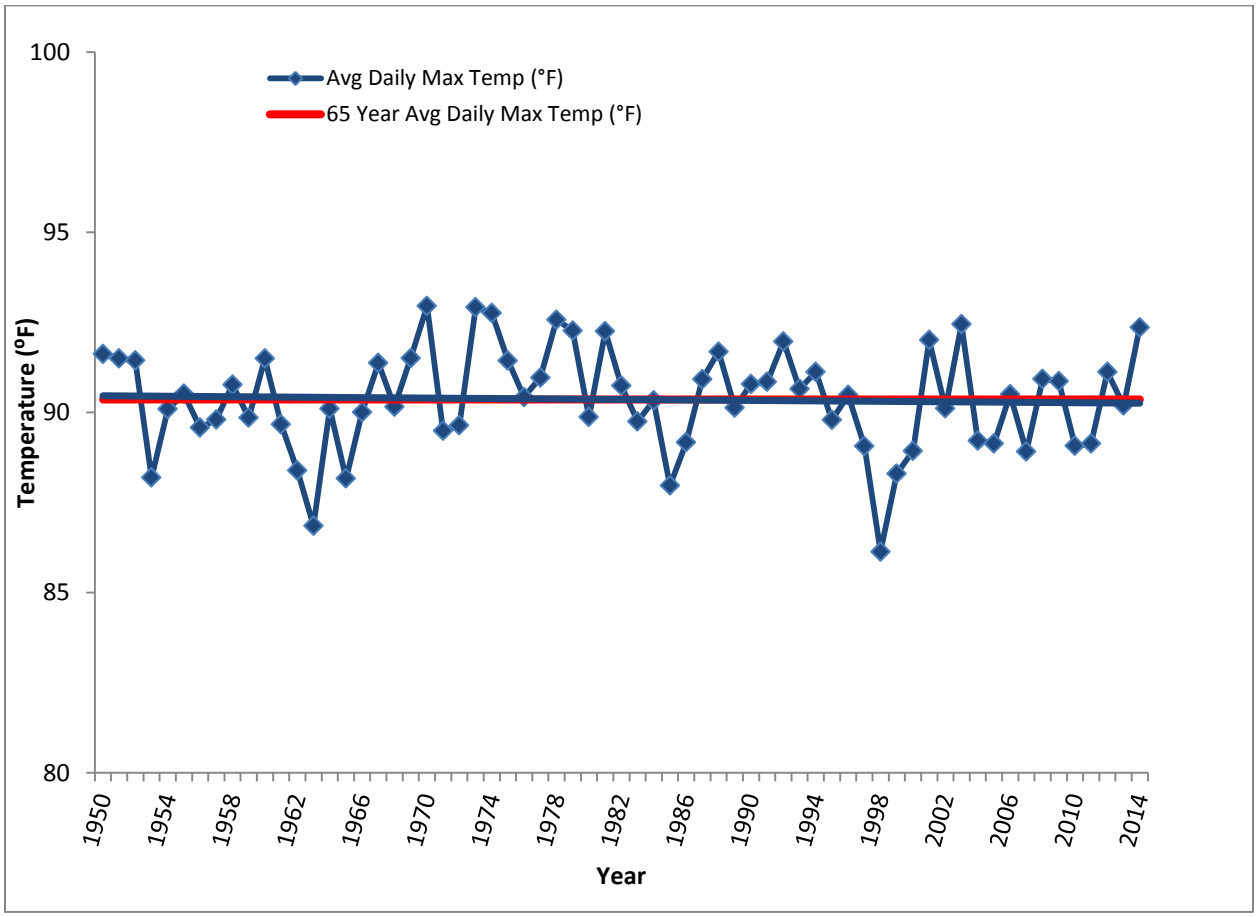


Figure 11. Ozone Season Average Range of Daily Maximum Temperatures – Bakersfield Meadows Airport, Averaged May-October (1950-2014)



Distribution of High Temperature Days

Figure 12. Stockton Airport Maximum Daily Temperatures (^{0}F), May - October (2000-2014)

