

Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards

[EPA-452/R-20-001]

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Errata – December 10, 2020

1. In Chapter 1, the following citation for the 2013 ISA was inadvertently omitted:

U.S. EPA (2013). Integrated Science Assessment of Ozone and Related Photochemical Oxidants (Final Report). Office of Research and Development, National Center for Environmental Assessment. Research Triangle Park, NC. U.S. EPA. EPA-600/R-10-076F. February 2013. Available at:
<https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100KETF.txt>.

2. In Chapter 3, the following citations were inadvertently omitted from the References section:

Kousha, T and Rowe, BH (2014). Ambient ozone and emergency department visits due to lower respiratory condition. *Int J Occup Med Environ Health* 27(1): 50-59.

Villeneuve, PJ, Chen, L, Rowe, BH and Coates, F (2007). Outdoor air pollution and emergency department visits for asthma among children and adults: A case-crossover study in northern Alberta, Canada. *Environ Health* 6: 40.

3. In Chapter 3, page 4-41 includes a reference to U.S. EPA 2018 which should be removed, as should the following citation from the References section:

U.S. EPA (2018). Integrated science assessment for oxides of nitrogen, oxides of sulfur and particulate matter -Ecological criteria (2nd external review draft). EPA/600/R-18/097. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment. Research Triangle Park, NC.
<http://cfint.rtpnc.epa.gov/ncea/prod/recordisplay.cfm?deid=340671>.

4. Chapter 3, page 3-55 includes a typographical error in reference to U.S. EPA 2010b, which should instead be a reference to U.S. EPA 2010a. The following citation was inadvertently included in the References section and should be removed:

U.S. EPA (2010b). Quantitative Health Risk Assessment for Particulate Matter (Second External Review Draft). Office of Air Quality Planning and Standards, Health and Environmental Impacts Division. Research Triangle Park, NC. U.S. EPA. EPA-452/P-10-001 February 2010. Available at:
<https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1006EST.txt>

5. In Chapter 3, page 3-81 includes a typographical error in reference to DHEW, 1969, which should instead read “U.S. DHEW, 1970”. The following citation was inadvertently included and should be removed from the Chapter 3 References section:

DHEW (1969). Air Quality Criteria for Particulate Matter. National Air Pollution Control Administration. Washington, D.C. U.S. Department of Health. January 1969.

6. Chapter 3, Table 3-2 includes the phrase “See Appendix 3A” that should be “See Appendix 3A ^D.” The corrected table appears below.

Table 3-2 Summary of 6.6-hour controlled human exposure study-findings, healthy adults.

Endpoint	O ₃ Target Exposure Concentration ^A	Statistically Significant Effect ^B	O ₃ -Induced Group Mean Response ^B	Study
FEV ₁ Reduction	120 ppb	Yes	-10.3% to -15.9% ^C	See Appendix 3A ^D
	100 ppb	Yes	-8.5% to -13.9% ^C	
	87 ppb	Yes	-12.2%	Schelegle et al., 2009
	80 ppb	Yes	-7.5%	Horstman et al., 1990
			-7.7%	McDonnell et al., 1991
			-6.5%	Adams, 2002
			-6.2% to -5.5% ^C	Adams, 2003
			-7.0% to -6.1% ^C	Adams, 2006b
			-7.8%	Schelegle et al., 2009
		ND ^E	-3.5%	Kim et al., 2011 ^F
	70 ppb	Yes	-6.1%	Schelegle et al., 2009 ^I
	60 ppb	Yes ^G	-2.9%	Adams, 2006b; Brown et al., 2008
			-2.8%	
		Yes	-1.7%	Kim et al., 2011
	40 ppb	No	-3.5%	Schelegle et al., 2009
		No	-1.2%	Adams, 2002
		No	-0.2%	Adams, 2006b
Increased Respiratory Symptoms	120 ppb	Yes	Increased symptom scores	See Appendix 3A ^D
	100 ppb	Yes		
	87 ppb	Yes		
	80 ppb	Yes		
	70 ppb	Yes		
	60 ppb	No		
	40 ppb	No		
Airway Inflammation	80 ppb	Yes	Multiple indicators ^H	Devlin et al., 1991; Alexis et al., 2010
	60 ppb	Yes	Increased neutrophils	Kim et al., 2011
Increased Airway Resistance and Responsiveness	120 ppb	Yes	Increased	Horstman et al., 1990; Folinsbee et al., 1994 (O ₃ induced sRaw not reported)
	100 ppb	Yes		Horstman et al., 1990
	80 ppb	Yes		Horstman et al., 1990

