ORAL ARGUMENT NOT YET SCHEDULED

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF MISSISSIPPI, et al.,	)	
	)	
Petitioners,	)	
	)	
v.	)	Docket No. 08-1200 (and consolidated cases)
	)	
ENVIRONMENTAL PROTECTION AGENCY,	)	
	)	
Respondent.	)	
	)	

UNOPPOSED MOTION TO SUPPLEMENT JOINT APPENDIX

Pursuant to Circuit Rule 30(e), the undersigned State Petitioners respectfully move for permission of the Court to file a supplemental volume to the Joint Appendix in this case. The supplemental volume includes additional pages and documents inadvertently omitted from the original, nine-volume Joint Appendix filed with the Court last week. State Petitioners have contacted counsel for the other parties in the case by electronic mail and have not received any response indicating that any party opposes this motion. In support of this motion, State Petitioners state:

1. State Petitioners prepared the Joint Appendix in this case, in consultation with the other parties, and filed the resulting nine-volume set with the Court on August 20, 2012.

2. After the Joint Appendix was filed, counsel for State Petitioners discovered that they had mistakenly omitted a document (a comment letter cited in State Petitioners' opening brief) from the Joint Appendix. In addition, *amicus curiae* Province of Ontario, whose counsel had contacted State Petitioners too late to include any materials in the Joint Appendix, asked State Petitioners to include a document (a comment letter cited in its *amicus curiae* brief) in a supplemental volume to the Joint Appendix.

3. On August 22, 2012, State Petitioners' attorney sent an electronic mail to counsel of record notifying counsel that State Petitioners would prepare a supplemental volume to the Joint Appendix to add these documents and requesting that parties inform State Petitioners' attorney by close of business on August 24, 2012 of any additional materials that should be included in the supplemental volume. Counsel for Environmental Petitioners provided additional pages that had been mistakenly omitted from excerpts of a document included the Joint Appendix.

4. In the August 22, 2012 electronic mail, State Petitioners' attorney also notified counsel of record that State Petitioners intended to file a motion to supplement the Joint Appendix and requested a response by close of business on August 24, 2012 whether any party opposed such motion. State Petitioners' counsel has not received any responses indicating that any party opposes this motion.

5. The inclusion of the materials in the supplemental volume is necessary for the Joint Appendix to be complete for purposes of the Court's review.

THEREFORE, for the reasons stated above, State Petitioners respectfully request that the Court accept for filing the supplemental volume of the Joint Appendix.

Dated: August 27, 2012 Respectfully submitted,

FOR THE STATE OF NEW YORK

ERIC T. SCHNEIDERMAN
Attorney General
BARBARA D. UNDERWOOD
Solicitor General
DENISE A. HARTMAN
Assistant Solicitor General
LEMUEL SROLOVIC
Bureau Chief

/s/ Morgan A. Costello
By: _____
MICHAEL J. MYERS
MORGAN A. COSTELLO
Assistant Attorneys General
Environmental Protection Bureau
The Capitol
Albany, New York 12224
(518) 402-2594

FOR THE STATE OF CALIFORNIA
and CALIFORNIA AIR RESOURCES BOARD

KAMALA D. HARRIS
Attorney General
SARA J. RUSSELL
Supervising Deputy Attorney General

By: /s/ Nicholas Stern
_____
NICHOLAS STERN
Deputy Attorney General
California Department of Justice
1300 I Street, P.O. Box 944255
Sacramento, CA 94244-2550
(916) 323-3840

FOR THE STATE OF CONNECTICUT

GEORGE JEPSEN
Attorney General

By: /s/ Kimberly P. Massicotte
_____
KIMBERLY P. MASSICOTTE
SCOTT KOSCHWITZ
Assistant Attorneys General
P.O. Box 120, 55 Elm Street
Hartford, Connecticut 06141-0120
(860) 808-5250

FOR THE STATE OF DELAWARE

JOSEPH R. BIDEN, III
Attorney General

By: /s/ Valerie M. Satterfield
_____
VALERIE M. SATTERFIELD
Deputy Attorney General
Attorney General's Office
Third Floor, 102 W. Water Street
Dover, Delaware 19904
(302) 739-4636

FOR THE STATE OF ILLINOIS

LISA MADIGAN
Attorney General

By: /s/ Gerald T. Karr
_____
MATTHEW J. DUNN
GERALD T. KARR
Senior Assistant Attorneys General
Environmental Bureau
69 W. Washington Street, S. 1800
Chicago, Illinois 60602
(312) 814-3369

FOR THE STATE OF MAINE

WILLIAM J. SCHNEIDER
Attorney General

By: /s/ Gerald D. Reid

GERALD D. REID
Assistant Attorney General
Department of the Attorney General
State House Station #6
Augusta, Maine 04333-0006
(207) 626-8800

FOR THE STATE OF MARYLAND

DOUGLAS F. GANSLER
Attorney General

By: /s/ Roberta R. James

ROBERTA R. JAMES
Assistant Attorney General
Maryland Dept. of the Environment
1800 Washington Blvd., S. 6048
Baltimore, Maryland 21230
(410) 537-3748

FOR THE COMMONWEALTH OF MASSACHUSETTS

MARTHA COAKLEY
Attorney General

By: /s/ I. Andrew Goldberg

CAROL IANCU
I. ANDREW GOLDBERG
Assistant Attorneys General
Environmental Protection Division
1 Ashburton Place, Rm. 1813
Boston, Massachusetts 02108
(617) 963-2428

FOR THE STATE OF NEW HAMPSHIRE

MICHAEL A. DELANEY
Attorney General

By: /s/ K. Allen Brooks

K. ALLEN BROOKS
Assistant Attorney General
Office of the Attorney General
33 Capitol Street
Concord, NH 03301-6397
(603) 271-3679

FOR THE STATE OF NEW MEXICO

GARY K. KING
Attorney General

By: /s/ Stephen R. Farris
_____
STEPHEN R. FARRIS
JUDITH ANN MOORE
TANNIS L. FOX
Assistant Attorneys General
Water, Environment, and Util. Divis.
P.O. Box Drawer 1508
Santa Fe, New Mexico 87504-1508
(505) 827-6010

FOR THE STATE OF OREGON

ELLEN F. ROSENBLUM
Attorney General

By: /s/ Paul S. Logan
_____
PAUL S. LOGAN
Deputy Chief Counsel
General Counsel Division
1515 SW Fifth Ave., S. 410
Portland, Oregon 97201
(971) 673-1880

FOR THE STATE OF RHODE ISLAND

PETER KILMARTIN
Attorney General

By: /s/ Gregory S. Schultz
_____
GREGORY S. SCHULTZ
Special Assistant Attorney General
Department of Attorney General
150 South Main
Providence, Rhode Island 02903
(401) 274-4400, ext. 2400

FOR THE DISTRICT OF COLUMBIA

IRVIN B. NATHAN
Attorney General

By: /s/ Amy E. McDonnell
_____
AMY E. MCDONNELL
Office of the Attorney General
Deputy General Counsel
District Department of the Environment
1200 First Street, NE, Seventh Floor
Washington, DC 20002
(202) 481-3845

FOR THE CITY OF NEW YORK

MICHAEL A. CARDOZO
Corporation Counsel

By: /s/ Christopher King
_____
CHRISTOPHER KING
Senior Counsel
HALEY STEIN
Environmental Law Division
New York City Law Department
100 Church Street
New York, New York 10007-2601
(212) 788-0788

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Unopposed Motion to Supplement Joint Appendix was filed on August 27, 2012 using the Court's CM/ECF system and that, therefore, service was accomplished upon counsel of record by the Court's system.

/s/ Morgan A. Costello

MORGAN A. COSTELLO

ORAL ARGUMENT NOT YET SCHEDULED

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 08-1200 (and consolidated cases)

STATE OF MISSISSIPPI, et al.,

Petitioners,

v.

ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

On Petitions for Review of Final Actions
of the United States Environmental Protection Agency

JOINT APPENDIX

SUPPLEMENTAL VOLUME

JA3856 TO JA3905

COUNSEL LISTED ON INSIDE COVER

Dated: August 24, 2012

For Petitioner in 08-1200 and Intervenor in Support of Respondent in 08-1202 and 08-1203

HAROLD E. PIZZETTA, III
Special Attorney to the
Attorney General
Office of the Attorney General,
State of Mississippi
Civil Litigation Division
P.O. Box 220
Jackson, MS 39205
(601) 359-3680

For the State of Mississippi

For Petitioners in 08-1202

ERIC T. SCHNEIDERMAN
Attorney General of New York
BARBARA D. UNDERWOOD
Solicitor General
DENISE A. HARTMAN
Assistant Solicitor General
LEMUEL SROLOVIC
Bureau Chief
MICHAEL J. MYERS
MORGAN A. COSTELLO
Assistant Attorneys General
Environmental Protection Bureau
The Capitol
Albany, New York 12224
(518) 402-2594

For the State of New York

KAMALA D. HARRIS
Attorney General of California
SARA J. RUSSELL
Supervising Deputy Attorney General
NICHOLAS STERN
Deputy Attorney General
California Department of Justice
1300 I Street, P.O. Box 944255
Sacramento, CA 94244-2550
(916) 323-3840

For the State of California and California Air Resources Board

GEORGE JEPSEN
Attorney General of Connecticut
KIMBERLY P. MASSICOTTE
SCOTT KOSCHWITZ
Assistant Attorneys General
P.O. Box 120, 55 Elm Street
Hartford, Connecticut 06141-0120
(860) 808-5250

For the State of Connecticut

JOSEPH R. BIDEN, III
Attorney General of Delaware
VALERIE M. SATTERFIELD
Deputy Attorney General
Attorney General's Office
Third Floor, 102 W. Water Street
Dover, Delaware 19904
(302) 739-4636

For the State of Delaware

LISA MADIGAN
Attorney General of Illinois
GERALD T. KARR
Senior Assistant Attorneys General
Environmental Bureau
69 W. Washington Street, S. 1800
Chicago, Illinois 60602
(312) 814-3369

For the State of Illinois

WILLIAM J. SCHNEIDER
Attorney General of Maine
GERALD D. REID
Assistant Attorney General
Department of the Attorney General
State House Station #6
Augusta, Maine 04333-0006
(207) 626-8800

For the State of Maine

DOUGLAS F. GANSLER
Attorney General of Maryland
ROBERTA R. JAMES
Assistant Attorney General
Maryland Dept. of the Environment
1800 Washington Blvd., S. 6048
Baltimore, Maryland 21230
(410) 537-3748

For The State Of Maryland

MARTHA COAKLEY
Attorney General of Massachusetts
CAROL IANCU
I. ANDREW GOLDBERG
Assistant Attorneys General
Environmental Protection Division
1 Ashburton Place, Rm. 1813
Boston, Massachusetts 02108
(617) 963-2428

For the Commonwealth of Massachusetts

MICHAEL A. DELANEY
Attorney General of New Hampshire
K. ALLEN BROOKS
Assistant Attorney General
Office of the Attorney General
33 Capitol Street
Concord, NH 03301-6397
(603) 271-3679
For the State of New Hampshire

GARY K. KING
Attorney General of New Mexico
STEPHEN R. FARRIS
JUDITH ANN MOORE
TANNIS L. FOX
Assistant Attorneys General
Water, Environment, and Util. Divis.
P.O. Box Drawer 1508
Santa Fe, New Mexico 87504-1508
(505) 827-6010

For the State of New Mexico

ELLEN F. ROSENBLUM
Attorney General of Oregon
PAUL S. LOGAN
Deputy Chief Counsel
General Counsel Division
1515 SW Fifth Ave., S. 410
Portland, Oregon 97201
(971) 673-1880

For the State of Oregon

PETER KILMARTIN
Attorney General of Rhode Island
GREGORY S. SCHULTZ
Special Assistant Attorney General
Department of Attorney General
150 South Main
Providence, Rhode Island 02903
(401) 274-4400, ext. 2400

For the State of Rhode Island

IRVIN B. NATHAN
Attorney General
AMY E. MCDONNELL
Office of the Attorney General
Deputy General Counsel
District Department of the Environment
1200 First Street, NE, Seventh Floor
Washington, DC 20002
(202) 481-3845

For the District of Columbia

MICHAEL A. CARDOZO
Corporation Counsel
CHRISTOPHER KING
Senior Counsel
HALEY STEIN
Environmental Law Division
New York City Law Department
100 Church Street
New York, New York 10007-2601
(212) 788-0788

For the City of New York

For Petitioners in 08-1203 and Intervenors in Support of Respondent in 08-1200, 08-1204, and 08-1206

DAVID S. BARON
SETH L. JOHNSON
Earthjustice
1625 Massachusetts Ave., N.W.
Suite 702
Washington, D.C. 20036
(202) 667-4500

For American Lung Association,
Environmental Defense Fund,
Natural Resources Defense Council,
National Parks Conservation Association,
and Appalachian Mountain Club

For Petitioners in 08-1204 and Intervenors in Support of Respondent in 08-1202 and 08-1203

F. WILLIAM BROWNELL
ALLISON D. WOOD
LUCINDA MINTON LANGWORTHY
Hunton & Williams LLP
2200 Pennsylvania Ave., N.W.
Washington, D.C. 20037
(202) 955-1500

For Ozone NAAQS Litigation Group
and Utility Air Regulatory Group

For Petitioner in 08-1206 and Intervenor in Support of Respondent in 08-1202 and 08-1203

ROBERT R. GASAWAY
JEFFREY BOSSERT CLARK
WILLIAM H. BURGESS
Kirkland & Ellis LLP
655 Fifteenth Street., N.W., Suite 1200
Washington, D.C. 20005
(202) 879-5000

For National Association of Home Builders

For Respondent in 08-1200, 08-1202, 08-1203, 08-1204, & 08-1206

IGNACIO S. MORENO
Assistant Attorney General
Environment & Natural Resources Div.
MADELINE FLEISHER
DAVID J. KAPLAN
Environmental Defense Section
Environment & Natural Resources Div.
United States Department of Justice
P.O. Box 7611
Washington, D.C. 20044
(202) 514-0242

OF COUNSEL:

LEA ANDERSON
JOHN HANNON
Office of General Counsel
U.S. Environmental Protection Agency

STATE OF MISSISSIPPI, ET AL. v. EPA (08-1200)

JOINT APPENDIX TABLE OF CONTENTS

SUPPLEMENTAL VOLUME

Selected Rulemaking Comments

Non-Record Materials Provided for Convenience of the Court

NACAA
national association of clean air agencies

Comments of the
National Association of Clean Air Agencies (NACAA)
on the U.S. Environmental Protection Agency's Proposal to
Revise the Ozone National Ambient Air Quality Standards (NAAQS)
(July 11, 2007) 72 *Federal Register* 37818

Docket ID No. EPA-HQ-OAR-2005-0172

October 9, 2007

The National Association of Clean Air Agencies (NACAA) offers the following comments on the U.S. Environmental Protection Agency's (EPA's) Proposed Rule to Revise the National Ambient Air Quality Standards (NAAQS) for Ozone ("Ozone NAAQS Proposal"), as published in the *Federal Register* on July 11, 2007 (72 *Federal Register* 37818). NACAA is an association of air pollution control agencies in 53 states and territories and over 165 metropolitan areas across the country.