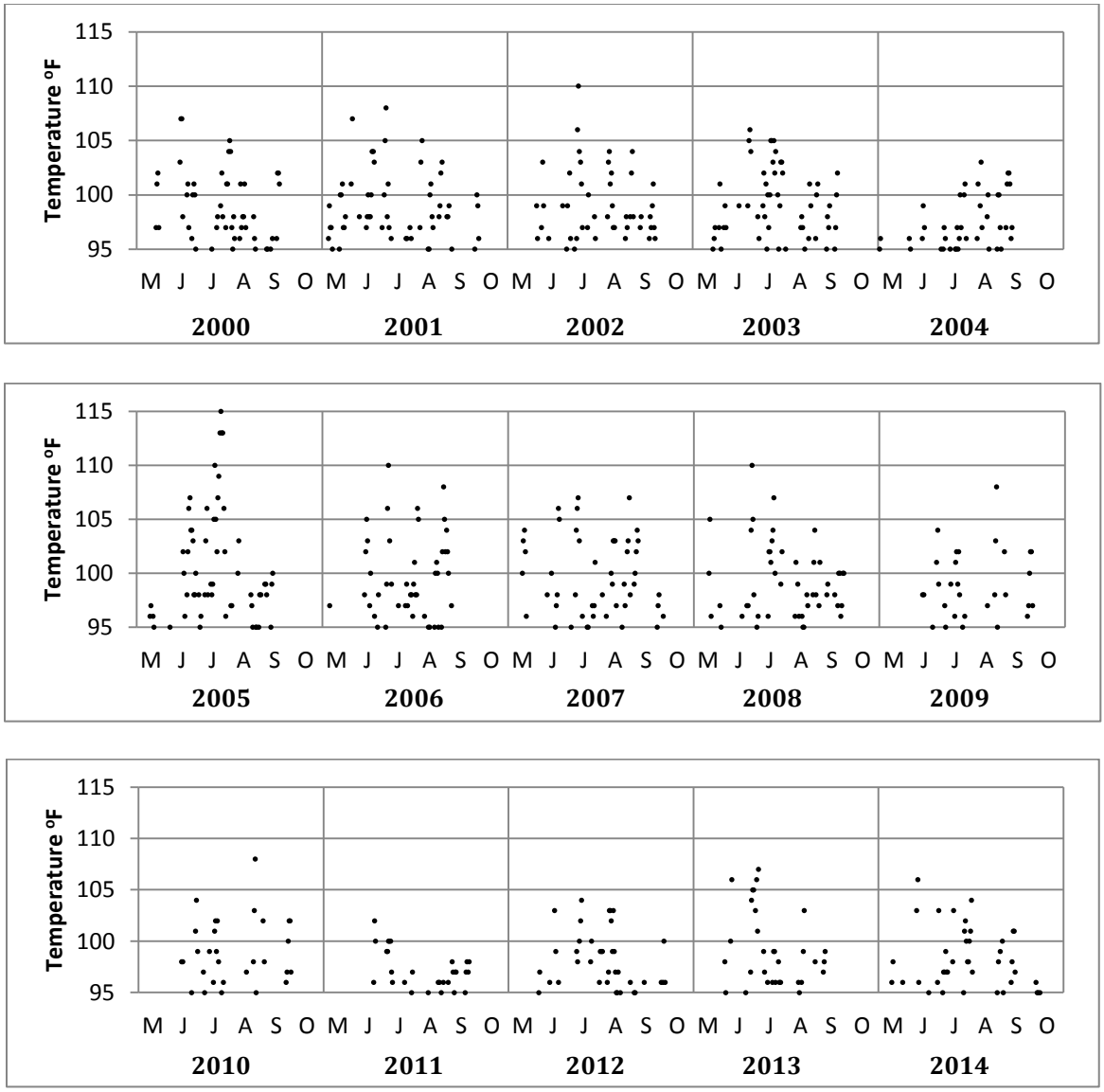


Figure 13. Fresno Yosemite International Airport Maximum Daily Temperatures (^{0}F), May-October (2000-2014)