^A This is the average concentration across the six exercise periods as targeted by authors. This differs from the time-weighted average concentration for the full exposure periods (targeted or actual). For example, as shown in Appendix 3A, Table 3A-2, in chamber studies implementing a varying concentration protocol with targets of 0.03, 0.07, 0.10, 0.15, 0.08 and 0.05 ppm, the exercise period average concentration is 0.08 ppm while the time weighted average for the full exposure period (based on targets) is 0.082 ppm due to the 0.6 hour lunchtime exposure between periods 3 and 4.

^B Statistical significance based on the O₃ compared to filtered air response at the study group mean (rounded here to decimal).

^C Ranges reflect the minimum to maximum FEV₁ decrements across multiple exposure designs and studies. Study-specific values and exposure details provided in Appendix 3A, Tables 3A-1 and 3A-2, respectively.

^D Citations for FEV₁ and respiratory symptoms findings for exposures above 80 ppb are in Appendix 3A and not repeated here.
^E ND (not determined) indicates these data have not been subjected to statistical testing.
^F The data for 30 subjects exposed to 80 ppb by Kim et al. (2011) are presented in Figure 5 of McDonnell et al. (2012).
^G Adams (2006b) reported FEV₁ data for 60 ppb exposure by both constant and varying concentration designs. Subsequent analysis of the FEV₁ data from the former found the group mean O₃ response to be statistically significant ($p < 0.002$) (Brown et al., 2008; 2013 ISA, section 6.2.1.1). The varying-concentration design data were not analyzed by Brown et al., 2008.
^H Increased numbers of bronchoalveolar neutrophils, permeability of respiratory tract epithelial lining, cell damage, production of proinflammatory cytokines and prostaglandins (ISA, Appendix 3, section 3.1.4.4.1; 2013 ISA, section 6.2.3.1).

7. p. 4A-27, “Attachment 1 to Appendix A” should say “Attachment 1 to Appendix 4A”
8. Appendix 4A, Tables 4A-7 and 4A-8 - Some entries in these tables are incorrect due to a minor typographical error in a cell of Table 4A-8 (the first column, “y2” entry, 476.6 should have been 471.6) that affected downstream calculations. Corrected tables are provided on the following pages.

Table 4A-8. Aboveground growth calculations for subset of scenarios.

	"ambient" (control in King) annual WOOD growth that year	"ambient" (control in King) annual FOLIAGE growth that year	"ambient" (control in King) annual growth that year (uses yr- yr delta for foliage)	"ambient" (control in King) aboveground biomass	Growth - % increase	O ₃ W126 (ppm- hrs)	O ₃ - impact (RBL)	W126=17 biomass (g/ m ²)	O3 W126 (ppm-hrs) - low->hi- >ave	O ₃ - impact (RBL)	W126=10, 24, 17, etc - biomass (g/m ²)	% diff from constant 3-yr ave
y0 (1997)	7.6	1.5		9.1				9.1			9.1	
y1	226.1	46.5	271.1	280.2	2979.1%	17.0	0.098	253.6	10.0	0.052	266.1	
y2	471.6	139.2	564.3	844.5	201.4%	17.0	0.098	762.6	24.0	0.145	748.6	
y3	390.5	234.7	486	1330.5	57.5%	17.0	0.098	1201.0	17.0	0.098	1187.0	-1.2%
y4	209	271.3	245.6	1576.1	18.5%	17.0	0.098	1422.5	10.0	0.052	1419.8	-0.2%
y5	434.5	355.1	518.3	2094.4	32.9%	17.0	0.098	1890.0	24.0	0.145	1862.9	-1.4%
y6 (2003)	500.1	450.8	595.8	2690.2	28.4%	17.0	0.098	2427.5	17.0	0.098	2400.3	-1.1%