As the Clean Air Act provides, state and local air agencies are primarily responsible for preventing and controlling air pollution in order to protect our citizens' health and welfare.[1] These agencies are charged with devising plans to ensure that the air in states and localities is clean and healthy to breathe; thus, any time EPA proposes to revise air quality standards, we pay close attention.

Primary NAAQS

NACAA commends EPA for proposing to set a more stringent primary ozone NAAQS to protect public health. Ozone exposure causes premature mortality in people with heart and lung disease. It also reduces lung function, aggravating asthma and other respiratory conditions, and increases the susceptibility of lungs to infection, leading to increased use of medicine among asthmatics and more frequent doctor visits, school absences, emergency room visits and hospital admissions. People with respiratory and heart problems, children and the elderly, and even healthy adults experience negative health effects when exposed to ozone, and recent evidence shows that the adverse health effects occur at concentrations lower than the current standard. Accordingly, although we appreciate EPA's proposed action because it recognizes the importance of tightening the standard, we have some significant concerns with the agency's proposal.

EPA's Congressionally chartered body of independent scientific advisers, the Clean Air Scientific Advisory Committee (CASAC), unanimously concluded that the primary ozone standard needs to be "substantially reduced" and recommended

[1] Section 101(a)(3).

444 North Capitol Street, NW • Suite 307 • Washington, DC 20001 • phone 202.624.7864 • fax 202.624.7863 • www.4cleanair.org

strengthening the primary ozone NAAQS to a level within the range of 0.060 to 0.070 parts per million (ppm).[2] To support its recommendation, CASAC pointed out that "[s]everal new single-city studies and large multi-city studies designed specifically to examine the effects of ozone and other pollutants on both morbidity and mortality have provided more evidence for adverse health effects at concentrations lower than the current standard."[3] In addition, CASAC also noted that controlled clinical studies of healthy adult volunteers showed adverse lung function effects in some individuals at 0.06 ppm, and "people with asthma, and particularly children, have been found to be more sensitive and to experience larger decrements in lung function in response to ozone exposures than would healthy volunteers."[4] CASAC also pointed to the EPA staff paper, in which agency staff concluded that "[b]eneficial effects in terms of reduction of adverse health effects were calculated to occur at the lowest concentration considered (*i.e.*, 0.064 ppm)."[5]

Nevertheless, EPA's proposed range of levels—0.070 to 0.075 ppm—falls outside the range recommended unanimously by CASAC, coinciding only at CASAC's upper bound. In determining the levels "requisite" to protect public health and welfare, NACAA strongly believes that EPA should follow the science—the learned, informed advice of CASAC.

In addition, NACAA questions why EPA is considering retaining the current standard of 0.084 ppm when, as CASAC points out, a large body of scientific evidence "clearly demonstrates adverse health effects" at the current standard and "[r]etaining this standard would continue to put large numbers of individuals at risk for respiratory effects and/or significant impact on quality of life including asthma exacerbations, emergency room visits, hospital admissions and mortality."[6] CASAC said it best: "there is no scientific justification for retaining the current primary 8-[hour] NAAQS."[7]

Also, EPA does not appear to be according CASAC's recommendations the weight they deserve, given CASAC's statutorily defined role in the NAAQS review process. CASAC is specifically charged in section 109 of the Clean Air Act with giving advice to the Administrator on the setting and revising of NAAQS. Accordingly, where EPA's proposal differs from CASAC's recommendations, EPA needs to specifically indicate why it chose not to follow the advice of its independent scientific advisors.

EPA provides an explanation in its proposal for why its proposed range is not lower than 0.070 ppm and why it is not higher than 0.075ppm. [8] However, it does not fully explain why its proposed range goes *up to* 0.075 ppm, when CASAC's upper bound

---

[2] Dr. Rogene Henderson, CASAC Chair, Letter to the Honorable Stephen L. Johnson regarding CASAC's Peer Review of the Agency's 2nd Draft Staff Paper, (Oct. 24, 2006) at 2.
[3] Id. at 3.
[4] Id at 3-4.
[5] Id at 4.
[6] Id. at 5.
[7] Id. at 1.
[8] EPA's Proposed Rule to Revise the National Ambient Air Quality Standards (NAAQS) for Ozone, 72 *Federal Register* 37818 (July 11, 2007) at 37880.

was 0.070 ppm. CASAC cites "overwhelming scientific evidence" for its recommendation that the standard be no greater than 0.070 ppm.[9] Why then did EPA propose any level higher than 0.070 ppm?

In addition, EPA does not fully address some of CASAC's specific scientific judgments. For example, in selecting its range of 0.070-0.075 ppm, EPA relies relatively heavily on its exposure assessment, which the agency says shows that a "standard within the 0.070 to 0.075 ppm range would thus substantially reduce exposures of concern by about 90 to 80 percent, respectively, from those estimated to occur upon just meeting the current standard."[10] But EPA does not address CASAC's concern that "[t]here is an underestimation [in the exposure assessment] of the affected population when one considers only twelve urban "Metropolitan Statistical Areas" (MSAs)."[11] EPA also states that the "most certain evidence of adverse health effects from exposure to [ozone] comes from clinical studies,"[12] yet the agency discounts recently reported clinical studies of healthy adult human volunteers showing adverse lung function effects in some individuals at 0.060 ppm, saying "this evidence is too limited to support a primary focus at this level."[13] CASAC, on the other hand, found these recent studies to be important, especially since people with asthma, particularly children, "have been found to be more sensitive and to experience larger decrements in lung function in response to ozone exposures than would healthy volunteers."[14]

Secondary NAAQS

With respect to the secondary ozone standard, NACAA is pleased that EPA has proposed a distinct, cumulative seasonal standard. Ozone inhibits photosynthesis, inhibits root growth, negatively affects tree growth, causes visible damage to leaves and reduces agricultural crop yields. A cumulative seasonal standard more directly correlates with the exposure of plants to ozone, since plants are exposed to ozone during the entire ozone season. As EPA notes in its proposal, "cumulative, seasonal [ozone] exposures were most strongly associated with observed vegetation response."[15]

CASAC called for a secondary standard "distinctly different from the primary standard in averaging time, level and form."[16] CASAC supported using a cumulative seasonal indicator called W126 that extends over the three-month growing season and counts ozone concentrations over at least the 12 daylight hours, and it recommended that EPA propose a level within the range of 7.5 to 15 ppm-hours (ppm-hrs).[17]

---

[9] Dr. Rogene Henderson, CASAC Chair, Letter to the Honorable Stephen L. Johnson regarding CASAC's Review of the Agency's Final Ozone Staff Paper, (March 26, 2007) at 2.
[10] Ozone NAAQS Proposal at 37880.
[11] Henderson letter of March 26, 2007, *supra* note 9, at 2.
[12] Ozone NAAQS Proposal at 37878.
[13] Id.
[14] Henderson letter of October 24, 2006, *supra* note 2, at 4.
[15] Ozone NAAQS Proposal at 37883.
[16] Henderson letter of October 24, 2006, *supra* note 2, at 6.
[17] Henderson letter of March 26, 2007, *supra* note 9, at 3.

As with the primary standard, EPA's proposal is a step in the right direction but falls short of what science indicates is needed. EPA proposed promulgating a distinct, cumulative seasonal secondary standard using the W126 formulation, but EPA's proposed range for a level extends outside CASAC's range—up to 21 ppm-hours. CASAC noted that adverse effects on vegetation have been documented in areas with W126 levels below 21 ppm-hours and that W126 ranges "well below" 18.75 ppm-hr "were recommended for protecting various managed and unmanaged crops and tree seedlings in the 1997 workshop [of ecological experts] on secondary ozone standards"[18] convened by EPA. (In fact, the ecological experts recommended a range of W126 levels from 5 ppm-hr up to 14 ppm-hr, even lower than CASAC's range of 7-15 ppm-hr.[19]) In the last review, an upper bound of 21 ppm-hr was considered and rejected "as not being a substantial improvement over the 8-hour maximum of 0.084 ppm."[20] We question why EPA would consider adopting a secondary standard at a level rejected 10 years ago as not being an improvement over the primary standard adopted 10 years ago. Therefore, consistent with the recommendations of CASAC and ecological experts, the range considered for the W126 secondary standard should be no higher than 15 ppm-hrs.

In addition, we are troubled that EPA proposed as an alternative making the secondary standard identical to the primary standard, despite agreement among CASAC, the ecological experts convened at the 1996 workshop and EPA staff on the need for a distinct, cumulative, seasonal secondary standard to protect vegetation.

In a letter to EPA, CASAC noted that adverse effects on vegetation have been observed in areas that register ozone levels below the current ozone standards and unanimously agreed that "it is *not* appropriate to try to protect vegetation from the substantial, known or anticipated, direct and/or indirect, adverse effects of ambient ozone by continuing to promulgate identical primary and secondary standards for ozone."[21]

EPA's proposal also cites strong scientific evidence for a distinct, cumulative seasonal standard. Harm to foliage occurred even in areas recording concentrations of ozone that would meet EPA's proposed range for a primary ozone NAAQS:

> Of the counties that met an 8-hour level of 0.07 ppm in those years [(2001-2004)], 11 to 30 percent still had incidence of visible foliar injury. The magnitude of these percentages suggests that phytotoxic exposures sufficient to induce visible foliar injury would still occur in many areas

[18] Henderson letter of October 24, 2006, *supra* note 2, at 6. EPA held a workshop of ecological experts in 1996 to determine consensus-based estimates for ranges of a cumulative seasonal standard that would protect vegetation; at the time, an alternative cumulative form called SUM06 was being considered and experts agreed on the need for seasonal SUM06 levels well below 25 ppm-hr. Approximately equivalent levels of W126 would be about 75% of SUM06, so a W126 of 18.75 ppm-hr would be approximately equivalent to a SUM06 of 25 ppm-hr. While CASAC refers to a 1997 workshop, the workshop was held in 1996 and its results were published in 1997. Ozone NAAQS Proposal at 37902.
[19] Ozone NAAQS Proposal at 37902.
[20] Henderson letter of March 26, 2007, *supra* note 9, at C-25.
[21] Henderson letter of October 24, 2006, *supra* note 2, at 7 (emphasis in the original).

> after meeting the level of the current secondary standard or alternative 0.07 ppm 8-hour standard.[22]

While setting a more stringent primary standard would be beneficial to plants, the agency's proposal recognizes that areas meeting a primary standard can still experience wide variations in cumulative, seasonal ozone totals, thus underscoring the need for a distinct standard to protect public welfare:

> This lack of a consistent degree of overlap between the two forms in different air quality years demonstrates that annual vegetation would be expected to receive widely differing degrees of protection from cumulative seasonal exposures in some areas from year to year, even when the 3-year average of the 8-hour form was consistently met.[23]

And this is especially true for the nation's parks and forests:

> The Staff Paper recognizes, however, that some areas meeting a 0.070 ppm 8-hour standard could continue to have elevated seasonal exposures, including forested park lands and other natural areas, and Class I areas which are federally mandated to preserve certain air quality related values. This is especially important in the high elevation forests in the Western U.S. where there are few [ozone] monitors. This is because the air quality patterns in remote areas can result in relatively low 8-hour averages while still experiencing relatively high cumulative exposures.[24]

Accordingly, given CASAC's explicit statement about the inappropriateness of promulgating identical primary and secondary standards and the evidence that such an approach does not adequately protect public welfare, NACAA is troubled with EPA's proposal.

Air Quality Index

The Air Quality Index (AQI) is a risk communication tool developed by EPA to keep members of the general public informed about their local air quality and to help them make informed decisions about their exposure to air pollutants. Air quality is measured by monitors that record the concentrations of major pollutants each day at thousands of locations across the country. Those raw measurements are then converted into AQI values using standard formulas developed by EPA. The effectiveness of the AQI as a public health tool will be undermined if EPA undertakes regulatory changes to the ozone NAAQS without simultaneously revising the AQI. Therefore, NACAA supports EPA's proposal to revise the AQI at the same time that it finalizes the new ozone NAAQS to better protect public health.

[22] Ozone NAAQS Proposal at 37893-37894.
[23] Id. at 37893.
[24] Id. at 37892.

Implementation Issues Improperly Included in Proposal

We are concerned that EPA in this proposal, as in the particulate matter NAAQS, is mixing in implementation issues in a rule setting a health-based standard. The NAAQS are set at a level to protect public health with an adequate margin of safety; how one *meets* the NAAQS is obviously important but a *separate* issue from what the standard should be.

For example, EPA in its proposal notes that provisions of the Energy Policy Act of 2005 requiring increased use of renewable fuels will have an impact on levels of ozone across the country and requests comment on the extent that EPA in this rulemaking may consider the impacts of this renewable fuels mandate on ozone compliance. The answer is unequivocal: EPA may not. Clearly, the impact of increased renewable fuels on ozone is an important issue that needs to be addressed, but not in a rulemaking focused solely on determining what level of ozone is protective of public health.

As with the particulate matter NAAQS, the agency in the preamble to the proposal addresses an issue—what constitutes reasonably available control measures (RACM) for meeting the standard—that unequivocally should be covered in an implementation rule or guidance and not in a rule setting the NAAQS. The agency says it

> anticipates that certain USDA-approved conservation systems and activities that reduce agricultural emissions of [nitrogen oxides] and [volatile organic compounds] may be able to satisfy the requirements for applicable sources to implement reasonably available control measures for purposes of attaining the primary and secondary [ozone] NAAQS.[25]

Guidance about which measures may be considered RACM is something EPA provides, in consultation with state and local clean air agencies, *after* a standard has been promulgated. Furthermore, EPA did not consult with NACAA about the appropriateness of this determination, which is at odds with the partnership between EPA and state and local clean air agencies in implementing the Clean Air Act. And, in any event, RACM determinations—even "anticipations"—are not appropriate in a rule setting the NAAQS.

The agency also requests comment on whether it may consider projected public health gains from meeting the current standard as a health-based criterion for its decisionmaking in revising the standard.[26] NACAA is unsure of what the agency's intent is here. If science shows that a 0.084 ppm standard is inadequate to protect public health, how are the public health gains from meeting that "inadequate" standard relevant to setting a more stringent standard? It is true that the public benefits from lowering ozone levels to 0.084 ppm in areas where ozone levels are higher than that, but that does not mean that 0.084 ppm is sufficiently protective of public health or that those incremental gains means EPA is justified in setting a less protective standard. Our members do face

[25] Ozone NAAQS proposal at 37821.
[26] Id. at 37881.

challenges in meeting the current ozone standard (and will face additional challenges meeting a stricter standard), but we are unclear what relevance this has to setting a level of ozone that is protective of public health.

EPA needs to erect a strong firewall between standard-setting and implementation issues. The Supreme Court in *Whitman v. American Trucking Associations* was very clear that EPA may not consider the cost of implementation in setting the NAAQS, because the sections of the statute providing for the setting and revising of the NAAQS do not mention cost as a factor, and cost is "*both* so indirectly related to public health *and* so full of potential for canceling the conclusions drawn from direct health effects that it [(cost)] would surely have been expressly mentioned [in these sections] had Congress meant it to be considered."[27] The benefits of setting a strong standard are harder to measure, in that one cannot precisely identify whose life was saved, whose child had fewer asthma attacks and which trees grew faster and stronger because of less ozone pollution. The costs, on the other hand, can be more easily tallied, and once considerations of implementation bleed into standard-setting, then the human propensity for avoiding pain makes it very likely that some stakeholders will clamor for a weaker standard to avoid those costs. EPA cannot blur the line between standard-setting and implementation; the agency must hew to its statutory mandate. It is instructive to note that CASAC recognized that its recommendation of lowering the current primary standard would likely result in "a large portion of the U.S being in nonattainment," yet CASAC said, "we take very seriously the statutory mandate in the Clean Air Act not only for the Administrator to establish, but also for the CASAC to recommend to the Administrator, a primary standard that provides for an 'adequate margin of safety … requisite to protect the public health.'"[28]

Issues EPA Will Need to Address After Setting the Ozone NAAQS

While EPA should not conflate implementation and standard-setting issues in this rulemaking, whatever decision EPA makes on the level and form of the primary and secondary NAAQS will have a profound impact on the work of state and local clean air agencies. EPA must recognize this, not in setting the NAAQS, but in timely future rulemakings and appropriations requests.