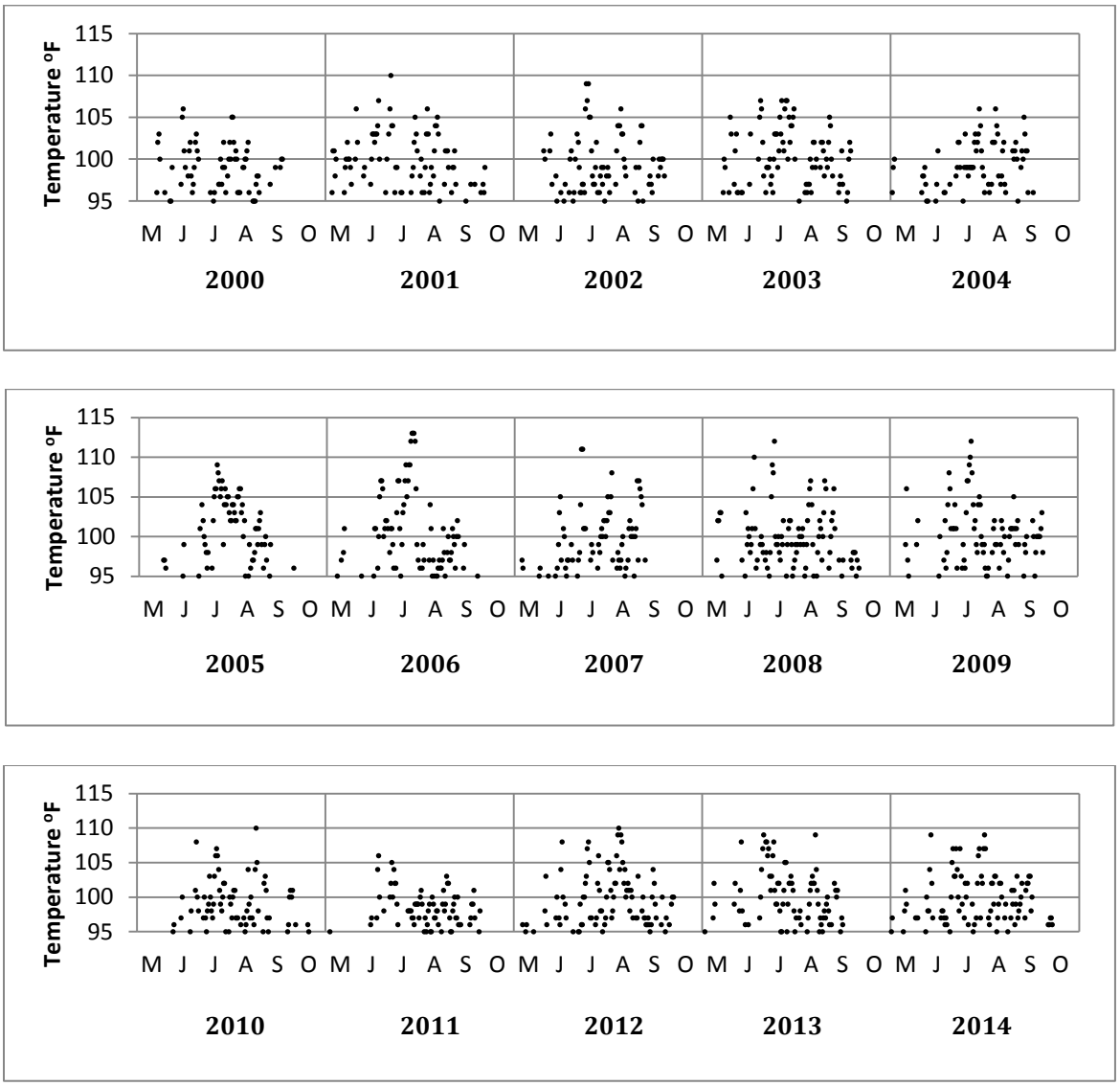
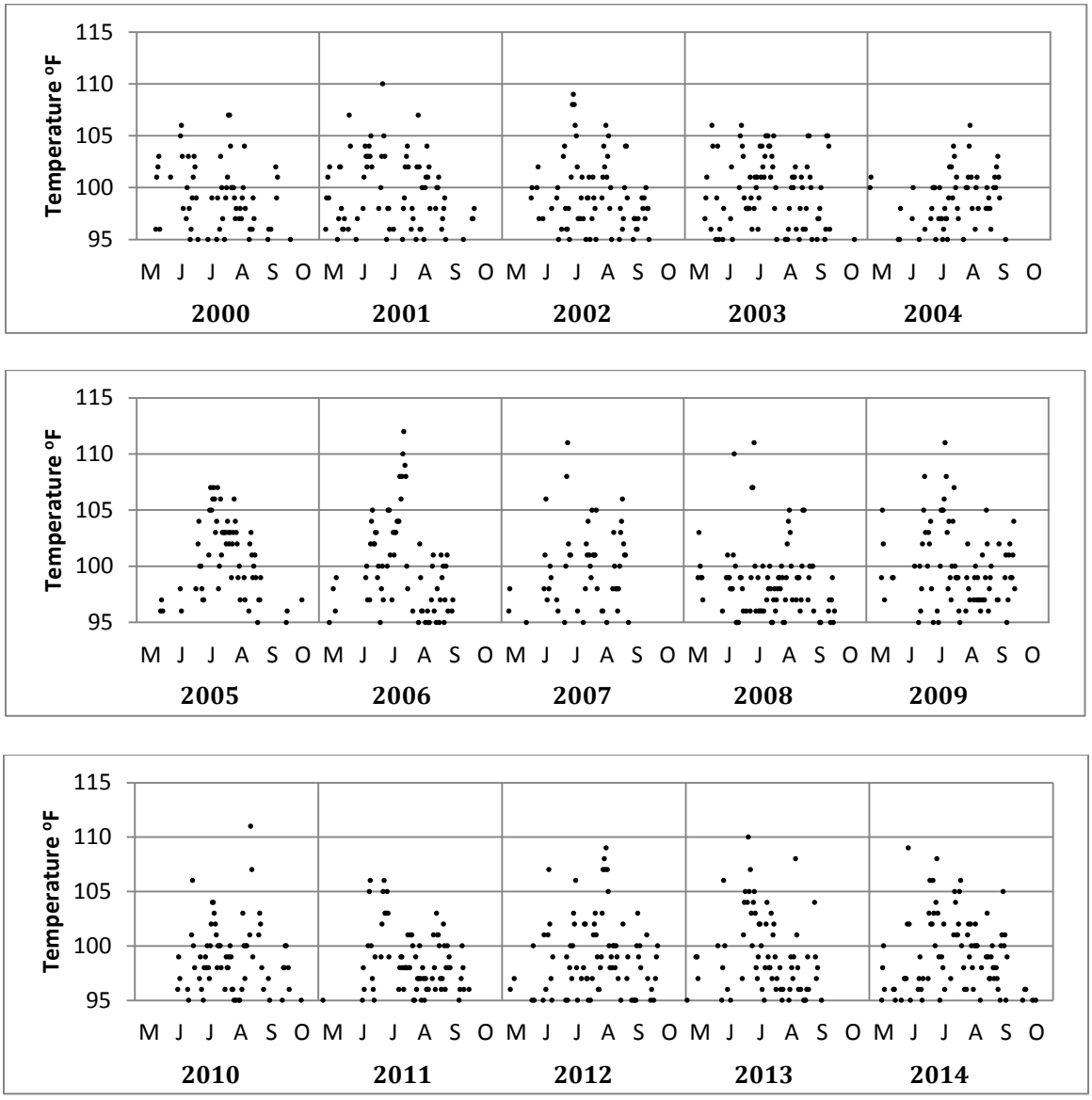


