

Technical Support Document

for

the Notice of Proposed Rulemaking

on

Designation of East Kern Nonattainment Area and Extension of Attainment
Date for the State Implementation Plan for California, San Joaquin Valley
Ozone Nonattainment Area

January 2001

Air Division

U.S. Environmental Protection Agency - Region 9

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A. Background

On June 19, 2000 EPA proposed to find that the San Joaquin Valley (SJV) serious ozone nonattainment area did not attain the 1-hour ozone NAAQS by November 15, 1999, the CAA attainment deadline for serious ozone nonattainment areas. 65 FR 37926. The SJV nonattainment area currently includes the Counties of San Joaquin, Kern, Fresno, Kings, Madera, Merced, Stanislaus and Tulare. 40 CFR 81.301.

During the public comment period for the proposal, EPA received a substantial number of comments requesting that EPA remove the eastern portion of Kern County from the SJV and designate it a separate ozone nonattainment area. On December 15, 2000, The California Air Resources Board (CARB) formally requested that EPA create a separate ozone nonattainment area for eastern Kern County.

Based on these comments, the State's request and our own analysis, we are today proposing to redesignate the SJV ozone nonattainment area by changing its boundaries to remove eastern Kern County. In order to reflect this proposed boundary change, we are repropounding our finding that the SJV did not attain the ozone NAAQS by the statutory deadline. If we finalize this proposal, the SJV nonattainment area with its revised boundaries will be reclassified by operation of law to severe.

We are today also proposing to designate eastern Kern County as a new, separate ozone nonattainment area which will have a serious classification. Finally, we are proposing to extend the attainment deadline for the proposed East Kern County serious ozone nonattainment area from November 15, 1999 to November 15, 2001. This proposed extension is based in part on monitoring data that indicate there were no exceedances of the 1-hour ozone NAAQS during 1999 and 2000 in eastern Kern County.

The primary purpose of this Technical Support Document (TSD) is to provide supplementary information supporting our proposal to remove eastern Kern County from the SJV nonattainment area and extend the attainment date for the proposed nonattainment area to November 15, 2001. The following documents are listed here, mentioned throughout the TSD, and provided as attachments:

- (1) Letter with attachments from James D. Boyd, Executive Officer, CARB, to Daniel W. McGovern, Regional Administrator at EPA Region IX, dated March 15, 1991.
- (2) Letter with enclosures from Cynthia Marvin, Chief of Air Quality and Transportation Planning, CARB, to Debbie Jordan of EPA Region IX, dated February 29, 2000.
- (3) Memorandum with attachments from Dean Saito, CARB, to John Ungvasky, EPA Region IX, dated March 30, 2000.
- (4) Technical Support Document for the Notice of Proposed Rulemaking on Reclassification and Finding of Failure to Implement State Implementation Plan for California, San Joaquin Valley Nonattainment Area; USEPA Region IX, June, 2000.
- (5) Letter from Elsie Munsell, Deputy Assistant Secretary of the Navy, to Felicia Marcus, Regional Administrator, EPA Region IX, dated August 18, 2000.

- (6) Letter with enclosures from Michael Kenny, Executive Officer, CARB, to Felicia Marcus, Regional Administrator, EPA Region IX, dated August 28, 2000.
- (7) Letter with attachment from Michael Kenny, Executive Officer, CARB, to Felicia Marcus, Regional Administrator, EPA Region IX, dated December 15, 2000.
- (8) Letter from Tom Paxson, Air Pollution Control Officer, Kern County APCD, to Michael Kenny, Executive Officer, CARB, dated December 1, 2000.

B. Rationale for Establishing a New, Separate East Kern Nonattainment Area

While EPA is proposing the designation of the new East Kern ozone nonattainment area pursuant to the request of the Governor under CAA section 107(d)(3)(D), that section contains no criteria upon which to evaluate the request. Therefore, the Agency is proposing to apply the criteria listed in an analogous CAA provision, section 107(d)(3)(A), which authorizes EPA to notify the Governor that the designation of an area should be revised on the basis of air quality data, planning and control considerations, or any other air quality-related considerations that EPA deems appropriate.

The SJV 1-hour ozone nonattainment area currently includes all of Kern County, a region which straddles the Sierra Nevada and Tehachapi mountains. It is located in two separate air basins: the SJV and the Southeast Desert (SED). The dividing line between these two air basins coincides with the jurisdictional boundary between the KCAPCD and the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)¹; it is also consistent with the boundary which we are today proposing to separate the proposed revised SJV nonattainment area from the proposed East Kern nonattainment area.