Funding

EPA should request sufficient additional funds for state and local air pollution control agencies to carry out work associated with meeting the new NAAQS. Currently, federal grants fall far short of what is needed to support our members' work to meet the existing standards and carry out their other air quality responsibilities. In recent years, federal grants for state and local air programs have amounted to only about one-third of what they should be and the latest budget requests have called for additional cuts. Tighter ozone standards mean existing and new nonattainment areas will need to identify

[27] *Whitman v. American Trucking Associations, Inc.*, Supreme Court Opinion No. 99-1257 (Feb. 27, 2001), at 9.
[28] Henderson letter of October 24, 2006, *supra* note 2, at 7.

and adopt additional control measures, convene stakeholder processes to explain the implications of a nonattainment designation and seek input on control measures, prepare nonattainment State Implementation Plans (SIPs), and shepherd these SIPs through their administrative processes and EPA approval procedures, among other tasks.[29] All of these activities will require significant *additional* resources for state and local air agencies, above and beyond what is currently provided.

Timely Implementation Guidance

EPA also needs to issue timely implementation guidance so that states and localities are apprised early on of EPA expectations for SIPs. Many states require at least a year for a SIP to be approved to comply with the terms of their state-specific administrative procedures, before the SIP is even submitted to EPA. State and local air pollution control agencies, therefore, need guidance from EPA well before SIP deadlines.

National Rules Addressing Major Sources

Many sources contributing to ozone pollution in a nonattainment area may be outside the legal jurisdiction of state and local clean air agencies or be best regulated by a national rule that sets tight minimum emissions standards. Accordingly, EPA needs to adopt national rules that address major sources of ozone precursors in order to assist with attainment.

For example, there remain significant opportunities to reduce emissions of ozone and particulate matter precursors from electric generating units (EGUs), both in the East and the West. For this reason we were extremely disappointed that EPA's Regulatory Impact Analysis (RIA), in which EPA analyzed the costs and benefits of reducing pollution to meet alternative ozone standards, did not even examine the costs and benefits of further controlling EGUs.[30] EPA's rationale for not examining further controls on EGUs is the agency's assertion that "extensive reductions" have already been obtained from EGUs through the Clean Air Interstate Rule (CAIR) (which only applies in the East), the Clean Air Mercury Rule (CAMR) and the Clean Air Visibility Rule (CAVR).[31] EPA's modeling in the RIA used the year 2020 as a projected attainment date for the new ozone standard. We fail to understand why EPA would not even consider that additional controls on EGU emissions could be warranted in the next 13 years. None of the rules EPA mentioned—neither CAIR nor CAMR nor CAVR—sets stringent enough requirements to reduce emissions of ozone precursors from EGUs in order to meet the *current* ozone standard, let alone a tighter standard.[32] In addition, clearly during the next

[29] The impact on the monitoring network and the need to fund additional monitors is addressed below.
[30] EPA, Regulatory Impact Analysis of the Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone (July 2007) (EPA-452/R-07-008), at 3-6.
[31] Id.
[32] EPA established EGU emissions reduction budgets for states in CAIR at levels sufficient to reduce upwind states' "significant contribution" to downwind states' nonattainment (i.e., interstate transport of EGU emissions). These budgets did not consider what EGU emissions reductions would be needed to

13 years air pollution control technology will have advanced, so EPA is not justified in concluding that further controls on EGUs would not be available or cost-effective.

Monitoring—Primary Ozone NAAQS

EPA's revision of the primary ozone NAAQS will be seriously compromised—and its new health protections will not be realized in a nationally consistent way—unless it is supported by accurate data establishing current ambient levels of ozone. Such information is the bedrock of attainment and nonattainment designations under a revised standard, and can only be provided by a robust nationwide ozone monitoring network. The proposed rule, however, ignores the needs that states and localities will have for additional monitors to measure ozone levels in currently under-monitored areas and, in particular, in unmonitored areas that have populations under 350,000. Unless this latter deficiency is corrected in the final rule, the health benefits of EPA's ozone NAAQS revision will likely be limited to those living in Metropolitan Statistical Areas (MSAs) having populations of more than 350,000.[33]

The proposed rule states that there are currently about 1100 ozone monitors now operating in MSAs.[34] According to the proposal, at a final NAAQS of 0.070 ppm, about 70 MSAs would be affected, with most changing from no required monitors to one, or from one to two. The agency concludes, "[b]ecause most of these areas already are operating at least as many monitors as the possible new requirement, the number of monitors which would need to be initiated…would be only about five monitors [nationwide].[35]

NACAA does not agree that the ozone monitoring network will need only minimal tweaking in order to provide adequate data to compare to a new health-based standard. Currently, only 639 of the nation's 3,000 counties have ozone monitors in place.[36] EPA's maps show that 533 of these counties will violate a proposed standard of 0.070, or 83 percent of the monitored counties. Given such a high projected nonattainment rate for the monitored counties, how can EPA conclude that the remaining 2,400 unmonitored counties will be in attainment? Yet, unless EPA's current ozone monitoring requirements are changed, the vast majority of the nation's counties will remain unmonitored.

---

ensure that *intrastate* EGU emissions were controlled sufficiently to achieve attainment. In addition, since CAIR is a cap-and-trade scheme, there is no requirement that an EGU next to or in a nonattainment area reduce its emissions. CAMR deals with mercury, not ozone. CAVR was designed to reduce emissions contributing to visibility pollution and not to achieve attainment with the health-based ozone standard.

[33] In 2006, NACAA opposed the proposed (and subsequently dropped) population-based $PM_{10-2.5}$ coarse monitoring network, which required no monitors for cities with fewer than 100,000 people. Similarly, the association advocates that EPA revisit the population-based ozone network design criteria of 40 CFR Part 58, Appendix D, Table D-2, which now require no ozone monitors for MSAs under 350,000 that have no design values and are estimated to be less than 85 percent of the current ozone NAAQS.

[34] Ozone NAAQS Proposal at 37906.

[35] Id. at 37907

[36] Congressional Research Service (CRS) R34057, *Ozone Air Quality Standards: EPA's 2007 Proposed Changes* (July13, 2007) at CRS-8

Adequate federal funding for expansion of the ozone monitoring network should be provided so that state and local permitting authorities will have the information necessary to designate counties attainment or nonattainment. Otherwise, they will be unable to devise control strategies for achieving attainment as necessary, and residents of areas in which ozone levels are unknown and unmonitored will continue to suffer ill health needlessly. NACAA urges EPA to modify the 40 CFR Part 58, Appendix D, Table D-2 SLAMS Minimum Ozone Monitoring Requirements so as to fund and provide monitors in an evenhanded way that does not penalize those persons who have chosen to live in cities of under 350,000.

We provide several illustrative examples relayed by NACAA members. The monitoring network director of a large Northeast state with both urban and rural populations disagrees with EPA's statement that no monitoring changes are necessary to support implementation of a revised NAAQS. This state has six MSAs of fewer than 350,000 populations, and if the 0.070-0.075 ppm range were selected for the primary ozone standard, according to the monitoring director, some of these areas would be above the standard, and some below it. Several are not now covered adequately by an ozone monitor. Although the monitoring director states that it has been possible to demonstrate through comparisons with other monitors and through modeling results that these areas are in fact in attainment of the current standards, a lowering of the primary standard to the point at which the area was close to the proposed standard would require additional ozone monitors to clearly define the areas of nonattainment.

A monitoring director from a Midwestern state arrived at the same conclusion for his state. A map of design values in this state indicates that of the 11 ozone monitors that are already sited in the state, all would have design values higher than 85 percent of a primary NAAQS set at 0.070 ppm. As with the Northeast state, the Midwest state can only resolve the uncertainty regarding attainment or nonattainment of these areas through monitoring. However, the monitoring director points out, such monitoring is not allowed by the Part 58 Table D-2 ozone network regulations. Table D-2 is, in effect, a "Catch 22:" If there is no design value for an area of fewer than 350,000 people, then there is no required monitor; but if there is no monitor, a design value cannot be established.[37] A literal reading of the current regulation suggests, therefore, that no new ozone monitors can ever be required when the NAAQS are lowered. If, however, the primary ozone standards are lowered to the range of 0.070-0.075 ppm, considerable uncertainty will arise.

In the opinion of the Midwestern state monitoring director, a more responsibly drafted Part 58 regulation would require a monitor to be placed downwind of an MSA of less than 350,000 if a design value appears to be greater than 85 percent of the NAAQS based on interpolating existing monitoring data or using regional ozone modeling, such as the Community Multiscale Air Quality (CMAQ) model. If the single monitor showed attainment issues based on a lower ozone standard, the monitoring director believes that

[37] 40 CFR Part 58, Appendix D, Table D-2.

an additional downwind monitor would also be necessary.[38] Nonattainment at a downwind site would also raise questions about the exposure of individuals in the city, which could be addressed by placing a population-oriented monitoring site in the city. Finally, an upwind monitoring site would be necessary so that the MSA seeking to solve a downwind ozone problem could establish whether concentrations upwind of the MSA are also elevated, in which case controls over the upwind areas would be required to mitigate the problem. Additional upwind monitors would be important to establish the upwind exposures and to demarcate the extent of the nonattainment area, according to the state's monitoring director.

Finally, a local agency described the possible effect of a more stringent standard on its already difficult funding situation, noting that it will be impossible to increase the level of monitoring without additional funding for implementation of the new primary and secondary standards. This monitoring director stated that a 2005 analysis of the monitoring network in the state and county indicated that many areas currently meeting the standard are projected to violate a lower standard. Some of the monitors that were part of this analysis, however, have now been shut down or relocated as a result of network reviews and funding cuts.

Other states and localities have also shut down many monitors nationwide due to flat funding for several years, followed by the severe budget cuts in State and Territorial Assistance Grants in 2007. In fact, if EPA anticipates that state and local government resources will fill the gaps left by inadequate federal funding for monitors and for personnel to operate the monitors, such an expectation is ill-founded. Adequate federal resources must be forthcoming to support the new health-based standard.

The proposed rule states, "[w]ith a lower [ozone] NAAQS, the issue arises of whether in some areas the required [ozone] monitoring season should be made longer." A longer monitoring season will necessitate additional funding for equipment maintenance and calibration, quality assurance procedures, operator time in sampling and transmitting samples to the appropriate laboratory, and time inputting the data into the Air Quality System (AQS). EPA should, therefore, provide additional resources that correspond with the longer ozone seasons necessitated by the new NAAQS.

Monitoring—Secondary Ozone NAAQS

EPA's proposed rule points out that rural areas are currently only sparsely monitored for ozone so violations of the secondary NAAQS in areas with sensitive vegetation may occur undetected, as a result of transport from urban areas with high precursor emissions and/or ozone concentrations or from formation of additional ozone

[38] An additional downwind monitor would help establish the extent of the downwind nonattainment area, and would also be available if there were data capture problems with the first monitor, as EPA requires ninety percent data capture over three years to establish attainment for an area. It also would mean that the design value gained by three years of monitoring would not be lost if the site lease for the first monitor was not renewed.

from precursors emitted from sources outside urban areas. [39] The proposal states further that rural violations of a secondary NAAQS could occur in areas with sensitive vegetation even though urban monitoring networks are showing compliance with the primary NAAQS, whether the forms and levels of the two standards are the same or different.[40]

The agency's own statements point to the logical conclusion that additional ozone monitors are needed in rural areas. NACAA agrees that rural violations of a secondary NAAQS will go undetected unless the agency provides adequate funding for an ozone network that will enable permitting authorities to determine compliance with the new standard. We urge EPA to avoid promoting voluntary monitoring (as suggested in the proposal). A voluntary approach ill serves this significant new standard and would likely result in scattershot, inconsistent monitoring. A well-planned and executed, federally funded approach would be more apt to yield adequate data, and, ultimately, sound mitigation measures.

Conclusion

NACAA urges EPA to follow the science and set a more stringent primary standard and a distinct, cumulative seasonal secondary standard in accordance with CASAC's recommendations. EPA should also recognize that, whatever decision EPA reaches on the primary and secondary standards, it will greatly affect the work of state and local air pollution control agencies. Accordingly, it will be imperative for EPA to work in close partnership with state and local clean air agencies at the appropriate time to address implementation issues and achieve the ultimate goal of public health protection.

[39] Ozone NAAQS Proposal at 37907.

[40] Id. See also, CRS Report RL34057, *supra* note 36, at CRS-8, which states "the current monitors are generally found in urban areas, because of the larger populations potentially affected, and because most of the sources of ozone precursor emissions are located in such areas. But…ozone is not emitted directly by polluters. It forms in the atmosphere downwind of emission sources. Thus, rural areas can have high ozone concentrations, unless they are located a substantial distance from any urban area."

United States Environmental Protection Agency
Office of Air and Radiation
Docket ID No. EPA-HQ-OAR-2005-0172

PROPOSED RULEMAKING ON NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OZONE

COMMENTS FILED ON BEHALF OF THE PROVINCE OF ONTARIO

by

Laurel Broten, Minister of the Environment

September 7, 2007

TABLE OF CONTENTS

FIGURES

Introduction and Overview

The Province of Ontario welcomes this opportunity to file comments on revisions to the National Ambient Air Quality Standards for Ozone contained in a Notice of Proposed Rulemaking on July 11, 2007 by Environmental Protection Agency Administrator Stephen L. Johnson. These comments are submitted on behalf of the Province of Ontario and Premier Dalton McGuinty by Minister of the Environment Laurel Broten.

Ontario has carefully reviewed EPA's proposal for ozone, and we are pleased that EPA is taking steps to tighten the U.S. standard. There is compelling evidence that ground-level ozone is a serious and growing health and environmental problem. Excessive ozone levels have been shown to cause significant respiratory and cardiovascular problems, and lead to premature mortality. Ontario estimates that over 4,800 premature deaths each year in Ontario are caused by high levels of ozone and particulate matter, and that annual health damage costs due to excessive levels of air pollution are almost $6.6 billion.[1] Breathing difficulties and circulatory problems can be especially acute for vulnerable segments of the population – the elderly, young children, and individuals with sensitive respiratory systems – but high ozone levels put even healthy adults at risk. The most severe problems occur during the summertime, when heat and stagnant air combine to magnify the adverse effect that ozone can have on the lungs and the cardiovascular system. To date during the summer of 2007, Ontario has already issued more than 30 days of smog advisories during which people who are sensitive were warned to stay indoors to avoid the effects of ozone. Ozone also causes damages to crops, other vegetation, and forested ecosystems.