Figure 14. Bakersfield Meadows Airport Maximum Daily Temperatures (^{0}F) May October (2000-2014)



Comparing High Temperature Days to 1-hour Ozone Exceedance Days

A comparison of two sets of data (2000-2011 and 2012-2014) for the 'average number of high temperature days per year' for days with maximum daily temperatures equal to and greater than 95 degrees Fahrenheit reveals a range of values and their average value (Table 13). This table demonstrates that the 2012-2014 'average number of high temperature days per year' are very similar (with an average slightly higher) than those of the previous years of 2000-2011 and that the number of high temperature days per year would not be a causative factor in reduced ozone concentrations that occurred during that time period.

Table 13. Average Number of High Temperature Days per Year (≥95^{0}F)

	2000-2011	2012-2014
Stockton	47	37
Fresno	79	91
Bakersfield	72	81
Average	66	70

Figures 15 through 17 compare the annual number of days with high temperatures (≥95^{0}F) at the Stockton, FYI, and the BM Airports to the annual number of days exceeding the 1-hour ozone standard Valley-wide (Basin) and locally (County) for 2000 to 2014.

As expected, the number of Valley-wide and local exceedances of the 1-hour ozone standard in Stockton have either decreased or stayed at or near zero through the period, relating well with the decrease in the 15-year trend line for high temperature days. In fact, the last time San Joaquin County exceeded the federal 1-hour ozone standard was in 1999. Alternatively, the analysis for Fresno and Bakersfield illustrates that even though the potential for 1-hour ozone formation has increased, due to more annual high temperature days, the measured 1-hour ozone concentrations have declined. This divergence of the trends between high temperature days and 1-hour ozone exceedances demonstrates the effectiveness of the emissions reductions achieved in the Valley through the District's control program despite the increasing temperatures at two of the three measurement sites.