Prior to 1991, the eastern portion of Kern County was designated unclassified. 43 FR 8964, 8972 (March 3, 1978). In 1991, by operation of law, all of Kern County was designated part of the SJV ozone nonattainment area. CAA section 107(d)(1)(C). We generally relied on the Metropolitan Statistical Area (MSA) boundaries for the purposes of designating nonattainment areas, consistent with CAA section 107(d)(4)(A)(iv). Therefore all of Kern County, which is in the same MSA as the other counties in the SJV nonattainment area, was included in the nonattainment area. While the State acknowledged that eastern Kern County did not have any monitoring sites established in 1991, the State supported eastern Kern's inclusion in the nonattainment area because "ozone is clearly a regional pollutant, and violations of both the state and federal ozone standards have been measured within 10 miles of the Kern County's desert border."²

The 1991 designation also pre-dated the consolidation of the SJV counties into a single air district, the SJVUAPD. With this change, the western portion of Kern County was annexed into the newly-formed SJVUAPCD. At the same time, the eastern portion of Kern County which was within the South East Desert (SED) air basin, became an independent air district, the KCAPCD.

Commenters on EPA's June 19, 2000 proposal, including the California Air Resources Board (CARB) and the U.S. Department of Defense provided a compelling technical justification as to why

¹Prior to the formation of the SJVUAPCD in 1992, the SJV ozone nonattainment area consisted of eight county air pollution control districts (i.e., San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern).

²See March 15, 1991 letter from CARB Executive Officer James D. Boyd to Daniel McGovern, Regional Administrator, EPA, Region IX.

eastern Kern County should be designated a separate ozone planning area. A summary of their reasoning follows.

Geography.

California is divided geographically into air basins for the purpose of managing the State's air resources on a regional basis. CARB first established air basins in 1968. California Health and Safety Code section 39606 (a) states the state board shall:

Based upon similar meteorological and geographic conditions and consideration for political boundary lines whenever practicable, divide the state into air basins to fulfill the purposes of this division.

Currently, the San Joaquin Valley federal one-hour ozone nonattainment area includes all of Kern County, a region which straddles the Sierra Nevada mountains. It is located in two separate air basins (and in two separate Air Quality Control Regions): the SJV (40 CFR 81.165) and the SED (40 CFR 81.167). The dividing line between these two regions coincides with the boundary between the Kern County Air Pollution Control District and the SJVUAPCD, and with the line along which we propose splitting the nonattainment area. Eastern Kern County is separated from the SJV by the Sierra Nevada and Tehachapi Mountain Ranges at elevations up to 7,500 feet. Average elevation in western Kern County is 450-500 feet above sea level; average eastern Kern County elevation is 2000-3000 feet above sea level. See maps included in February 29, 2000 letter from CARB. Eastern Kern County is a vast arid desert, 3,700 square miles in size.

Population, Employment, and Commuting Patterns.

There are no major or fast growing population centers in eastern Kern County. Eastern Kern's population of approximately 92,000 has stayed constant over the past 10 years. The area has a low population density of approximately 25 persons per square mile. People tend to live and work in eastern Kern, and because of its geographic isolation there is no convenient commute to cities outside the region. The major employers in eastern Kern are Edwards Air Force Base (AFB) and China Lake Naval Weapons Station (NAWS) which employ over half of the eastern Kern workforce. Two of the three major towns within eastern Kern are Ridgecrest, which is located just outside the China Lake NAWS, and California City, located 9 miles from Edwards Air Force Base (AFB). This close correlation between population and workforce suggests that a large percentage of the traffic in eastern Kern is independent of western Kern and urban areas in the SED nonattainment area. Ridgecrest, the largest town in eastern Kern, has a population of approximately 28,000. It is located in the portion of eastern Kern with air quality well below the 1-hour standard and furthest from any major urban areas in western Kern or SED. The SED urban areas nearest to eastern Kern, Palmdale and Lancaster, are bedroom communities for the Los Angeles area. There are no significant commute patterns from eastern Kern into the SED, SJV or the South Coast Air Basin (SCAB) or vice versa.

Eastern Kern's population is less significant than areas outside of eastern Kern. Directly east of Kern County lies the Victor Valley, which includes the communities of Adelanto, Apple Valley, Hesperia, Lucerne Valley, Oak Hills, Phelan, and Spring Valley Lake, is home to over 300,000 residents. The residential population of Victorville is currently 60,400 and growing. Estimates from the Victorville Chamber of Commerce suggest that this figure more than doubles during business hours to serve the commercial needs of the more than 300,000 people who call the Victor Valley home.