Ontario has long recognized the harmful effects of ozone, and has acted vigourously to control it. In 2000, Ontario adopted Canada's CWS for ozone, a standard considerably more protective than the one currently in effect in the United States. The existing U.S. ozone standard allows nearly 20 parts per billion more of ozone pollution to be present in the atmosphere over the same measuring period.

Ontario strongly recommends that EPA adopt a standard that is *at least as stringent* as the Canada-wide Standard (CWS) for ozone of 65 parts per billion (ppb), averaged over an 8-hour period. We say this not only because we believe that a standard at least as stringent as the CWS is needed in order to protect public health and welfare, but also because Ontario is downwind of major ozone-causing emission sources in the United States, and cannot sufficiently control its own ozone levels without cooperation from the U.S.

On hot summer days, when ozone pollution is at its worst, *more than half* of all of the ozone (excluding background) affecting Ontario comes from sources in the United States. What this means is that even if Ontario were somehow to reduce to zero its own sources of air pollution, we would still experience exceedances of our ozone standard at most of the measuring stations in Ontario, especially at those stations located near the Canada–U.S. border. Conversely, if the situation was reversed and the air traveled predominantly from Canada to the United States, and all of U.S.–generated ozone pollution were somehow contained within the U.S., Ontario would easily attain the CWS at 100% of its monitoring stations. In short, we cannot get there without help from the U.S.

These comments are divided into five parts. Part I describes in detail the impact of high ozone levels on public health and welfare in the U.S. and Canada. Part II describes the transboundary flow of air pollution from the U.S. into Ontario, and shows how this flow affects Ontario's efforts to meet its own ozone standards. Part III reviews the steps the McGuinty government in Ontario is taking to reduce air pollution, including the phase-out of coal-fired power plants in the Province by 2014, and an ambitious energy efficiency program. Part IV discusses how the compelling health impact data reviewed by EPA staff and the agency's Clean Air Scientific Advisory Committee justifies a more stringent ozone standard than currently proposed by EPA. Part V discusses how international law and agreements provide EPA with a strong legal basis for more aggressive action to control ozone-causing emissions that impact Ontario.

I. Ground-level ozone has significant impacts on public health and welfare

Ground-level ozone is formed when its precursors, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), interact in the presence of sunlight. As a result, ozone is "one of several pollutants that combine to form a chemical soup that hangs in the warm, still air over many Canadian cities on hot summer days."[2] A dangerous substance when inhaled or absorbed, ozone can adversely affect human health, the environment, and the functional and aesthetic qualities of materials Ontarians encounter in their daily lives.

Because ozone can cause inflammation in the lungs at lower concentrations than any other gas, there is a significant association between ambient ozone and adverse health effects in humans.[3] Sensitive subpopulations such as the elderly, children, and outdoor workers are particularly vulnerable to ozone levels and pre-existing respiratory conditions can be triggered by only slight increases in ozone concentrations. However, no one is immune to the effects of ozone. Even the healthiest individuals can experience respiratory symptoms when ozone levels rise on smoggy days. Healthy individuals who spend their adolescence in smoggy areas may also demonstrate reduced lung development (e.g. smaller airways) than people who are raised in locations with lower ozone concentrations.[4]

A. Review of recent scientific data on the health impacts of ozone.

As discussed below, a recent and growing body of health data from North America and Europe suggests a strong correlation between increased ozone levels, cardiovascular episodes, and mortality.

1. Respiratory effects

Scientific studies demonstrate that sensitive subpopulations such as the elderly, young children, and individuals with impaired respiratory systems are especially vulnerable to even the slightest increase in ozone levels. For example, a study published last year analyzed respiratory hospital admissions and air pollution data from 1986 – 1999 for 36 U.S. cities.[5] Researchers found that "during the warm season, the 2-day cumulative effect of a 0.005 ppm increase in

ozone was a 0.27% increase in chronic obstructive pulmonary disease admissions and a 0.41% increase in pneumonia admissions."[6] Other studies have shown that emergency room visits – particularly for pediatric patients suffering from asthma – significantly increase when ozone concentrations rise.[7] Conversely, studies have also indicated that emergency room visits for children with asthma noticeably drop when ozone levels decrease, such as during the 1996 Summer Olympic Games in Atlanta, Georgia, when transportation changes limited the number of vehicles entering the downtown area.[8]

Children also suffer minor illnesses when ozone levels are high which can reduce their ability to attend school and participate in outdoor activities. The effects of ozone on school absenteeism were measured in a study of 4th-grade children in 12 southern California communities.[9] An increase of 0.020 ppm of O_3 was associated with an increase of 62.9% for illness-related absence rates, 82.9% for respiratory illnesses, 45.1% for upper respiratory illnesses, and 173.9% for lower respiratory illnesses with wet cough.[10] Researchers concluded that "increased school absenteeism from O_3 exposure in children is an important adverse effect of ambient air pollution worthy of public policy consideration."[11]

Several studies on the respiratory effects of ozone have shown that the pollutant also significantly affects healthy individuals. Since the early 1990s, chamber studies have repeatedly shown that healthy adults suffer "reduced lung function, increased respiratory symptoms, changes in airway responsiveness and inflammation following just 6.6 hour exposures to 0.08 ppm," the current EPA standard.[12] More recent chamber studies have shown that "some healthy adults experience adverse effects at 0.06 ppm or below."[13] The EPA's Clean Air Scientific Advisory Committee (CASAC) cited these recent controlled clinical studies of healthy adult volunteers as evidence that *"the current ozone standard of 0.08 ppm is not sufficiently health-protective with an adequate margin of safety."*[14]

In recent years, researchers have also linked ozone exposure to adverse effects on lung development during birth and adolescence. A 2004 study of infant rhesus monkeys demonstrated that chronic exposure to high ozone concentrations can change the structure of the airways, leading researchers to conclude that the developing lung is more vulnerable to damage from ozone than the mature lung.[15] In a study to determine the effect of ozone concentrations on lung development after birth, Yale University researchers closely followed almost 700 infants born in southwestern Virginia during the summer months in 1995 and 1996. Maximum 8-hour and peak 1-hour ozone concentrations were associated with difficulty breathing in infants of asthmatic mothers. The mean concentrations in this study (0.055 ppm 8-hour average, and 0.061 ppm peak 1-hour concentration) were well below the EPA standards of 0.080 ppm and 0.012 ppm, respectively. The researchers concluded: "At levels of ozone exposure near or below current EPA standards, infants are at risk of respiratory symptoms."[16] Another recent study looked at the effects of chronic exposure to air pollutants in non-smoking college freshmen at University of California, Berkeley who were lifelong residents of the Los Angeles or San Francisco Bay areas.[17] Researchers found that "lifetime exposure to ozone in adolescents 18-20 years old is associated with reduced levels of lung function measures that reflect the function of the small airways."[18]

2. Cardiovascular effects

Since 1997, an increasing amount of health data has indicated that ozone levels can have a significant impact on cardiovascular function. Notably, a recent French study followed middle-aged adults without heart disease and found that short-term exposure to ozone is independently related to acute cardiac events occurring within 1 to 2 days.[19] Furthermore, when determining their conclusions, the researchers allowed for control of long-term seasonal trends, and removed the effects of temperature, relative humidity, and influenza epidemics.

Other studies of cardiovascular effects have revealed that even slight increases in ozone levels can impair cardiac function. In an evaluation of the effects of ozone concentrations on patients with implanted cardioverter defibrillators, researchers recently found that increased levels of ambient ozone concentrations during the previous hour were associated with an increased risk of a certain type of cardiac arrhythmia called atrial fibrillation, which can lead to stroke if not controlled by medication.[20] Another study used electrocardiograph monitoring to track heart rate variability (HRV) against ozone concentrations in 497 men in Boston, Massachusetts who were enrolled in the Veterans Administration Normative Aging Study. Reduced HRV is a common risk-factor for heart disease as it indicates poor cardiac autonomic function. Researchers concluded that low-frequency HRV was reduced by 11.5% per 0.013 ppm increment in the previous 4-hour average of ozone.[21]

3. Mortality

The most concerning studies on the health effects of ozone in recent years have investigated the causational links between increased ozone levels and levels of mortality. One of the most comprehensive of these studies involved an analysis of daily ozone levels in 95 U.S. cities based on data from 1987 to 2000. Researchers found an increase in mortality associated with heightened levels of ozone, noting that just a 0.010 ppm increase in the previous week's ozone levels raised mortality rates by 0.52%. Further, a 0.010 ppm increase in daily ozone would result in an additional 3,767 premature deaths annually in the 95 cities studied.[22]

A 2004 study sponsored by the "Air Pollution and Health: A European Approach" (APHEA2) project reported similar conclusions regarding the link between ozone exposure and mortality.[23] Researchers gathered daily ozone level and daily mortality data from 23 cities and areas for at least 3 years since 1990. They found that during the warm season, a 0.005 ppm increase in the 1-hour ozone concentration was associated with a 0.33% increase in the total number of daily deaths, a 0.45% increase in the number of cardiovascular deaths, and a 1.13% increase in the number of respiratory deaths. The 8-hour ozone concentration data produced similar results. The researchers also noted that these mortality effects appeared independent of SO_2 and particulate matter levels.

Other studies have been conducted to test the validity of the independent relationship between ozone and mortality concluded in the aforementioned studies. One such follow-up study controlled for temperature influence on ozone formation. Scientists concluded that the premature mortality risk from ozone pollution is independent of the effect of temperature and particle pollution.[24] EPA itself recently commissioned three meta-analyses to statistically

synthesize the results of the ozone and mortality research. All of the analyses found a small but significant association between daily ozone levels and total mortality.[25] Even EPA's own peer-reviewed Air Quality Criteria document summarized the "overall" mortality evidence as being "highly suggestive that short-term exposure to ozone increases the risk of early death."[26]

In a further follow-up to the 95-city U.S. study, researchers investigated whether there "exists a threshold level, below which ozone does not adversely impact risk of mortality."[27] They found that even if ozone levels are reduced significantly below the current U.S. standard, mortality risk remains. As noted in the testimony of Michelle Bell, one of the lead researchers in the study, before the Senate Environment and Public Works Committee, "we found no safe level of ozone that does not affect risk of mortality."[28]

B. Canada's Assessment and Action Regarding Ozone Impacts

The 1999 *Science Assessment Document* (SAD) that formed the basis of Canada's CWS for ozone of 65 ppb (0.065 ppm)[29] provides a helpful summary of the dangerous effect ozone can have on the human respiratory, cardiac, and immune systems, and explains how ozone levels can impact the public health statistics discussed above (i.e., school absenteeism, visits to the doctor, hospital admissions, and mortality):

> Evidence suggests a biologically plausible mechanistic sequence(s), beginning with an inflammatory response which irritates the respiratory tract, giving rise to cough, pain which inhibits inspiration, and bronchoconstriction which reduces airflow. Ozone-induced impaired endogenous defence system (including injury of immune cells and depletion of antioxidants) would render the individual more vulnerable to viral or bacterial infections. These effects and symptoms, if severe enough, could lead to respiratory dysfunction and a requirement for medical intervention such as doctor or emergency room visits, and hospitalization… it is logical to expect that the biological stress related to these effects could exacerbate underlying conditions (e.g. cardiovascular problems) and lead to acute death.[30]

The CWS for ozone in 2000 primarily took into account the effects of ozone on human health. However, the 0.065 ppm standard was also viewed as sufficiently protective of the environment. The SAD discussed how vegetation and materials in the environment are susceptible to the effects of ozone, often exhibiting adverse effects at lower concentration levels than humans. Ozone injures vegetation by imparting a phytotoxic effect on plant cells located in sensitive sites on leaves. This cellular effect is eventually visible as noticeable injury to the leaf, or as a secondary effect such as reduced root growth, reduced yield of fruits or seeds, or both.[31] Studies of the impact of ozone on crop yield in Ontario have shown that dry bean, potato, onion, hay, turnip, winter wheat, soybean, spinach, green bean, flue-cured tobacco, tomato, and sweet corn are particularly at risk to ozone injury.[32] Studies that explore the effects of ozone on common tree species in Canada have also established that maples, ash, spruce, white pine, poplar, cottonwood, cherry, walnut, sycamore, white birch, and red oak trees all demonstrate ozone sensitivity (e.g. reductions in growth, biomass, or photosynthesis). Over half of the studies reported at least a small growth reduction when the trees were exposed to seasonal mean concentrations of 0.040 to 0.060 ppm.[33]

While SO_2 is most responsible for the degradation of materials, the recent decline of SO_2 emissions means that ozone is gaining importance as an atmospheric pollutant that is damaging to many types of materials, both functionally and aesthetically.[34] Individually, ozone is particularly detrimental to organic materials such as elastomers (e.g. rubber), natural fiber textiles, and pigmented surface coatings as it causes fading and cracking of the material. In combination with SO_2, ozone accelerates the corrosive action of SO_2 on metals such as copper, zinc, silver, aluminum, nickel, and iron.[35] The interaction of ozone and SO_2 also contributes to the corrosion of stone building materials such as marbles, sandstones, limestones, bricks, concrete, and gravel. The SAD concluded that "it should be recognized that chronic exposures in an ambient environment, in the order of weeks at concentrations in the range of 0.020-0.050 ppm, have the potential to adversely impact elastomers, textiles, paints and dyes."[36]

Because of ozone's many adverse impacts on the Ontario population and environment, the Province has acted to control levels of the pollutant over the past three decades. Ontario established an ozone standard under the Environmental Protection Act of 1971; subsequently, the first Province-wide Ambient Air Quality Criteria for ozone was set as a 1-hour standard of 0.08 ppm in 1974.[37]

In June 2000 the Canadian Council of Ministers of the Environment (CCME), a cooperative partnership of the federal, provincial and territorial governments of Canada, endorsed the national Canada-wide Standard for ozone of 0.065 ppm (8-hour averaging time) to be achieved by 2010. The CCME based the 0.065 ppm standard on "the desire to achieve the best health and environmental protection possible in the relative near-term and the feasibility and costs of reducing the pollutant emissions" that create high levels of ozone in ambient air.[38] The SAD that accompanied the development of the CWS for ozone reviewed the science available in 1999 and found that the overall body of evidence was "significant, consistent, coherent, robust, and compelling" to justify the standard of 0.065 ppm.[39] The SAD evaluated a large number of epidemiological, human clinical, and animal studies and concluded that there exists a strong association between ozone and adverse health effects.