Figure 15. Number of Days per Year with High Temperatures ≥ 95^{0}F at Stockton Airport (May-October) and Days Exceeding the 1-hour Ozone NAAQS (2000-2014)

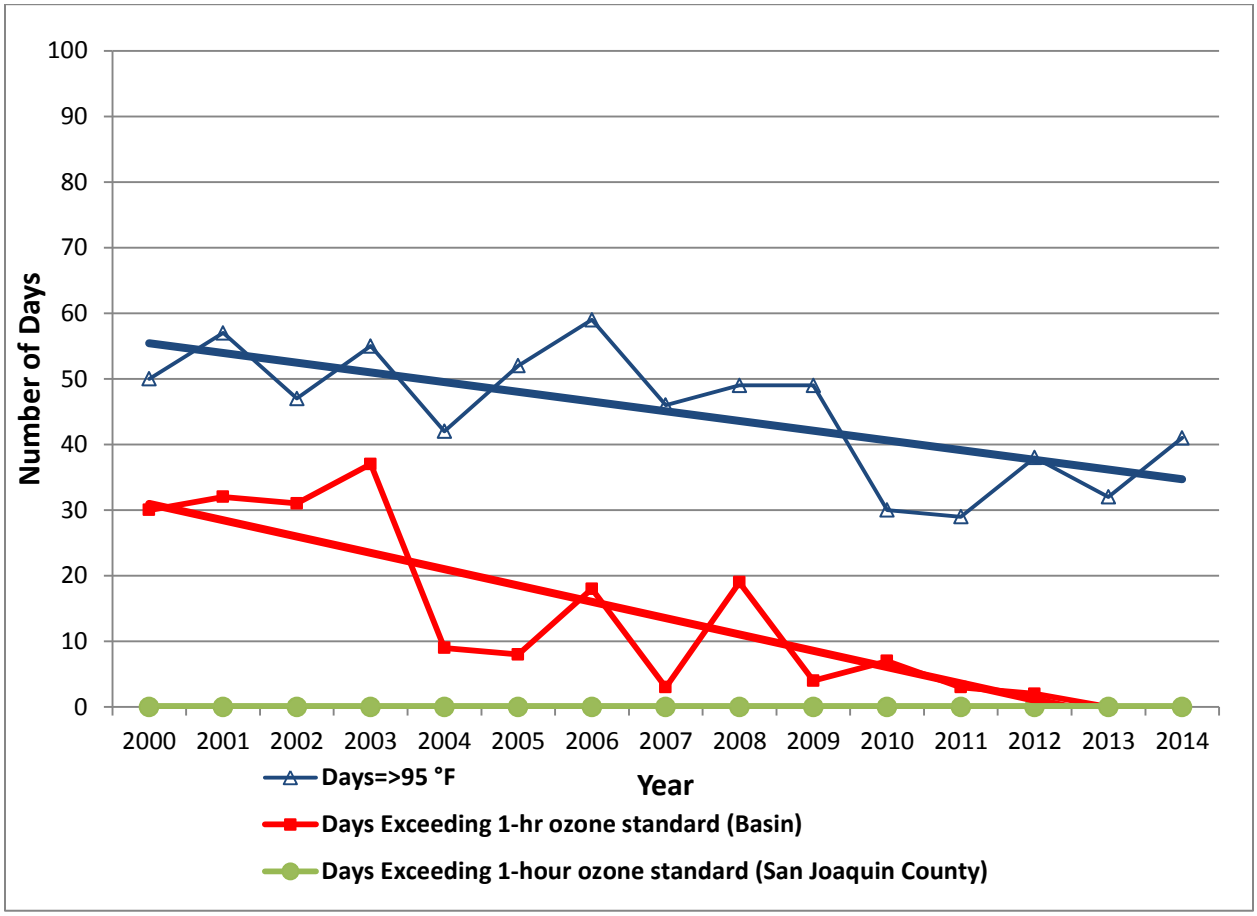


Figure 16. Number of Days per Year with High Temperatures ≥ 95^{0}F at Fresno Yosemite International Airport (May-October) and Days Exceeding the 1-hour Ozone NAAQS (2000-2014)