South of Kern County lies the Antelope Valley portion of Los Angeles County with population centers at Lancaster (123,200) and Palmdale (114,900). This represents over five times the population of eastern Kern, with the Antelope Valley area being less than 50 percent of eastern Kern County. These two facts together result in a population density difference of more than ten fold.

Western Kern is roughly the same area (about 4000 square miles) as eastern Kern, but the population density in western Kern, which includes the greater Bakersfield area, is almost four times higher than eastern Kern. While the western Kern population is steadily increasing; eastern Kern's population has stayed almost constant in recent years due to decreased employment at Department of Defense installations. For a more detailed comparison of eastern versus western Kern, see the Tables titled "Kern County Population and Housing" in the February 29 and March 30, 2000 letters from CARB.

Commercial Development.

Eastern Kern County is not strongly integrated economically with western Kern County or the SED urban areas. The economy of western Kern is largely based on the oil and agricultural industries. Eastern Kern's economy is based largely on the aerospace, defense, and mineral extraction industries. Also, eastern Kern residents are not dependent on western Kern for economic activities such as employment, shopping, or other services.

Emissions.

There are only a handful of major emission sources in eastern Kern, and projected industrial growth is minimal. The 1996 annual emissions inventory for eastern Kern indicates 11 tons per day (tpd) of volatile organic compounds (VOCs) and 33 tpd of nitrogen oxides (NOx).³ Total emissions in the area are not sufficient to cause violations of the federal 1-hour ozone standard. Emissions in eastern Kern are significantly less than in the San Joaquin Valley and SED ozone nonattainment areas. For a comparison of 1996 emissions by county in the San Joaquin Valley, see the February 29, 2000 letter from CARB. For a more detailed breakdown of the emissions by category for eastern Kern County and the SED ozone nonattainment area (i.e., areas regulated by the Antelope Valley APCD and Mojave Desert AQMD), see the March 30, 2000 letter from CARB. For 1995 annual averages for NOx and reactive organic gases (ROG) and reporting facilities, see page 7 in the August 18, 2000 letter from the Navy.

Air Quality.

During the late 1990s, eastern Kern County averaged only a few days over the 1-hour ozone NAAQS each year; the SJV averaged approximately 30 days over the NAAQS each year; and the San Bernardino County portion of the SED averaged approximately 16 days over the NAAQS each year. Ozone levels in eastern Kern are markedly better than the SJV and marginally better than the SED. For the 1997-1999 period, the 1-hour design value for eastern Kern is 0.139 ppm compared to 0.154 ppm for western Kern, 0.161 ppm for the highest site in the SJV, and 0.147 for Victorville in the SED. Table 1 below summarizes the 1997-1999 ozone air quality data for the three monitors located in eastern Kern County.

³Ozone is not emitted directly into the air, but is formed through the photochemical reaction of NOx and VOCs.

For a comparison of air quality data in the SJV versus eastern Kern for the Edwards AFB and Mojave monitors, see EPA's June, 2000 TSD for the Notice of Proposed Rulemaking to reclassify the SJV⁴. For a comparison of air quality data in eastern Kern County versus the remainder of the Mojave Desert Air Basin, see Figure 7 in the March 30, 2000 letter from CARB. For a summary of 1997-2000 (partial) monitoring data for eastern Kern County, western Kern County, SJV, Metropolitan Los Angeles, and the portion of the San Bernardino County, see page 6 in the August 18, 2000 letter from the Navy.

Table 1

Ozone Air Quality in Eastern Kern County (1997-1999)

| Monitoring Site | Number of days over the standard 1997-1999 ⁵ | Average number of exceedance days per year | Site design value (ppm) |
|------------------------------|---|--|-------------------------|
| China Lake NAWS ⁶ | 0 | 0.0 | 0.083 |
| Mohave | 2 | 0.6 | 0.119 |
| Edwards AFB ⁷ | 6 | 2.0 | 0.139 |

Pollution Transport.

The State has completed three reviews of the impacts of pollution transport on ozone concentrations in California. The State has determined that the few exceedances that have occurred in eastern Kern County were caused by overwhelming transport from the SJV Air Basin and SCAB.⁸ Wind patterns are such that eastern Kern does not contribute to exceedances in the SJV, SED, or SCAB.

⁴Technical Support Document for the Notice of Proposed Rulemaking on Reclassification and Finding of Failure to Implement State Implementation Plan for California, San Joaquin Valley Ozone Nonattainment Area, June 2000, Air Division, USEPA Region 9.

⁵No exceedances of the 1-hour ozone standard were recorded in 1999 or 2000 in eastern Kern County.