Additionally, the SAD looked at ozone effects specifically in Canada. Using a regression analysis of mortality and hospitalization statistics over an 11-year period in 13 Canadian cities, including 4 cities in Ontario (Toronto, Hamilton, London, Windsor), the SAD presented data showing that there is a significant association between ambient ozone and respiratory hospitalizations and premature mortality. Researchers noted that the results were similar to those observed in studies of cities across the world. This data was then used to identify two Reference Levels for ozone (defined as an estimate of the lowest ambient concentration at which statistically significant increases in health responses have been detected):

- 0.020 ppm (daily, 1 hour maximum) – for non-accidental mortality
- 0.025 ppm (daily, 1 hour maximum) – for respiratory hospitalization

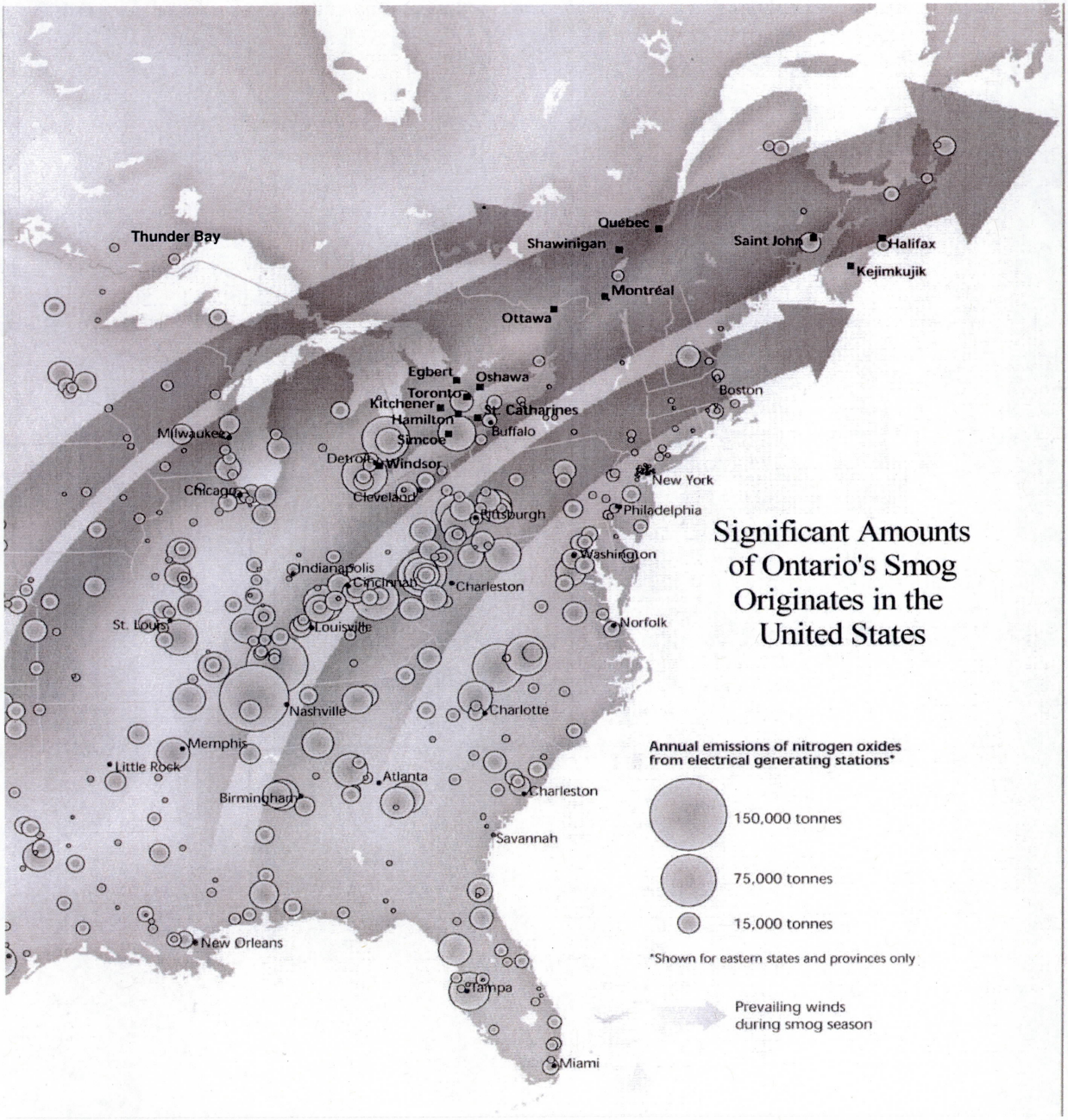
In general, the Reference Levels are not interpreted as thresholds for effects, but rather "guidance points" at which evidence suggests effects are present. In conjunction with the full body of worldwide scientific literature on ozone and health effects, the Reference Levels above guided the basis for the development of the CWS for ozone of 0.065 ppm. All Canadian provinces (with the exception of Quebec), territories, and the Federal government were signatories to the CWS.

As of 2005, despite nationwide efforts to reduce ozone-causing emissions, at least 40% of Canadians lived in communities where ambient ozone levels were above the CWS target of 0.065 ppm.[40] This was particularly a problem in Ontario – ground-level ozone concentrations exceeded the CWS at 17 of 18 designated ozone measuring locations in the province during 2003-2005.[41] The only measuring location in Ontario that could meet the 2010 CWS for ozone is located in Thunder Bay, well north of the U.S. border and not dominantly affected by transboundary air pollution from the U.S. Therefore, Ontario is justifiably concerned about the effects of ozone-causing emissions on its citizens and environment. A 2005 report prepared by the Ontario Medical Association (OMA) entitled *The Illness Costs of Air Pollution* quantified the costs of air pollution in terms of its health effects.[42] Key findings showed that exposure to air pollution such as fine particulate matter and ozone resulted in an estimated 5,800 premature deaths in the Province of Ontario in 2005.[43] The OMA also estimated that in 2005, nearly 17,000 Ontarians were admitted to hospitals and nearly 60,000 made emergency room visits for air pollution-related reasons.

II. Transboundary flows of U.S. ozone-causing emissions affect public health and welfare in Ontario

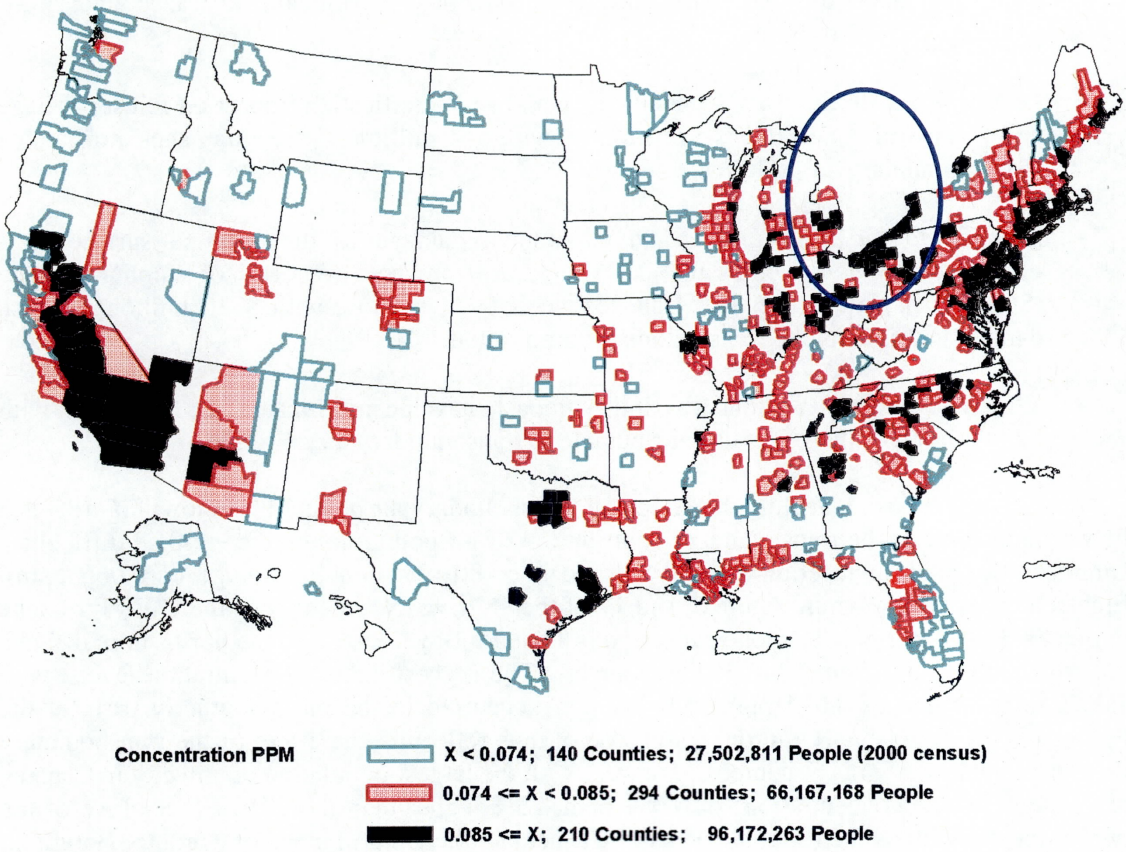
Because of its downwind location, Ontario receives hundreds of thousands of tons of pollution each year that is generated in the U.S. Figure 1 below illustrates how prevailing air flows result in the long-range transport of ozone-causing pollutants from U.S. urban and industrial areas into Ontario and other regions of Eastern Canada.

Figure 1: Significant Amounts of Ontario's Smog Originates in the United States (Source: Shared Air Summit 2006, Jim Young Atmospheric Services Inc.)[44]



EPA's recent data corroborate Ontario's assertion that high levels of ozone-causing pollutants originate across the border in the Ohio Valley and Great Lakes region. In the "Air Quality Characterization" chapter of EPA's *Final Staff Paper* (published in 2007) on ozone, a map illustrating U.S. ozone concentrations demonstrates that many of the counties exceeding the current U.S. standard are located in border areas in the joint Canada-U.S. airshed. In the EPA-originated figure below, almost all of the U.S. counties near the border of Ontario and the city of Toronto show elevated ozone levels, and many of the counties bordering Ontario (circled in the figure) are entirely shaded in black to indicate average ozone levels above 0.085.

Figure 2: Average 4th Highest Daily Maximum 8-hour values in U.S. Counties, 2002-2004 AQS Data[45]



In 2005, a report entitled *Transboundary Air Pollution in Ontario*, prepared by scientists, professional staff, and consultants of the Province's Ministry of the Environment, confirmed the magnitude and the impact of the transboundary contribution to pollution in the Ontario airshed.[46] The report found that at many Ontario locations, the U.S. contribution (excluding background) to ozone levels is as much as 90%.[47] Portions of Ontario receive as much as 77% of their total sulphur and nitrogen deposition from emission sources located in the United States.[48] Most importantly, however, the study showed that each year transboundary pollution in Ontario is attributable to more than 2,700 premature deaths, almost 12,000 hospital admissions, almost 14,000 emergency room visits, and health damages of $3.7 billion.[49]

Ozone and other transboundary air pollutants also have a serious impact on public welfare in Ontario. Areas of environmental damage identified by the Province include:[50]

- *Loss of agricultural productivity*—annual ozone impacts from reduced crop yields total more than $200 million. The share of this damage attributable to transboundary air pollution is $165 million.

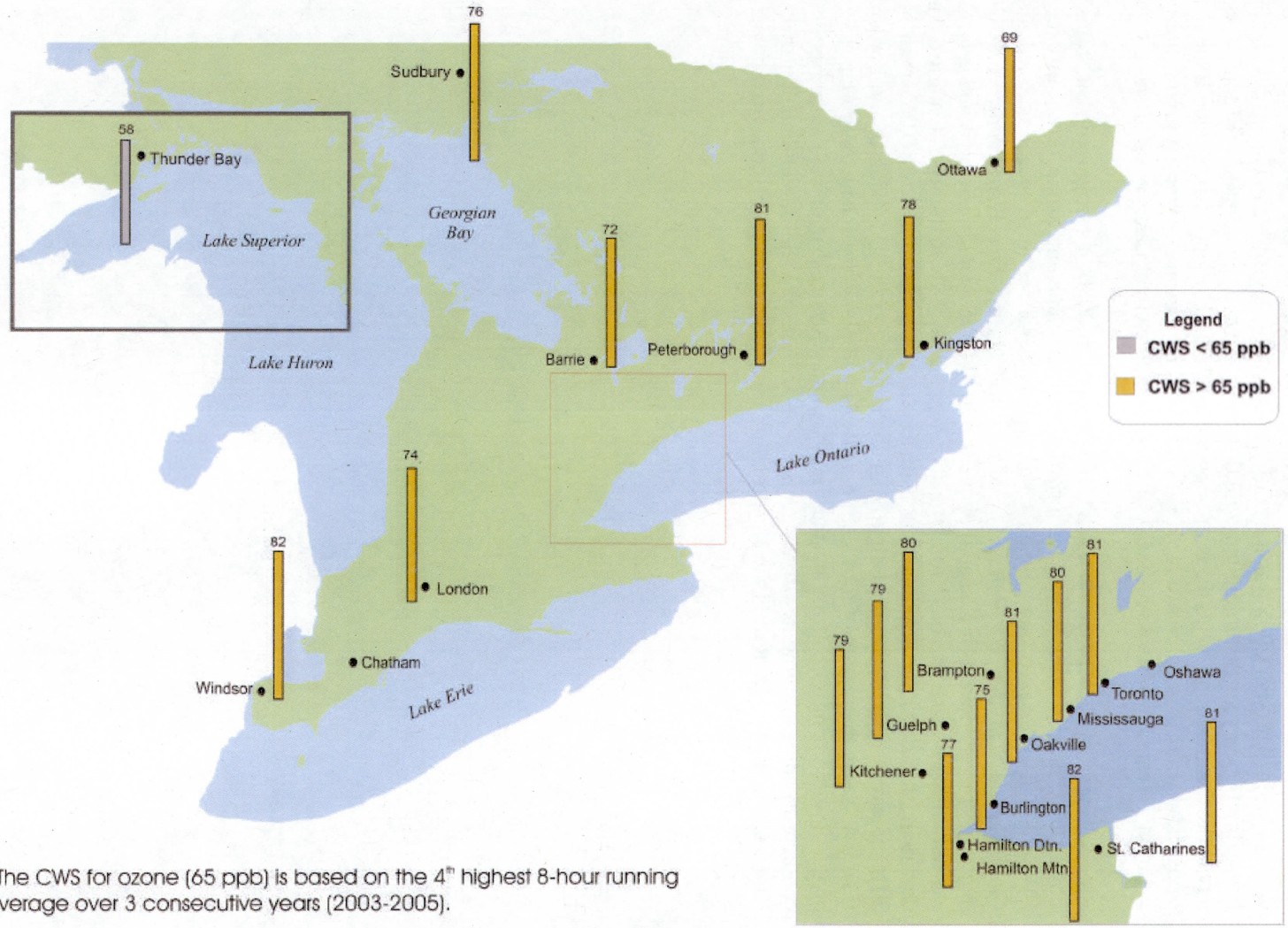
- *Loss of forest productivity*—annual ozone and soil acidification impact on forests, foliage and forest soil conditions is $77 million, with $51 million of these damages attributable to transboundary air pollution.

- *Damage to buildings and structures*—annual damage to the exposed surfaces and materials of Ontario buildings and structures from acid fractions of sulphur dioxide (SO_2), particulate matter (PM) and ozone is $974 million, with $310 million of these damages attributable to transboundary air pollution.

- *Visibility impairment*—annual visibility impacts have been estimated at $1.3 billion, with $779 million of these impacts attributable to transboundary air pollution.