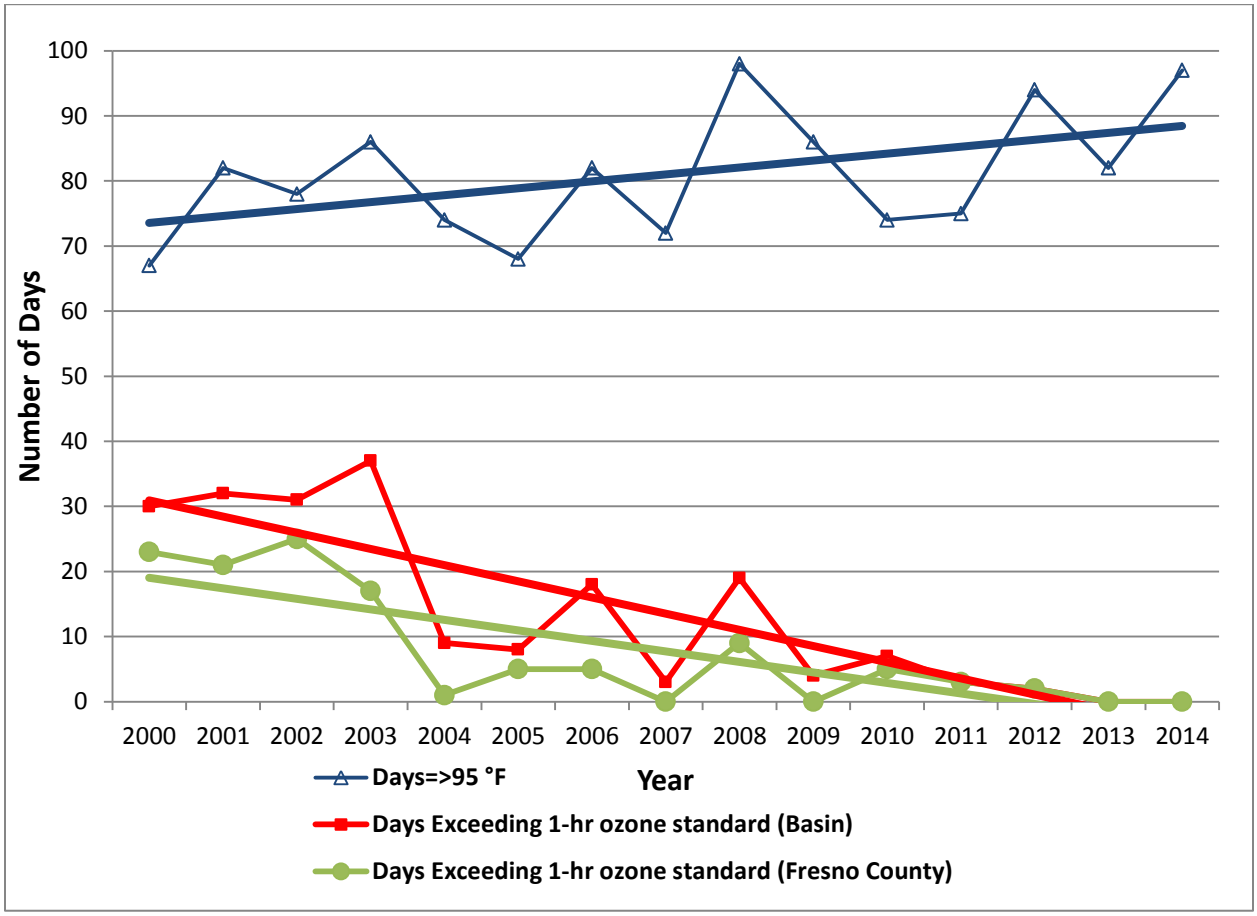
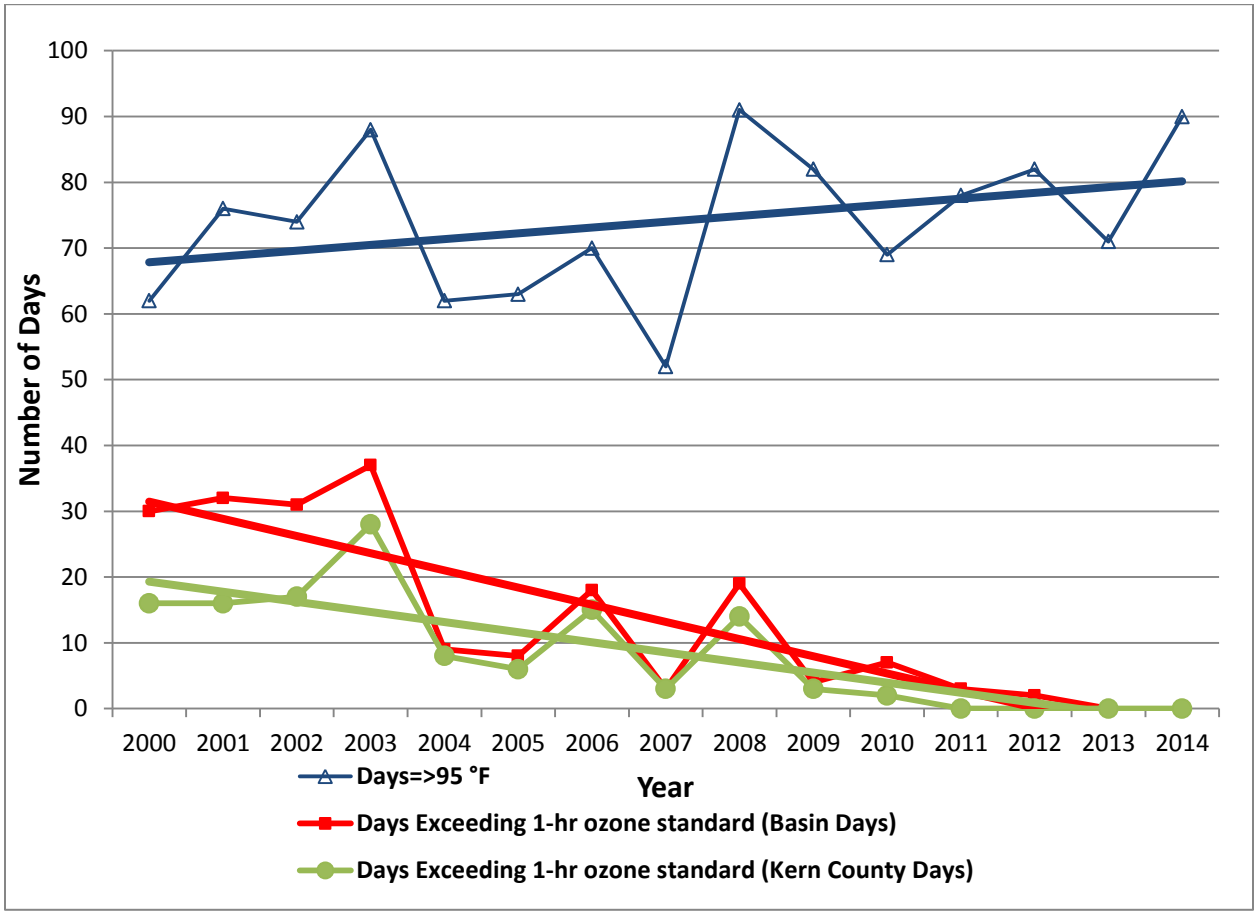


