

information that is appropriately relied upon as a basis for NAAQS rulemaking.

Although, for the reasons discussed above, EPA has not relied on the Madronich draft analysis in reaching this final response, the Agency nevertheless has conducted a provisional examination of this draft analysis to assess whether the results of the analysis call into question or are consistent with the conclusions reached in the proposed response. In this draft analysis, Madronich estimates the increases in NMSC that would result from changes in ground-level O₃ from 1997 baseline values to full attainment of the 1996 proposed O₃ NAAQS (*i.e.*, a standard set at 0.08 ppm O₃ with a form based on the 3-year average of the annual third-highest daily maximum 8-hour average concentrations). As an initial matter, and as recognized by some commenters, this draft analysis is based on an inappropriate comparison—then-current air quality versus attainment of the proposed NAAQS. The relevant comparison is between full attainment of the 1979 1-hour 0.12 ppm O₃ standard and full attainment of the 1997 final 8-hour O₃ NAAQS (with a somewhat less stringent form based on the fourth-highest daily maximum 8-hour average concentrations). Thus, the analysis by its design substantially overestimates the relevant projected decreases in O₃ levels likely to result from revising the 1979 O₃ standard (since baseline levels in some areas are substantially above levels that would attain the 1979 1-hour standard), and thus, substantially overestimates projected UV-B radiation-related impacts.

Looking beyond this initial matter, EPA notes that this analysis is based on estimated statewide average changes in O₃ concentrations. Thus, like the three other analyses discussed above, this draft analysis incorporates none of the area-specific factors, discussed in section II.B.2.b above, that EPA considers to be important in developing credible estimates of UV-B radiation-related impacts mediated by the localized and highly variable changes in ground-level O₃ likely to result from attainment of a more stringent O₃ NAAQS. The EPA does not dispute that the draft analysis uses assumptions and models that may well be appropriate for developing credible estimates of UV-B radiation-related impacts mediated by large-scale regional and relatively uniform changes in stratospheric O₃ likely to result from emissions of O₃-depleting substances.⁶⁰ But, EPA also

recognizes and has fully explained (above in section II.B.2) the important differences in the factors that are central to analyses of UV-B radiation-related impacts that are mediated by changes in stratospheric O₃ versus ground-level O₃—differences that this analysis, and the commenters, simply ignore.

Apart from these area-specific methodological issues, EPA has also provisionally looked at the quantitative estimates of State-by-State annual incidences of NMSC that result from the Madronich draft analysis, yielding a nationwide aggregate estimate of an additional 696 NMSC cases annually, with over half of this estimate coming from the State of California alone.⁶¹ Using the California estimate as an example, EPA has considered the potential impact of various assumptions used in the analysis on the estimated incidences. First, as discussed above, the use of a current baseline comparison would likely substantially overestimate incidences in California in particular, in light of the significant extent to which many areas in California continue to exceed the 1979 1-hour standard. That is, it is likely that decreases in ground-level O₃ from baseline levels to levels that would attain the 1979 1-hour standard would be greater, perhaps much greater, than the additional decreases needed to reach attainment of the 1997 8-hour standard. This bias would also likely affect estimates from other States that contribute a high proportion of the national incidence estimate and that have areas that exceed the 1-hour standard by a significant margin, including, for example, New Jersey, Georgia, and Texas, which together account for approximately 20 percent of the national estimate.

Second, as in the Cupitt analysis, the Madronich analysis assumes that the entire population would be equally susceptible to NMSC based on assumed exposure factors. This assumption would also lead to substantial overestimation of effects, however, based on demographic data from the 2001 Statistical Abstract of the United States and information on sensitive

model that has been previously used in a number of O₃ scientific studies and WMO/UNEP international assessments of stratospheric O₃ depletion, and NMSC incidences using information from epidemiologic studies and from studies of action spectrum for induction of skin cancer in mice. The draft analysis assumes national incidence rates of 500,000 BCC cases per year and 100,000 SCC cases per year for the baseline scenario.

⁶¹ Only point estimates are presented in the analysis; no quantitative estimates or even qualitative discussion of the uncertainties in these estimates are presented.

populations (discussed above in section II.B.1).⁶²

Third, as noted above, the Madronich draft analysis assumes that attainment of a more stringent O₃ standard will decrease O₃ concentrations and increase UV-B radiation flux equally throughout the State, without taking into account the highly variable and localized patterns of changes in ground-level O₃ likely to result from attainment of the O₃ NAAQS, nor does it take into account the variable exposure patterns of people as they move through various microenvironments and exhibit varying degrees of sun-seeking and sun-avoidance behaviors. However, attainment of a more stringent O₃ standard will not reduce O₃ concentrations equally everywhere, and may not reduce O₃ concentrations at all in locations where people receive their highest exposure to UV-B radiation. As noted above in section II.B.2.b, in the heavily populated Los Angeles area, ground-level O₃ is at its lowest levels thus providing the least shielding along the coast, where the potential for exposure to UV-B radiation is the highest, and it is unlikely that programs designed to bring Los Angeles into attainment with a more stringent standard will result in any significant reductions in coastal O₃ levels. In this regard, some commenters also note that the analysis may also underestimate incidences since the analysis assumes that the entire population of a State will experience changes in O₃ concentrations, and presumably resultant changes in UV-B radiation-related impacts, that reflect a statewide average, thus potentially underestimating changes to the large segments of the population that live in urban areas that would likely experience larger than average changes in ground-level O₃ concentrations. However, given the variable and localized patterns of changes in ground-level O₃ that have been monitored in urban areas, including in some cases significantly lower concentrations in inner cities and higher concentrations in downwind suburban areas, it is not clear the extent to which ignoring such area-specific factors would bias resulting estimates for any given urban area either low or high. These considerations serve to demonstrate the

⁶⁰ The EPA notes that the draft analysis estimates changes in radiation levels using a radiative transfer

⁶² According to the 2000 Census (U.S. Census Bureau, 2001), approximately 47 percent of the population of California is designated as "white alone." While not all "white" people are susceptible to skin cancer, this proportion is probably a better estimate of the fairer members of all races and ethnic groups in California that would be more susceptible to NMSC than the entire population.