Clearly Ontario is feeling the effects of transboundary air pollution. Below, Figure 3 is a further indication of the transboundary contribution of air pollution and the extreme difficulties Ontario cities face in meeting the CWS for ozone (8-hour running average of 0.065 ppm). Eighteen cities are shown in Figure 3, and 17 of the 18 have exceedances of the CWS for ozone in the 2003-2005 period. The lone exception is Thunder Bay, located on the north shore of Lake Superior, and distant from Ohio Valley sources. The highest ozone concentration levels, with values in the range of 0.074 ppm to 0.082 ppm, occurred in the more southerly parts of the Province, e.g., Windsor, Hamilton, and Toronto, thus reflecting the effect of the transboundary flow of pollutants from U.S. sources. Toronto, with the largest population of any city in Canada, has average ozone concentrations of 0.081 ppm, 25% higher than the 2010 CWS. Five of the twelve most populous metropolitan areas of Canada are the Ontario cities of Toronto, Hamilton, London, Kitchener, and St. Catharines, where ozone concentrations range from 14% to 26% above the 2010 CWS. Each of these Ontario metropolitan areas are close to the U.S. border and are clearly impacted by elevated ozone concentrations attributable in large measure to ozone-causing transboundary pollutants.

Figure 3: Geographical Distribution of Ozone Levels at Designated CWS Sites Across Ontario Based on the CWS for Ozone (2003-2005)



*The CWS for ozone (65 ppb) is based on the 4th highest 8-hour running average over 3 consecutive years (2003-2005).

The trend in the region of exceptionally high levels of pollutants has continued in recent years as well. The year 2005 was a record year for smog advisories in Ontario, with 53 advisory days. In 2006, a year that exhibited a mild summer weather pattern, only 17 total days of smog advisories were issued. In 2007, as of September 6th, the Province has already issued 35 days of smog advisories.[51] As a result, Health Canada is focusing several current transboundary pollution research projects specifically on the vulnerable Great Lakes basin airshed.[52]

When the CCME set the CWS at 0.065 ppm in 2000, it recognized that "transboundary flows" may be the "key driver" in jurisdictions with ambient ozone levels in excess of the CWS.[53] This is exactly the case in Ontario. As described in a recent national assessment, *Canada-wide Standards for Particulate Matter and Ozone: Five Year Report: 2000-2005*, "the majority of ozone levels [in Canada] above the 2010 CWS were in southern and central Ontario, with significant contributions from transboundary flow."[54] In light of Ontario's susceptible downwind location, the Province cannot meet the CWS benchmark of 0.065 ppm in 2010 or 2015 unless there are additional significant reductions on the U.S. side of the border. Below, Figure 4 shows the results of a modeling analysis completed by scientists of Ontario's Ministry of the Environment demonstrating that transboundary sources of ozone-causing pollutants will continue to adversely impact ozone levels in Ontario despite the implementation of U.S. Clean Air Interstate Rule (CAIR) and the closure of the Province's remaining coal-fired power plants in 2014.

Figure 4: Analysis by Ontario Scientists on Impact of CAIR on Ozone Levels in Ontario Communities in 2010 and 2015 (Source: Ontario Ministry of the Environment)

City	2003-2005 ozone levels in ppb (3-year average)[a]	2010		2015	
		Modelled Reduction in %[b]	Projected 2010 ozone levels with CAIR[c]	Modelled Reduction in %	Projected 2015 ozone levels with CAIR[d]
Windsor	82	2.0	80	2.0	80
London	74	3.1	72	8.3	68
Guelph	79	2.4	77	9.0	72
Kitchener	79	3.4	77	9.2	72
Hamilton Downtown	77	0.3	77	4.0	74
Hamilton Mountain	82	1.7	81	6.5	77
St. Catharines	81	2.9	79	8.1	75
Burlington	75	0.3	75	4.0	72
Oakville	81	0.9	80	5.2	77
Brampton	80	-1.1	81	1.7	79
Mississauga	80	-1.1	81	1.7	79
Toronto	81	-1.6	82	0.8	80
Peterborough	81	3.7	78	9.4	74
Kingston	78	4.5	75	10.3	70
Ottawa	69	4.5	66	10.2	61
Barrie	72	3.4	69	8.5	66
Sudbury	76	4.6	73	9.3	69

[a]Ozone concentrations are highly dependent on meteorological conditions.
[b]Negative reductions are a result of ozone scavenging or titration[55]. Reductions in low level NOx emissions can result in less titration in ozone in large urban areas.
[c]Projected 2010 ozone levels include emissions from the four coal-fired power plants in Ontario.
[d]Projected 2015 ozone levels do not include emissions from coal-fired power plants in Ontario. The power plants will not operate after 2014.

Furthermore, Ontario will not be able to meet the CWS for ozone even if EPA adopts an ozone standard between 0.070-0.075 ppm, the current range proposed for the ozone standard. Ministry scientists noted that in 2005, on days when 8-hour maximum ozone concentrations in the 0.070-0.075 ppm range were observed at U.S. air monitoring sites bordering Ontario, there were a number of sites in southwestern Ontario that experienced 8-hour maximum concentrations above the CWS benchmark of 0.065 ppm. Concentrations above the CWS benchmark were also observed in areas from the Niagara Peninsula to the Greater Toronto Area. Although observed 8-hour maximum ozone concentrations in Ontario were much lower on days when U.S. border area concentrations were in the 0.070-0.075 ppm range compared to days with values in the U.S. border areas above 0.084 ppm (current primary ozone standard), data shows that Ontario would still exceed the CWS benchmark for ozone even if a primary ozone standard in the range of 0.070-0.075 ppm were adopted by EPA.

Ontario urges EPA to consider the pivotal impact its ozone rulemaking will have on Ontario's successful attainment of the CWS at any point in the future.

III. Ontario is making progress in implementing an effective program to reduce ozone emissions

Ontario has long-recognized the adverse effects of ozone. Since the 1970s, it has passed regulations and instituted various programs to control ozone-causing emissions as part of an overall Clean Air agenda. In recent years the McGuinty government has acted to eliminate the Province's reliance on coal-burning power plants, created incentives for the production of renewable energy, reduced the overall demand for electric energy among Ontarian consumers, required proper maintenance of vehicles, and promoted rapid transit projects throughout the Province. Ontario has undertaken the following initiatives to further reduce ozone-causing air pollutants, including NO_x and VOCs:

Phase-out of coal-fired power plants

- The McGuinty government has committed to replacing all coal-fired power plants in the Province with new, cleaner generation sources by 2014. The Province has already closed its Lakeview coal-fired power plant (in April 2005), and Premier McGuinty announced at the Shared Air Summit in June 2007 that Ontario's four remaining coal-fired power plants – Thunder Bay, Atitkokan, Lambton and Nanticoke – will close by the end of 2014.

- To that end, on August 24, 2007 the McGuinty government made a regulation under the Environmental Protection Act (Ontario) mandating the closure of the four remaining coal-fired power plants by December 31, 2014. [Appendix A].

- Closure of Ontario's coal-fired power plants will eliminate more than 40,000 tons of nitrogen oxide,[56] improving air quality within the Province, and in neighbouring border and downwind states.

Clean energy

- Ontario is shifting to cleaner, renewable, and less carbon-intensive sources of power that have fewer environmental impacts. To support the phase-out of coal-fired generation in Ontario with cleaner sources, the government has directed the Ontario Power Authority (OPA) to double the amount of renewable electricity capacity, bringing the total to 15,700 megawatts (MW) by 2025.[57]

- Ontario has created a Renewable Standard Offer Program to facilitate the shift to cleaner sources of energy. The Program provides a guaranteed price for electricity produced by small scale wind, biomass, hydroelectric and solar projects. Over 10 years, this could add up to 1,000 MW of renewable energy to Ontario's electricity supply, enough to power 250,000 homes. Under the Program, the OPA will purchase energy produced by wind, biomass or hydroelectric operations at a base price of 11 cents per kilowatt-hour. The fixed price for solar energy will be 42 cents per kilowatt-hour. The first set of SOP contracts was announced by Energy Minister Dwight Duncan on February 27, 2007. At that time, the OPA had issued 22 contracts to purchase power from small-scale generators, representing 140 MW of renewable energy—enough to supply over 30,000 homes.[58] As of July 2007, 78 Standard Offer Contracts have been executed by the OPA, representing over 400 MW of renewable energy.[59]

- On November 14, 2006, Québec and Ontario announced the signing of an agreement between Hydro-Québec TransEnergie and Hydro-One networks for the construction of a new 1,250 MW interconnection.[60] Ontario is also expanding power generation at Niagara Falls, creating enough new clean electricity to power every home in a city twice the size of Niagara Falls.[61]

- On June 20, 2007, the McGuinty government announced a $150 million home retrofit program and solar initiatives for Ontario homeowners. All of the initiatives will be funded through money set aside in the 2007 Ontario Budget. The Home Energy Retrofit Program will provide up to $5000 per home for energy retrofits that include Energy Star qualified furnaces, solar domestic water systems, and insulation. Point of sale retail sales tax exemptions will be provided on Energy Star products purchased, rented, or leased after July 19, 2007 and before July 20, 2008. Premier McGuinty also set a target of 100,000 installed solar systems across Ontario and created a task force of industry experts and market specialists to develop recommendations on how best to achieve this target.[62]

Energy conservation

- As part of its commitment to supporting conservation across Ontario, the government has created a Conservation Bureau and appointed Ontario's first Chief Energy Conservation Officer to lead efforts to build a culture of conservation and energy efficiency in the Province. The Bureau, housed within the Ontario Power Authority, is helping the government meet its target to reduce peak electricity demand growth in Ontario by five per cent by 2007.

- Bill 21, the *Energy Conservation Responsibility Act*, was enacted in February 2006. This legislation allows the government to require, for example, public and broader public sector organizations to prepare energy conservation plans and engage in regular reporting on progress.[63] Additionally, the Province has set targets that will achieve a total of 6,300 MW of electricity demand reduction through conservation by 2025. Of this, 2,700 MW of savings are to be realized by 2010. To achieve these objectives, the McGuinty government has launched programs through the Conservation Bureau that will result in up to 1,300 MW of energy savings by 2010, including:

    - On April 27, 2007, Ontario announced it is investing $24 million over four years to help homeowners conduct energy audits.[64]

    - Also in April 2007, Ontario announced its decision to ban the sale of inefficient light bulbs by 2012. Replacing all 87 million incandescent bulbs in Ontario households with compact florescent light bulbs will save six million megawatt hours annually – enough to power 600,000 homes.[65]

    - Ontario's new Building Code, which was updated in 2006, has the toughest energy-efficiency standards of any building code in Canada. Over the next eight years alone, the Building Code's increased energy-efficiency requirements will save enough energy to power 380,000 homes.[66]

- Ontario has taken a leadership role in promoting conservation at the government level. By the end of this year, Ontario has committed to reducing the government's own energy consumption by 10%, or 62 million kilowatt-hours by the end of this year. The Province already has programs in place that will fulfill two-thirds of this target, such as extensive energy retrofits across the government's real estate portfolio and engaging the government's 62,000 employees in conservation initiatives.[67]

Industry

- Ontario Regulation 194/05, *Industry Emissions – Nitrogen Oxides (NOx) and Sulphur Dioxide*, applies specific nitrogen oxides and sulphur dioxide limits to seven industrial sectors. The seven sectors include non-ferrous smelting, iron and steel, cement, petroleum refining, pulp and paper, glass and carbon black.

Transportation and fuels

- The Ontario government is investing heavily in rapid transit with its *MoveOntario 2020* 12-year building project. Starting in 2008, the Province will build 902 kilometres of new or improved rapid transit reflecting 52 separate initiatives and more than $17.5 billion in investment. The project will result in 800 million new transit trips per year, taking approximately 300 million car trips off Ontario's roads. By 2020, this will reduce carbon dioxide emissions in the Province by 10 megatonnes.[68]

- Ontario's *Drive Clean* program is an illustration of Ontario's efforts to reduce air emissions (pollution from vehicles is the Province's largest single source of smog-causing pollutants). The complementary Vehicle Emissions Enforcement Unit (Smog Patrol) monitors polluting vehicles and since 1998 has conducted more than 41,000 inspections and issued more than 6,500 tickets.[69]

IV. The available health impact data on ozone should convince EPA to adopt a substantially lower standard for ozone

As detailed in Section I, over the past decade studies of ozone health impacts have presented persuasive evidence that elevated ozone concentrations – including levels below the current EPA standard – are associated with respiratory impairment in sensitive sub-populations *and* healthy individuals, with acute cardiovascular events, and even with significant mortality risks. These compelling findings were summarized in the *Air Quality Criteria Document for Ozone* and the EPA *Final Staff Paper* and communicated to EPA in the comments and recommendations of CASAC, and in letters sent by the independent scientific and public health community to EPA during the rulemaking process.[70] Each of these groups – including EPA's own internal staff – found that there is no scientific justification for retaining the current standard of 0.08 ppm. Ontario agrees with this conclusion and urges EPA to adopt a standard for ozone that is at least as stringent as the current CWS of 0.065 ppm.

The Clean Air Scientific Advisory Committee's Ozone Review Panel (CASAC Ozone Panel) has taken a particularly firm stance in its recommendation to EPA of a stricter primary standard than the level advocated by EPA staff. The CASAC Ozone Panel indicated that the *Staff Paper* did not go far enough in urging the Administrator to adopt a substantially lower standard. In its comments to Administrator Johnson on the second and final drafts of the *Staff Paper*, the Panel unanimously recommended a range of 0.060 to 0.070 ppm for the primary ozone NAAQS, a range in line with the CWS for ozone, concluding that:

> "1. There is no scientific justification for retaining the current primary 8-hr NAAQS of 0.08 parts per million (ppm), and
>
> 2. The primary 8-hr NAAQS needs to be substantially reduced to protect human health, particularly in sensitive subpopulations."[71]

The Ozone Panel disagreed with EPA and its staff's determination that the cardiovascular impact data is "inconclusive" and that the mortality effects of ozone require "additional research."[72] Rather, the Panel conceded that "scientific uncertainty does exist with regard to the lower level of ozone exposure that would be fully-protective of human health… it is possible that there is no threshold for an ozone-induced impact on human health and that some adverse events may occur at policy-relevant background."[73] The CASAC Ozone Panel, a group of 24 experts, each of whom holds a doctorate in their field and seven of whom are members of the overall statutory Clean Air Scientific Advisory Committee (CASAC) appointed by Administrator Johnson, determined unanimously that the overall science (including mortality and cardiovascular data) is supportive of a standard in range with the CWS.

The Ozone Panel also noted that the EPA staff's reliance solely on risk assessment data from 12 metropolitan U.S. areas could underestimate the health effects of ozone. One Panel member's individual comments particularly echoed Ontario's concerns with the EPA staff's conclusions: "limiting the analysis of O_3 exposure to 12 major cities may underestimate its impact, as it has been shown that O_3 concentrations downwind of an urban area are often higher than within a city."[74] Evidently, the CASAC Ozone Panel acknowledges the direct downwind effects of ozone on people living outside metropolitan areas – and outside the United States.