Figure 17. Number of Days per Year with High Temperatures ≥ 95^{0}F at Bakersfield Meadows Airport (May-October) and Days Exceeding the 1-hour Ozone NAAQS (2000-2014)



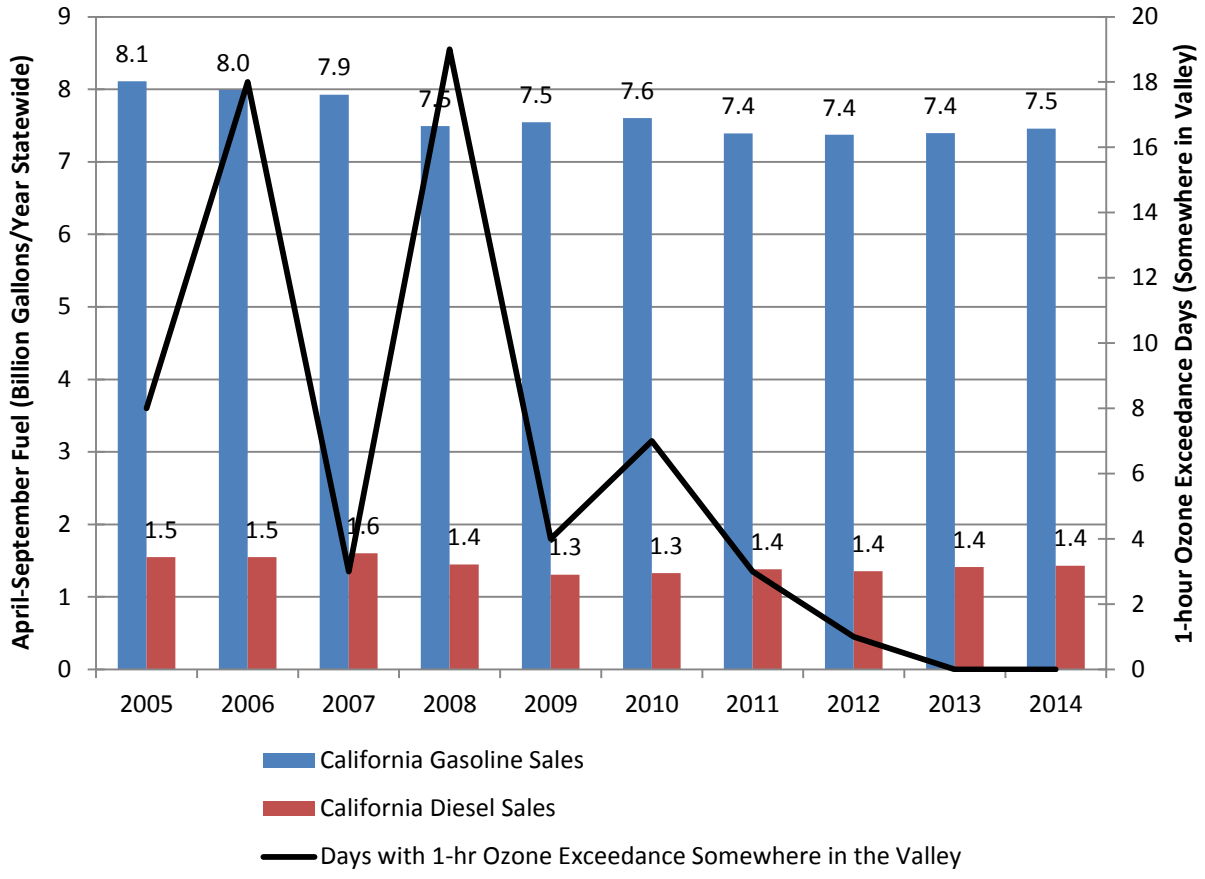
C. Attainment is Not Due to Temporary Emissions Reductions

