Category: 41 – Afterburners

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: July 26, 1979

SUBJECT: Ozone/Oxidant NAAQS Violations for the November, 1976 - March, 1977, December, 1976 - February, 1977 and April, 1977 - October 1977 Time Periods

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An update of seasonal oxidant (Ox) ozone / (O3) NAAQS violations was done to determine the impact during the winter months due to the raising of the O3 NAAQS from 0.08 ppm to 0.12 ppm. This analysis would be used to amend, if necessary, EPA's position on the use of natural gas fired afterburners to control hydrocarbon emissions for the sole purpose of reducing ambient oxidant concentrations. The original policy decision dated July 28, 1976, was based upon 1974 SAROAD data, and of course the old oxidant standard.

For the re-analysis, all 1976-1977 Ox/O3 data in SAROAD was used, as of April 12th. A total of about 600 individual sites were initially screened for inclusion in the analysis. As the previous analysis had done, the following three time periods were investigated for all days having their maximum hour above 0.125 ppm, which would be the level required to actually be in violation of the NAAQS:

a) December, 1976 - February, 1977

b) November, 1976 - March, 1977 - Months of low ozone potential

c) April, 1977 - October, 1977 - Months of high ozone potential

The highest percentage of violations of the new O3 NAAQS for each of these time periods was determined for each U.S. country having data. A total of about 200 countries, 30 of which were in California had sufficient Ox/O3 data to make a reasonable judgement about their status with respect to the present O3 NAAQS. A country not having at least 50% of all possible days monitored during any of the three time periods identified above was excluded from the analysis for only those time periods.

Figures 1-3 show the percentage of days with their maximum hour equal to or greater than 0.125 ppm for the December-February, November-March, and April-October time periods. The two periods of low ozone potential (Figures 1 and 2) show no violations except in California, Texas and Louisiana for both

of these time periods and New York for the November-March period. The two violations in New York at Schenectady and Rensseler in the November-March period both occurred on March 30th. A check with the State of New York concerning this day revealed that the day was unusually hot for March with the maximum temperature reaching 85 F. Other O3 sites in the State also recorded elevated O3 levels, but none were in excess of the NAAQA except those two sites. During the April-October period many of the counties (about 75%) had their highest site in excess of the present O3 standard.

A review of these data reveals, that with the exception of the one day (March 30th) at the New York State sites, that there were no violations during the winter months of the present O3 standard except in California Texas and Louisiana. All other States did not have any counties showing winter time O3 violations.

The ozone analysis was supplemented with an analysis of maximum daily temperature. Mr. E.L. Martinez found that a maximum daily temperature of 65 F, or above is necessary to create the potential for exceedance of the ambient ozone standard of 0.12 ppm. Figure 4 shows the areas where the average maximum daily temperature of 65 F isopleth falls for the months December through February and November through March. Daily maximum ozone and temperature data from the late 1976-early 1977 period were used to select the apparent temperature threshold value associated with standard exceedance. Long-term (30 year) climatic data were then used to delineate the 65 F isopleths. The areas below the two isopleths have average daily maximum temperature > 65 F during at least one month over the monthly ranges indicated. You will note that the respective areas of meteorological potential for ozone violation coincide rather well with the areas of actual violation occurrences (Figures 1 and 2). These isopleth lines should be interpreted as being broad lines reflecting some uncertainty, rather than a precise demarcation. A separate isopleth was not drawn to include October and April because these months show potential for high ozone formation based on actual measured data in nearly all of the nation.

Based upon these analysis, it would appear that afterburner controls solely to reduce ambient oxidant concentrations could be restricted during the winter months to only the very extreme southern portion of the country. Two areas in California and a small area of Texas and southern Louisiana have recorded winter (November-March) days in excess of 0.12 ppm. The December-February period as would be expected even shows a smaller area above this level. The meteorological analysis of daily maximum temperature above 65 F suggests that the potential exists for violation of the ozone standard for again just the extreme southern portion of the country (Figure 4).

Attachments

cc: R. Neligan
W. Cox
E. Martinez

(NOTE: Attachments are a series of 4 maps of the United States)