⁶The China Lake monitor is a special purpose monitor (SPM) operated by the Navy at China Lake NAWS in eastern Kern County. It began operation in April, 1998. EPA's policy on the use of ozone special purpose monitoring data is described in a memorandum entitled "Agency Policy on the Use of Ozone Special Purpose Monitoring Data" from John Seitz, Director, Office of Air Quality Planning and Standards, to the Regional Air Directors, August 22, 1997. Until three years of data can be collected, the design value for the China Lake monitoring site is based on its highest recorded value.

⁷The Edwards AFB monitor is a SPM operated by the Air Force on Edwards AFB in eastern Kern County. We have evaluated the Edwards site and its quality assurance information and have determined that its data are valid.

⁸Transport Assessment, November 1996 and November 1999, California Air Resources Board (<http://www.arb.ca.gov/aqd/transport/transport.htm>).

In 1996, an assessment of the federal exceedances monitored in eastern Kern was performed by Dr. Glen Cass for Edwards AFB. This assessment concluded from wind streamlines prepared by the Aerometric Data Division of CARB for the summer and fall seasons, air flows from both the SJV and from the SCAB into eastern Kern County. A tracer study conducted in 1979 by Professor Fred Shair of Caltech showed that the primary mechanism for ventilating the southern SJV is a daytime northwest flow over the Tehachapi Mountains. The study concluded that the "northwest flow over the Tehachapis during the afternoon results in significant pollution impact in the Mojave Desert." Surface wind data in the SJV, summarized by the Aerometric Data Division of CARB (1984), show that during the summer, 90 percent of all hours and 97 percent of afternoon and evening hours flow in a direction that ventilates the SJV through its southern end (e.g., at Tehachapi Pass).

As part of Dr. Cass' study of transport in eastern Kern County, an analysis of the August 2 and September 10, 1993, federal exceedances was performed. On those days, ozone concentrations first peaked above the federal standard upwind at Edison within the SJV. On August 2, ozone peaked above the federal standard at Edison near noon, the wind blew from the southern SJV toward the desert and a transported ozone peak arrived four hours later at Mojave on the same day. On September 10, there was a comparable delay between the time of the ozone peak at Edison within the SJV and the arrival of a transported ozone peak at Mojave late in the day. Backward trajectories drawn based on surface winds from the time and place of the two ozone standard exceedances at Mojave confirm that the air masses involved originated earlier those same days in the southern end of the SJV. The transport paths and timing of the ozone peaks, when combined with the fact that emissions of ozone precursors are vastly higher in the SJV than they are in the desert, leads one to conclude that the violations of the federal ozone standard observed in eastern Kern County at the Mohave site are due to overwhelming transport from the upwind SJV non-attainment area. Exceedances typically seen in eastern Kern at the Mohave site are attributable to air masses which originate in the SJV and not the SCAB.

More recent analysis of wind flow patterns into eastern Kern County indicates two primary wind flow patterns into eastern Kern. Hourly surface wind plots generally show winds blowing through the Tehachapi Pass from the SJV to the Mojave Desert Air Basin (MDAB) on most days. This typical drainage flow from the southern end of the SJV into eastern Kern is well documented and has been attributed to overwhelming contribution into eastern Kern. The identification of this drainage flow was the basis of CARB's action in October 1996 to identify the SJV as an overwhelming transport couple to eastern Kern County.

More recent analysis of monitored ozone data at the Edwards AFB site⁹ in eastern Kern County prompted CARB staff to look at the wind flow patterns coming up through Antelope Valley from the SCAB. There is a wind flow pattern that appears to cut through Edwards AFB and simulate ozone conditions more similar to that of the Lancaster monitoring site.

On pages 1-9 of their August 18, 2000 comment letter, the Navy provided an analysis of the exceedances in eastern Kern County. They concluded that "given the right airflow conditions and ozone concentrations in the SJV, the potential exists for direct transport of pollutants" into eastern Kern County. Their analysis also showed that air flows out of southern Los Angeles County into the desert portion of Los Angeles County and eastern Kern County reveal another significant transport route. The Navy concluded that all of the six exceedances that occurred at the Edwards AFB site during the 1997-1998 time frame were caused by transport from the SCAB.

⁹Prior to 2000, CARB and EPA were unaware that there was an ozone monitor located at Edwards AFB.