Since the Valley's ozone precursor emissions are dominated by mobile sources, and since mobile sources are a key component of economic activity in California, fuel sales were analyzed as indicators of economic activity.[17] This analysis shows that the improvement in air quality leading to 1-hour ozone attainment in the Valley is not due to a temporary economic downturn.

[17] These were also the economic indicators used in analysis of Sacramento Metropolitan AQMD's 1-hour ozone attainment request. See EPA's proposed approval of their request at 76 FR 28696. http://www.gpo.gov/fdsys/pkg/FR-2011-05-18/pdf/2011-12063.pdf.

Analysis of California[18] gasoline and diesel sales from April to September shows some variation from year to year, including slight decreases[19] (as did the analysis for 2000-2009 for Sacramento). Figure 18 shows these variations as well as the number of days when a 1-hour ozone exceedance was recorded in the Valley. California fuel sales over 2012-2014 were very similar to fuel sales in 2008-2010, yet 2008-2010 had more 1-hour ozone exceedance days. Based on this motor vehicle analysis, it is reasonable to conclude that the Valley's ozone improvement is not attributable to a temporary economic downturn.

Figure 18. State-Wide Fuel Sales (April-September) and Valley 1-hour Ozone Exceedance Days



[18] Valley-specific fuel sale data not available. In addition, fuel can be purchased in one region and used in another. Sacramento's 2010 analysis, approved by EPA, also analyzed state-wide fuel sales.
[19] Data available from California State Board of Equalization, Fuel Taxes Statistics & Reports, http://www.boe.ca.gov/sptaxprog/reports/Diesel_10_Year_Report.pdf and http://www.boe.ca.gov/sptaxprog/reports/MVF_10_Year_Report.pdf

IV. CONCLUSION

In 2013, for the first time in recorded history, the San Joaquin Valley had zero violations of the federal 1-hour ozone standard. Based on 2012-2014 ozone concentrations, the District requests that EPA formally determine that the Valley has reached attainment of the 1-hour ozone standard.

This document meets the requirements for 1-hour ozone attainment findings. Specifically, this document supports a clean data finding by showing that the number of expected exceedance days in the 2012-2014 time period meets the 1-hour ozone standard at each site and that the Valley's ozone monitoring network meets monitoring requirements.

This document also supports a finding that the clean data is due to permanent and enforceable emissions reductions by showing that the District has numerous EPA-approved regulations in place; that these regulations and Valley investments have yielded significant emissions reductions; and that the Valley's recent ozone improvement is not due to favorable meteorology or an economic downturn.

Many air quality challenges remain for the Valley under existing and upcoming EPA standards, accordingly air pollutant emissions will continue to be reduced in the Valley. An EPA finding of 1-hour ozone attainment will enable the Valley to better focus its efforts and investments on these upcoming challenges while removing exposure by Valley businesses to potential additional penalties and returning full local control to the Valley for decisions regarding the need, the magnitude, and the expenditure of DMV dollars.

Attachment A

Arvin Ozone Saturation Study