

statement must share the limitations outlined above for Cupitt and the fact that the analytical approach is neither well documented nor peer reviewed, no reliance is placed on the quantitative results presented in the DOE submission.

The work of economic analysts Lutter and Wolz (1997) provides a self-described "preliminary analysis" of UV-B radiation screening by tropospheric O<sub>3</sub>. Here, the exposition permits a more direct comparison with that of Cupitt, and it appears that many of the same simplifying assumptions were used—either explicitly or implicitly. This paper relied upon Cupitt's assumption that the NAAQS revision might bring about a summertime average of 10 ppb reduction in O<sub>3</sub> in areas not attaining the standard. As discussed above, based on the record, EPA believes this substantially overstates the likely effect of the NAAQS revision. Their assumption of a constant mixing ratio for the 10 ppb change that would extend well above the planetary boundary layer, up to 10 km, also introduces upward bias into their upper-bound risk estimates. The resultant apparent dose appears to be a factor of 4 larger than the upper bound used by Cupitt and DOE staff. The other quantitative inputs to the analysis differed to a more modest degree from those used by Cupitt. In the end, the upper bound estimate of possible increased occurrences of NMSC is more than double that of Cupitt, due largely to the unwarranted assumption of a 10 km mixing height.

Again, because the quantitative assessment shares most of the limitations cited above for Cupitt, and actually adds substantial bias in a key assumption, EPA has appropriately placed no reliance on the quantitative risk estimates for NMSC from Lutter and Wolz (1997) or to the secondary estimates derived in the DOE analyses.

In the proposed response to the remand, EPA solicited comment on its evaluation of the three analyses discussed above (66 FR 57286). No commenter offered specific challenges to any technical aspect of EPA's evaluations of the quantitative analyses by Cupitt (1994), DOE (1995), and Lutter and Wolz (1997), as discussed above. Some commenters, however, expressed the general view, presumably despite the limitations of these analyses, that EPA was not justified in ignoring or discounting such evidence of positive effects, or that such analyses could serve

as an upper bound on estimated UV-B radiation-related impacts. In sharp contrast, other commenters expressed the view that these analyses were of questionable reliability and did not achieve minimum standards of scientific adequacy appropriate for information to be used as a basis for NAAQS decisions.

In taking all these comments into account, EPA rejects the notion that it has ignored or completely discounted these analyses. On the contrary, EPA has thoroughly reviewed these analyses by examining the methodologies used, the nature and validity of the underlying assumptions, and the resultant uncertainties inherent in the UV-B radiation-related impacts estimated by these analyses. In so doing, EPA has concluded that (1) the methodologies used in these analyses inherently ignore area-specific factors that are important in estimating the extent to which small, variable changes in ground-level O<sub>3</sub> mediate long-term exposures to UV-B radiation (in contrast to the appropriate application of such methodologies that EPA and others have done in estimating the impact of relatively large changes in the stratospheric O<sub>3</sub> reservoir attributable to emissions of O<sub>3</sub>-depleting substances); (2) the studies likely substantially overestimate UV-B radiation-related impacts as a result of the biases introduced by the use of specific underlying assumptions, as discussed above; and (3) as a consequence of the first two conclusions, the analyses are not scientifically adequate to be relied upon as a basis for making NAAQS decisions, and they do not provide credible quantitative estimates of UV-B radiation-related impacts that can appropriately be compared to the quantitative estimates of direct adverse respiratory-related impacts that EPA used in part as a basis for its initial NAAQS decision. The EPA believes that its examination of these analyses and their underlying assumptions, together with its examination of the basic science dealing with the atmospheric distribution of O<sub>3</sub> and UV-B radiation (section I.C above) and information on the health effects associated with UV-B radiation and the relationship between ground-level O<sub>3</sub> and UV-B radiation exposure (sections II.B.1 and 2 above), does support the conclusion that UV-B radiation impacts mediated by changes in ground-level O<sub>3</sub> associated with attaining a more stringent O<sub>3</sub> NAAQS are likely very small from a public health perspective.

Beyond the comments submitted on the three analyses discussed above, a few commenters also contended that

EPA's proposed response was incomplete because it did not consider another draft analysis by Madronich, referred to as a 1997 "EPA staff assessment" of UV-B radiation-related health benefits, that had been submitted by EPA to the Office of Management and Budget (OMB) in conjunction with OMB's review of the draft RIA for the O<sub>3</sub> NAAQS. These comments expressed the view that this draft analysis represented a substantial improvement over the earlier analyses of Cupitt (1994), DOE (1995), and Lutter and Wolz (1997) in its approach to estimating potential increases in NMSC associated with State-specific average changes in O<sub>3</sub> concentrations between baseline levels (*i.e.*, ground-level O<sub>3</sub> concentrations current at the time of the analysis) and full attainment of the 1996 proposed O<sub>3</sub> NAAQS. These commenters assert that EPA should now consider the results of this draft analysis, or the results of a new analysis that incorporates further refinements and extensions to the methodology and scope of the Madronich analysis, in its response.

In considering this comment, EPA first notes that the Madronich analysis submitted with the comments has not been appropriately characterized in the comments. The Madronich analysis is not an "EPA staff assessment," but rather it is a draft analysis prepared by a consultant at the request of EPA, to help inform EPA's preparation of the RIA. This draft analysis was not completed, published, or peer reviewed. Moreover, it was judged not to provide an adequate basis for quantifying potential UV-B radiation-related impacts as part of EPA's final RIA, a document that historically includes quantitative estimates of a more speculative nature than those thought to be adequate to consider as a basis for setting a NAAQS. In fact, the final RIA for the 1997 O<sub>3</sub> NAAQS, which was reviewed by other Federal agencies and approved for release by OMB, concluded that the available scientific and technical information, which included the Madronich draft analysis, would not permit reliable quantitative estimates of any potential impact of the more stringent O<sub>3</sub> NAAQS on UV-B radiation-related effects.<sup>59</sup> In summary, the Madronich draft analysis does not represent the type of peer-reviewed

<sup>59</sup> The EPA also notes that this draft analysis was appropriately not part of the rulemaking record upon which EPA is basing its response. The fact that OMB staff placed this draft analysis in OMB's docket, which includes information related to OMB's review of the RIA, in no way implies that the draft analysis was or should have been part of EPA's rulemaking record.

such effects nor the uncritical reliance on them by Lutter and Wolz (1997) should be given quantitative credence.