Conclusion

Based on the above factors, EPA believes that the criteria listed in CAA section 107(d)(3)(A) have been met. Eastern Kern is in a separate air basin from the SJV. The area has a low population that primarily lives and works in the immediate area. Furthermore, eastern Kern has minimal VOC and NOx emission sources with markedly better air quality than the SJV. In addition, the few exceedances of the ozone NAAQS that have occurred in eastern Kern are a result of overwhelming transport from outside the eastern Kern air basin. EPA is therefore proposing to approve the State's section 107(d)(3)(D) request to change the boundaries (i.e., revise the designation) of the current SJV ozone nonattainment area to remove eastern Kern County.

C. Proposed Attainment Date Extension for Proposed East Kern Nonattainment Area

Because the new proposed East Kern nonattainment area would retain the serious classification that it had as part of the originally designated SJV nonattainment area, the attainment deadline for the area is November 15, 1999. On December 15, 2000, the State requested two one-year attainment date extensions for the proposed East Kern ozone nonattainment area.¹⁰

CAA section 181(a)(5) provides that, upon application by any State, the Administrator may extend the attainment deadline for one year if the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan, and no more than one exceedance of the NAAQS has occurred in the area in the year preceding the extension year. This section further provides that up to two one-year extensions may be granted.

We interpret this provision to authorize the granting of a one-year extension under the following minimum conditions: (1) the State requests a one-year extension; (2) all requirements and commitments in the EPA-approved SIP for the area have been complied with; and (3) at any one monitor, the area has no more than one measured exceedance of the NAAQS during the year that includes the attainment date (or the subsequent year, if a second one-year extension is requested). See generally 57 FR 13506 (April 16, 1992) and Memorandum from D. Kent Berry, Acting Director, Air Quality Management Division, EPA, to Regional Air Office Directors; "Procedures for Processing Bump Ups and Extensions for Marginal Ozone Nonattainment Areas," February 3, 1994.¹¹ Granting extensions is discretionary; EPA guidance states that, in exercising this discretion, the Agency will examine the air quality progress made in the nonattainment area. Specifically, EPA will expect the state to have adopted and substantially

¹⁰A review of the actual ambient air quality ozone data from the EPA Aerometric Information Retrieval System (AIRS) and special purpose monitors shows that two of the three air quality monitors located in the proposed East Kern ozone nonattainment area recorded exceedances of the NAAQS for ozone during the three-year period from 1997 to 1999. There were 6 exceedances at the Edwards AFB monitor, an average of more than 1.0 over the three-year period, which constitute a violation of the ozone NAAQS for the proposed East Kern area during this three-year period. Thus, because we determine attainment status on the basis of the expected number of exceedances of the NAAQS over the three-year period up to, and including, the attainment date (57 FR 13498, 13506, April 16 1992), the area needed the two 1-year extensions to avoid a reclassification to severe.

¹¹While explicitly applicable only to marginal areas, the general procedures for processing reclassifications and extension requests described in this memorandum apply regardless of the initial classification of an area.

implemented control measures necessary to reduce emissions in the area.¹²

We have determined that both the mandatory and discretionary requirements for one-year extensions of the attainment date for both 1999 and 2000 have been fulfilled as follows:

- (1) CARB has formally submitted the attainment date extension request, in a letter dated December 15, 2000, from Michael P. Kenny, Executive Officer, CARB, to Felicia Marcus, EPA Regional Administrator, Region 9 (see attached letter).
- (2) California is currently implementing the EPA-approved SIP. The State's letter, cited above, discusses implementation of State measures in the SIP, and shows that these measures plus new State measures have achieved an overall surplus of emission reductions beyond those assumed in the SIP. In addition, a letter dated December 1, 2000 from Thomas Paxson, Air Pollution Control Officer, KCAPCD, provides evidence that all District SIP rules and serious area requirements have been fully implemented (see attached letter).
- (3) In its December 15, 2000 letter, CARB stated that the area had no monitored exceedances during 1999 and 2000.

Conclusion

Because the statutory provisions have been satisfied, we are proposing to grant two one-year attainment date extensions for the proposed East Kern ozone nonattainment area. If we finalize this action, the attainment deadline would be extended from November 15, 1999, to November 15, 2001.

¹²See Memorandum from Sally Shaver, Director, Air Quality Strategies and Standards Division, EPA, to EPA Regional Offices, titled "Criteria for Granting Attainment Date Extensions, Making Attainment Determinations, and Determinations of Failure to Attain the NAAQS for Moderate [carbon monoxide] CO Nonattainment Areas," October 23, 1995. While this memorandum specifically addresses the CAA extension provisions for CO nonattainment areas, it applies equally to ozone areas. Compare the substantially identical language of sections 181(a)(5)(ozone) and 186(a)(4)(CO).

ATTACHMENTS