The World Health Organization (WHO) has also recognized that new health data, particularly the mortality evidence, suggest ozone is a significant public health threat. In its *Global Update 2005* on air quality guidelines, the WHO characterized the mortality data as showing "convincing, though small, positive associations between daily mortality and ozone levels, independent of the effects of particulate matter. Similar associations have been observed in both North America and Europe." Heavily-weighing the mortality data, the WHO concluded, "there is a good case for reducing the guideline [for ozone] from the existing level of 120 $\mu g/m^3$" (0.060 ppm).[75]

Although EPA staff decided not to consider the cardiovascular and mortality data as conclusive evidence, the staff did recognize that a lower ozone standard is needed to protect public health. In the *Final Staff Paper* on NAAQS for ozone released in January 2007, EPA staff recommended that Administrator Johnson consider a primary standard level within the range of "somewhat below 0.080 ppm to 0.060 ppm."[76] The phrase "somewhat below" is unclear because in risk assessments EPA staff defines 0.074, 0.070, and 0.064 ppm as "representative of levels within the upper, middle, and lower parts of the range, respectively."[77] However, the clear indication is that EPA staff supports a reduction in the current standard:

> "We conclude that the overall body of evidence clearly calls into question the adequacy of the current standard and provides strong support for consideration of an O_3 standard that would provide increased health protection for sensitive groups, including asthmatic children and other people with lung disease, as well as all children and older adults, especially those active outdoors, and outdoor workers, against an array of adverse health effects that range from decreased lung function and respiratory symptoms to serious indicators of respiratory morbidity including ED visits and hospital admissions for respiratory causes, and possibly cardiovascular-related effects and mortality. We also conclude that risks projected to remain upon meeting the current standard, based on the exposure and risk assessment, are indicative of risks to sensitive groups that can reasonably be judged to be important from a public health perspective, which reinforces our conclusion that consideration should be given to revising the level of the standard so as to provide increased public health protection [emphasis added]."[78]

To support its position that a standard below 0.070 ppm is not currently necessary to adequately protect public health, EPA has focused on the *Staff Paper's* assertion that certain data is inconclusive. In its July 11, 2007 Federal Register notice on the proposed rulemaking for ozone, EPA did not accept the available mortality and cardiovascular data, and decided that the

scientific evidence regarding health effects at ozone levels below the current standard is too "limited:"

> "Although the Administrator takes notes of the very limited new evidence of lung function decrements and respiratory symptoms in some healthy individuals at the 0.060 ppm exposure level, he judges this evidence too limited to support a primary focus at this level… the Administrator also judges that there is only quite limited evidence from clinical studies at exposure levels below 0.080 ppm O_3… the evidence of a causal relationship between adverse health outcomes and O_3 exposures becomes increasingly uncertain at lower levels of exposure."[79]

The Administrator invited comment on whether it would be appropriate to retain the existing standard and delay considering revisions to the 8-hour standard until the next NAAQS review, "when a more complete body of information is expected to be available."[80] Ontario believes the available data already shows a scientifically-supportable causal connection between ozone and health impacts, and does not believe that EPA should postpone more aggressive action on ozone.

Ontario reiterates the comments of CASAC and the public health community in asserting that the compelling scientific evidence has not been given enough weight by EPA in its new proposal for ozone NAAQS, especially in view of the EPA obligation to set a health-protective standard with an adequate margin of safety. EPA's actions with respect to the available science are particularly significant to Ontario, given its downwind location from U.S. cities with high ozone levels identified as "risk areas" by EPA (e.g. Detroit, Chicago, Cincinnati, and St. Louis). As concluded by the CCME in its *Five Year Report* on the CWS for ozone, "any reduction in the ambient levels [of ozone] provides a reduction in population health risk" [emphasis added].[81] The achievable public health benefits demonstrated by strong scientific evidence formed the basis for setting Canada's CWS at 0.065 ppm in 2000. The recent scientific findings outlined in Section I serve only to reinforce a standard in this lower range, and the CWS for ozone will be reviewed again by the end of year 2010 to assess the need to revise the standards for target years beyond 2015.[82] The CCME will address the newest scientific data and heavily weigh these findings in its decision. Furthermore, the WHO's reasoning for setting a recommended standard at 0.050 ppm will be taken into account in this process. The CCME considers both health and socioeconomic factors in its analysis. It is noteworthy that despite the additional costs of achieving a standard of 0.065 ppm, the CCME still agreed upon that standard in 2000.

Ontario believes that the scientific consensus clearly justifies a standard below the 0.070 ppm level. The CASAC Ozone Panel strongly recommends a level below 0.070 ppm. Public health organizations such as the American Lung Association and the Children's Health Protection Advisory Committee (CHPAC) have written letters to EPA recommending a standard well below 0.070 ppm. Below, Figure 5 shows that many of the jurisdictions in the developed world have already adopted an ozone standard well below 0.070 ppm. Canada, a neighbouring jurisdiction, found overwhelming epidemiological and clinical evidence to support a CWS of 0.065 ppm almost a decade ago.

Figure 5: Ozone Ambient Air Quality Standards in Various OECD Nations, the European Union and the WHO Ozone Guideline[83]

Country	Air Quality Standard ppb	Averaging Time
Canada Ontario [84]	65	8 hr
Austria [85]	55	8 hr
Australia [86]	80	4hr
European Union (EU) [87]	60	8hr
Japan [88]	60	1 hr
Netherlands [89]	60	8 hr
Sweden [90]	60	8 hr
Switzerland[91]	60	1 hr
United Kingdom[92]	50	8 hr
United States[93]	80 (84)	8 hr
California, U.S.[94]	70	8 hr
World Health Organization (WHO)[95]	50	8 hr

For these reasons, Ontario respectfully urges EPA in its final rulemaking for ozone to confront this public health issue head-on by setting a standard that is at least as protective as the current CWS. The agency has a historic opportunity to demonstrate leadership in putting an aggressive ozone policy into effect that will benefit both Americans and Ontarians.

In regard to setting a secondary standard for ozone, Ontario encourages EPA to carefully consider the cumulative and downwind environmental effects of ozone on rural U.S. areas and other jurisdictions such as our own. While Canada does not utilize a separate secondary standard for ozone, the 0.065 ppm standard was viewed as sufficiently protective of both public health and the environment. Ontario wishes to emphasize that the current Canadian CWS of 0.065 ppm provides greater protection to vegetation and agriculture than EPA's proposal. As discussed in a 2005 CWS update for the CCME, "while the current CWS does provide some protection of ecosystems and vegetation, there is more and stronger evidence to support the introduction of a longer-term ozone CWS, based on the need to protect ecosystems (particularly vegetation, including some crops) from harmful effects."[96] We therefore note that a separate, more stringent secondary standard in the U.S. will help protect all ecosystems that are exposed to the cumulative effects of ozone during each hour of the day. We view such an increase in stringency as favourable to the welfare of both the U.S. and Canadian environment.

Finally, as to the technical issue of the U.S. convention of rounding the ozone standard down to the nearest hundredth ppm, we concur with EPA on specifying the level of the primary

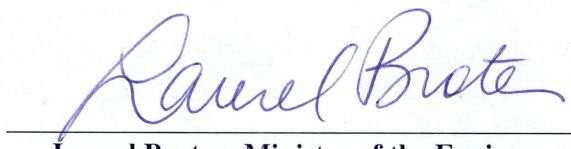
standard to the nearest thousandth ppm. This reflects the "degree of precision with which ambient O_3 concentrations can be measured" and prevents U.S. counties from continuing the current practice of rounding the standard to a higher effective level.[97] Ontario has specified its primary standard to the thousandth ppm for many years due to the advanced technology available at Canada's monitoring systems. The National Air Pollution Surveillance Network (NAPS Network), established in 1969 as a collaboration of federal, provincial, and municipal monitoring agencies, currently operates over 152 pollution monitoring stations in 55 cities in the ten provinces and two territories in Canada.[98] The NAPS Network allows for continuous collection of air quality data to enable studies of regional ozone episodes, annual reports of overall trends, and comparisons of ozone levels across locales. The U.S. also has a national, interagency network of ozone monitors (AIRNow), to which Environment Canada contributes data. There is little doubt that most U.S. monitors have been capable for some time of implementing a thousandth ppm standard. Thus, we are pleased that EPA proposes to adopt a more precise standard for measuring ozone.

V. A more stringent EPA standard for ozone would be consistent with the air quality protections that exist under international law and the Canada-U.S. Air Quality Agreement.

Ontario believes that, in setting its NAAQS for ozone, EPA should take into account whether the NAAQS is consistent with U.S. obligations under international law, the Foreign Relations Law of the United States, as well the current bilateral air quality agreement. In a long line of precedent, stretching back to the landmark *Trail Smelter* case[99] and continuing through Principle 21 of the Stockholm Declaration, it has been widely accepted in international law that "[S]tates have … the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."[100] This same principle has been incorporated in the Foreign Relations Law of the United States through the Third Restatement, as well as the Rio Declaration on Environment and Development in 1992.[101] Ontario believes that the compelling body of scientific evidence demonstrates that an ozone standard in EPA's proposed range of 0.070 ppm – 0.075 ppm would continue to cause significant adverse health and welfare effects both in the U.S. and Canada. A more stringent ozone standard within the range of 0.060-0.070 ppm, as recommended by CASAC, and consistent with the CWS of 0.065 ppm, would be more closely aligned with Principle 21, the U.S. Restatement and the goals of the Canada-U.S. Air Quality Agreement.

Conclusion

For the reasons stated above, Ontario respectfully urges EPA to reconsider its position on the proposed standard for ozone, and to adopt a primary standard no less stringent than 0.065 ppm, averaged over eight hours. Ontario also urges the U.S. to tighten its secondary standard to a comparable level of stringency. Dozens of scientific studies conducted over the past 10 years by international organizations, respected health and environmental groups, and EPA's own scientists have documented the adverse health and public welfare effects associated with current ozone levels. A more stringent NAAQS will reduce the impacts of ozone on the health and welfare of the 12 million people who live in Ontario, as well as millions more who suffer from high ozone levels on the U.S. side of the border.



Laurel Broten, Minister of the Environment

U.S. Counsel:
Richard A. Wegman
Harold G. Bailey, Jr.
Garvey Schubert Barer
5th Floor, Flour Mill Building
1000 Potomac Street NW
Washington DC 20007

Canadian Counsel:
John C. Turchin
Risa Schwartz
Ministry of the Attorney General
Legal Services Branch (Environment)
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Appendix A

ONTARIO REGULATION 496/07

made under the

ENVIRONMENTAL PROTECTION ACT

Made: August 22, 2007
Filed: August 24, 2007
Published on e-Laws: August 27, 2007
Printed in *The Ontario Gazette*: September 8, 2007

CESSATION OF COAL USE — ATIKOKAN, LAMBTON, NANTICOKE AND THUNDER BAY GENERATING STATIONS

Cessation of coal use at certain generating stations

1. (1) The owner and the operator of each of the following generating stations shall ensure that coal is not used to generate electricity at the generating station after December 31, 2014:

1. Atikokan Generating Station, located on Highway 622 in the Township of Atikokan.
2. Lambton Generating Station, located on St. Clair Parkway in the Township of St. Clair.
3. Nanticoke Generating Station, located on Regional Road 55 South in Haldimand County.
4. Thunder Bay Generating Station, located on 108th Avenue in the City of Thunder Bay.

(2) Subsection (1) applies in respect of each generating station named in that subsection even if the generating station's name or ownership changes.

Commencement

2. This Regulation comes into force on the day it is filed.

ENDNOTES

[1] See Ontario Ministry of the Environment, *Transboundary Air Pollution in Ontario*, June 2005. http://www.ene.gov.on.ca/envision/techdocs/5158e_index.htm at 59, 60. The Ontario Report considered the impacts of two air pollutants, ozone and fine particulate matter, in the parts of Ontario most impacted by transboundary air pollution from the United States.

[2] *See* Environment Canada, National Ambient Air Quality Objectives for Ground Level Ozone, Summary Science Assessment Document (SAD), July 1999; http://www.hc-sc.gc.ca/ewh-semt/pubs/air/naaqo-onqaa/ground_level_ozone_tropospherique/summary-sommaire/index_e.html

[3] Bates, David. Ambient ozone and mortality. *Epidemiology*, Vol. 16, No. 4, pp 427-429, July 2005.

[4] Tager IB, Balmes, Lurmann F, Ngo L, Alcorn S, and Küenzli. Chronic Exposure to Ambient Ozone and Lung Function in Young Adults. *Epidemiology* 2005; 16:751-759.

[5] Medina-Ramon M, Zanobetti A, Schwartz J. The effect of ozone and PM10 on hospital admissions for pneumonia and chronic obstructive pulmonary disease: a national multicity study. *Am J Epidemiol* 2006;163: 579-588.

[6] *Id.* Abstract available at http://aje.oxfordjournals.org/cgi/content/abstract/163/6/579

[7] Children's Health Protection Advisory Committee to EPA, Letter to Administrator Johnson Re: "Review of the NAAQS for Ozone: Policy Assessment of Scientific and Technical Information," March 23, 3007, available at: http://www.cleanairstandards.org/wp-content/uploads/2007/04/chpac-letter-to-johnson-3232007.pdf; Friedman MS, Powell, KE, Hutwagner L, Graham LM, Teague WG. Impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma. *JAMA* 2001 Feb 21; 285(7):897-905; Jaffe, DH, Singer ME, Rimm AA. Air Pollution and emergency department visits for asthma among Ohio Medicaid recipients, 1991 – 1996. *Environ Res.* 2003 Jan; 91(1):21-8;Tolbert PE, Mulholland JA, MacIntosh DL, Xu F, Daniels D, Devine OJ, Carlin BP, Klein M, Dorley J, Butler AJ, Nordenberg DF, Frumkin H, Ryan PB, White MC. Air quality and pediatric emergency room visits for asthma in Atlanta, Georgia, USA. *Am J Epidemiol* 2000; 151:798-810.

[8] Friedman MS, Powell, KE, Hutwagner L, Graham LM, Teague WG. Impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma. *JAMA* 2001 Feb 21; 285(7):897-905; Jaffe, DH, Singer ME, Rimm AA. Air Pollution and emergency department visits for asthma among Ohio Medicaid recipients, 1991 – 1996. *Environ Res.* 2003 Jan; 91(1):21-8;Tolbert PE, Mulholland JA, MacIntosh DL, Xu F, Daniels D, Devine OJ, Carlin BP, Klein M, Dorley J, Butler AJ, Nordenberg DF, Frumkin H, Ryan PB, White MC. Air quality and pediatric emergency room visits for asthma in Atlanta, Georgia, USA. *Am J Epidemiol* 2000; 151:798-810.

[9] Gilliland FD, Berhane K, Rappaport EB, Thomas DC, Avol E, Gauderman WJ, London SJ, Margolis HG, McConnell R, Islam KT, Peters JM. The effects of ambient air pollution on school absenteeism due to respiratory illnesses. *Epidemiology* 2001; 12:43-53.

[10] *Id.* Abstract available at http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=11138819&dopt=AbstractPlus

[11] *Id.*

[12] American Lung Association et al., Letter to Administrator Johnson Re: "Science Review Compels Stricter NAAQS for Ozone," April 16, 2007, available at: http://www.cleanairstandards.org/wp-content/uploads/2007/04/ltr-from-public-health-environ-groups-on-ozone-naaqs-04-16-07.pdf; Mudway IS, Kelly FJ. An investigation of inhaled ozone dose and the magnitude of airway inflammation in healthy adults. *Am J Respir Crit Car Med* 2004; 169: 1089-1095; Horstman DH, Folinsbee LJ, Ives PJ, Abdul-Salaam S, McDonnell WF. Ozone Concentration and pulmonary response relationships for 6.6-hour exposures with five hours of moderate exercise to 0.08, 0.10, and

0.12 ppm. *Am Rev Respir Dis* 1990; 142:1158-1163; McDonnell WF, Kehrl HR, Abdul-Salaam S, Ives PJ, Folinsbee LJ, Devlin RB, O'Neil JJ, Horstman DH. Respiratory response of humans exposed to low levels of ozone for 6.6 hours. *Arch Environ Health* 1991; 46:145-150.

[13] American Lung Association et al., Letter to Administrator Johnson Re: "Science Review Compels Stricter NAAQS for Ozone," April 16, 2007, available at: http://www.cleanairstandards.org/wp-content/uploads/2007/04/ltr-from-public-health-environ-groups-on-ozone-naaqs-04-16-07.pdf; Adams WC. Comparison of chamber 6.6h exposures to 0.04-0.08 ppm ozone via square-wave and triangular profiles on pulmonary responses. *Inhal Toxicol* 2006; 18:127-136.

[14] CASAC, Letter to Administrator Johnson Re: "Clean Air Scientific Advisory Committee's (CASAC) Peer Review of the Agency's 2nd Draft Ozone Paper," October 24, 2006, available at: http://www.epa.gov/sab/panels/casacorpanel.html.

[15] Fanucchi MV, Plopper CG, Evans MJ, Hyde DM, Van Winkle LS, Gershwin LJ, Schelegle ES. Cyclic exposure to ozone alters distal airway development in infant rhesus monkeys. *Am J Physiol Lung Cell Mol Physiol* 2006; 291: L644-50; Children's Health Protection Advisory Committee to EPA, Letter to Administrator Johnson Re: "Review of the NAAQS for Ozone: Policy Assessment of Scientific and Technical Information," March 23, 3007, available at: http://www.cleanairstandards.org/wp-content/uploads/2007/04/chpac-letter-to-johnson-3232007.pdf.

[16] American Lung Association, "2005 Research Highlights: Health Effects of Particulate Matter and Ozone Air Pollution," 30 January 2006, available at: http://www.cleanairstandards.org/wp-content/uploads/2006/01/1322005-2005-health-studie.pdf.; Triche EW, Gent JF, Holford TR, Belanger K, Bracken MB, Beckett WS, Laeher L, McSharry J-E, Leaderer BP. Low-Level Ozone Exposure and Respiratory Symptoms in Infants. *Environ Health Perspect* 2006. Published online 29 December 2005. doi: 10.1289/ehp.8559, available at: http://ehp.niehs.nih.gov/members/2005/8559/8559.pdf

[17] Tager IB, Balmes, Lurmann F, Ngo L, Alcorn S, and Küenzli. Chronic Exposure to Ambient Ozone and Lung Function in Young Adults. *Epidemiology* 2005; 16:751-759.

[18] American Lung Association, "2005 Research Highlights: Health Effects of Particulate Matter and Ozone Air Pollution," 30 January 2006, available at: http://www.cleanairstandards.org/wp-content/uploads/2006/01/1322005-2005-health-studie.pdf

[19] American Lung Association, "2005 Research Highlights: Health Effects of Particulate Matter and Ozone Air Pollution," 30 January 2006, available at: http://www.cleanairstandards.org/wp-content/uploads/2006/01/1322005-2005-health-studie.pdf. Ruidavets J-B, Cournot M, Cassadou S, Giroux M, Meybeck M, Ferrières. Ozone Air Pollution is Associated with Acute Myocardial Infraction. *Circulation* 2005; 111:563-569. http://circ.ahajournals.org/cgi/content/abstract/111/5/563

[20] American Lung Association, "2005 Research Highlights: Health Effects of Particulate Matter and Ozone Air Pollution," 30 January 2006, available at: http://www.cleanairstandards.org/wp-content/uploads/2006/01/1322005-2005-health-studie.pdf. Rich DQ, Mittleman MA, Link MS, Schwartz J, Luttmann-Gibson H, Catalano PJ, Speizer FE, Gold DR, and Dockery DW. Increased Risk of Paroxysmal Atrial Fibrillation Episodes Associated with Acute Increases in Ambient Air Pollution. *Environ Health Perspec* 2006; 114:120-123, available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1332666

[21] Park SK et al. Effects of air pollution on heart rate variability: the VA normative aging study. *Environmental Health Perspectives*, 2005, 113:304-309; abstract at http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=Retrieve&db=PubMed&list_uids=15743719&dopt=Citation; *see also* World Health Organization, WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. *Global update 2005,* p 316, summary and report available at: http://www.who.int/phe/health_topics/outdoorair_aqg/en/index.html

[22] Bell ML, McDermott A, Zeger SL, Samet JM, Dominici F. Ozone and short-term mortality in 95 US urban communities, 1987-2000. *JAMA* 2004; 292:2372-2378. Bell, Michelle L. "Mortality Effects of Ozone." Testimony to the U.S. Senate Committee on Environment & Public Works, Subcommittee on Clear Air and Nuclear Safety. 11 July 2007.

[23] Gryparis A, Forsberg B, Katsouyanni K, Analitis A, Touloumi G, Schwartz J, Samoli E, Medina S, Anderson HR, Niciu EM, Wichmann E, Kriz B, Kosnik M, Skorkovsky J, Vonk JM, Dortbudak Z. Acute effects of ozone on mortality from the "Air Pollution and Health: A European Approach" project. *Am J Respir Crit Care Med* 2004;170:1080 -1087. Abstract available at: http://ajrccm.atsjournals.org/cgi/content/abstract/170/10/1080

[24] Schwartz J. How sensitive is the association between ozone and daily deaths to control for temperature? Am J Resp Crit Care Med 2005; 171: 627- 631; Huang Y, Dominici F, Bell ML. Bayesian hierarchical distributed lag models for summer ozone exposure and cardio-respiratory mortality. *Environmetrics* 2005; 16: 547-562.

[25] Bates DV. Ambient Ozone and Mortality. *Epidemiology* 2005; 16:427-429, available at:
Bell ML, Dominici F, and Samet JM. A Meta-Analysis of Time-Series Studies of Ozone and Mortality with Comparison to the National Morbidity, Mortality, and Air Pollution Study. *Epidemiology* 2005; 16:436-445, available at: http://www.bepress.com/jhubiostat/paper57/
Goodman SN. The Methodologic Ozone Effect. *Epidemiology* 2005; 16:430-435.
Ito K, De Leon SF, Lippmann M. Associations Between Ozone and Daily Mortality: Analysis and Meta-Analysis. *Epidemiology* 2005; 16:446-429.
Levy JI, Chermerynski SM, Sarnat JA. Ozone Exposure and Mortality: An Empiric Bayes Metaregression Analysis. *Epidemiology* 2005: 16:458-468.

[26] U.S. Environmental Protection Agency. *Air Quality Criteria for Ozone and Related Photochemical Oxidants* (Final). Washington, DC, EPA/600/R-05/004aB-cB, 2006, available at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=149923

[27] Bell ML, Peng RD, Dominici F. The Exposure-Response Curve for Ozone and Risk of Mortality and the Adequacy of Current Ozone Regulations. *Environ Health Perspec* 2006;114:532 -536.

[28] Bell, Michelle L. "Mortality Effects of Ozone." Testimony to the U.S. Senate Committee on Environment & Public Works, Subcommittee on Clear Air and Nuclear Safety. 11 July 2007.

[29] From this point forward, these comments will express the CWS of 65 ppb in terms of parts per million (ppm).

[30] *See* p. S-63, Environment Canada, National Ambient Air Quality Objectives for Ground Level Ozone, Summary Science Assessment Document (SAD), July 1999; available at: http://www.hc-sc.gc.ca/ewh-semt/pubs/air/naaqo-onqaa/ground_level_ozone_tropospherique/summary-sommaire/index_e.html

[31] SAD p. S-17.

[32] SAD p. S-18.

[33] *Id.*.

[34] SAD p. S-15

[35] SAD p. S-16

[36] *Id.*

[37] Regulation 872/74, *Ontario Gazette*, November 30, 1974, p. 4739.

[38] *Canada-wide Standards for Particulate Matter and Ozone: Five Year Report: 2000-2005*, Canadian Council of Ministers of the Environment, November 2006, http://www.ccme.ca/assets/pdf/pm_oz_2000_2005_rpt_e.pdf

[39] SAD p. S-50.

[40] *See* p. 17 of the CWS Five Year Report. http://www.ccme.ca/assets/pdf/pm_oz_2000_2005_rpt_e.pdf

[41] *See* Figure 3 on page 11.

[42] *See* Ontario Medical Association (OMA), *The Illness Costs of Air Pollution (2005 ICAP)* (June 2005), pp. 6-7, http://www.oma.org/Health/Smog/index.asp. The 2005 ICAP Report considered the impacts of five air pollutants (ozone, fine particulate matter, sulphur dioxide, nitrogen dioxide and carbon monoxide) on all areas of the Province. This website also contains the Medical Association's previous report on *the Illness Costs of Air Pollution* from the year 2000, as well as a 2001 report entitled *Ontario's Air: Years of Stagnation.*

[43] Premature deaths have been measured by the OMA on the basis of exposure to smog. *See* OMA, *The Illness Costs of Air Pollution: 2005-2026 Health and Economic Damage Estimates* (June 2005), p. 2.

[44] The background levels shown in Figure 2 represent the ambient air pollution from background and from sources in the United States. Dr. Young is a member of the Advisory Committee on Transboundary Science.

[45] *Review of National Ambient Air Quality Standards for Ozone Final Staff Paper*, Environmental Protection Agency, July 2007, p.2-21, available at:
http://www.epa.gov/ttn/naaqs/standards/ozone/data/2007_07_ozone_staff_paper.pdf

[46] See Ontario Ministry of the Environment, *Transboundary Air Pollution in Ontario*, June 2005. http://www.ene.gov.on.ca/envision/techdocs/5158e_index.htm at 13, 38, 55.

[47] *Id.* at 13, 15. Background levels are estimated to be from 33 to 40 parts per billion in summer.

[48] *Id.* at 38, 111-113.

[49] *Id.* at 59, 60.

[50] *Id.* at 60-72.

[51] *See* http://www.airqualityontario.com/press/smog_advisories.cfm

[52] *Ibid,* pp. 46-47. Great Lakes Basin Airshed research studies include the "Windsor Children's Respiratory Health Study," the "Windsor Exposure Assessment Study," the "Long-term Exposure to Air Pollutants and Mortality and Morbidity Rates including Cancer," and "Cardiovascular Effects of Air Pollution on Diabetic Patients," the results of which indicate that particulate air pollution may be linked to an impaired cardiovascular function in diabetic patients.

[53] See p. 15, *Canada-wide Standards for Particulate Matter and Ozone: Five Year Report: 2000-2005*, Canadian Council of Ministers of the Environment, November 2006,
http://www.ccme.ca/assets/pdf/pm_oz_2000_2005_rpt_e.pdf

[54] p. 10, *Canada-wide Standards for Particulate Matter and Ozone: Five Year Report: 2000-2005*, Canadian Council of Ministers of the Environment, November 2006,
http://www.ccme.ca/assets/pdf/pm_oz_2000_2005_rpt_e.pdf

[55] Reid, Neville. A Review of Background Ozone in the Troposphere. 2007, pp. 3. It is not at all uncommon, notably in highly urbanized areas, for a reduction in NOx emissions to lead to a local increase in ozone concentrations. This happens because emissions of NOx in such areas can react with ozone already present, leading

to reduction in concentration, a phenomenon generally referred to as ozone scavenging or titration. However, concentrations of ozone further downwind will increase as a result of the increased NOx emissions. If the emissions of NOx are then reduced there will be less reaction, leaving more ozone in the local atmosphere, though the overall effect beyond the local area will probably be a reduction in ozone concentration.

[56] Ontario Power Generation, *Sustainable Development Report* (2004), http://www.opg.com/pdf/Sustainable%20Development%20Reports/Sustainable%20Development%20Report%202004.pdf

[57] *The McGuinty Government's Environmental Accomplishments and Commitments,* June 18, 2007, http://www.premier.gov.on.ca/news/Product.asp?ProductID=1398.

[58] *See* Ontario Power Authority, News, *McGuinty Government Strengthens Energy System with More Green Power:* Standard Offer Program Boosts Wind, Solar, Bio-Mass, and Water Power (February 27, 2007), http://www.powerauthority.on.ca/Page.asp?PageID=376&ContentID=5183&SiteNodeID=134&BL_ExpandID=.

[59] *Id.*

[60] *See* Ministry of Energy, News Release, *Quebec and Ontario sign an historic agreement for construction of a new transmission interconnection* (November 14, 2006), http://ogov.newswire.ca/ontario/GPOE/2006/11/14/c4219.html?lmatch=&lang=_e.html.

[61] *The McGuinty Government's Environmental Accomplishments and Commitments*, June 18, 2007 http://www.premier.gov.on.ca/news/Product.asp?ProductID=1398.

[62] *See* Office of the Premier, News Release, *Helping Ontarians Go Green and Get Green at Home* (June 20, 2007), http://www.premier.gov.on.ca/news/Product.asp?ProductID=1409. See *also* Go Green Ontario, *Incentives,* http://www.gogreenontario.ca/incentives.php. See also Tyler Hamilton, *Solar Energy Continues to Gain Steam,* Toronto Star (June 25, 2007) at http://www.thestar.com/Business/article/228987.

[63] Ministry of the Environment Fact Sheet, *Ontario takes action on Clean Air and Climate Change*, June 26, 2006, http://www.ene.gov.on.ca/en/news/2006/062602fs.pdf See also Bill 21, Energy Conservation Responsibility Act, 2006 http://www.ontla.on.ca/web/bills/bills_detail.do?locale=en&BillID=291.

[64] *See* Ministry of Energy, News Release, *McGuinty Government Helps Homeowners Fight Climate Change* (April 27, 2007), http://www.energy.gov.on.ca/index.cfm?fuseaction=english.news&body=yes&news_id=150.

[65] *See* Ministry of Energy, News Release, *McGuinty Government to Ban Inefficient Light Bulbs by 2012* (April 18, 2007), http://www.energy.gov.on.ca/index.cfm?fuseaction=english.news&body=yes&news_id=148.

[66] *See* Ministry of Municipal Affairs and Housing, *Energy Efficiency in the 2006 Building Code,* http://www.mah.gov.on.ca/Page681.aspx.

[67] Ministry of the Environment Fact Sheet, *Ontario takes action on Clean Air and Climate Change*, June 26, 2006, http://www.ene.gov.on.ca/en/news/2006/062602fs.pdf.

[68] *See* Office of the Premier, News Release, *McGuinty Government Action Plan for Rapid Transit Will Move the Economy Forward* (June 15, 2007), http://www.premier.gov.on.ca/news/Product.asp?ProductID=1383.

[69] *Canada-United States Air Quality Agreement*: *Progress Report 2006*, p. 16.

[70] *Se, e.g,,* American Lung Association et al., Letter to Administrator Johnson Re: "Science Review Compels Stricter NAAQS for Ozone," April 16, 2007, available at: http://www.cleanairstandards.org/wp-content/uploads/2007/04/ltr-from-public-health-environ-groups-on-ozone-naaqs-04-16-07.pdf; Children's Health Protection Advisory Committee to EPA, Letter to Administrator Johnson Re: "Review of the NAAQS for Ozone:

Policy Assessment of Scientific and Technical Information," March 23, 3007, available at: http://www.cleanairstandards.org/wp-content/uploads/2007/04/chpac-letter-to-johnson-3232007.pdf.

[71] CASAC, Letter to Administrator Johnson Re: "Clean Air Scientific Advisory Committee's (CASAC) Peer Review of the Agency's 2nd Draft Ozone Paper," October 24, 2006, available at: http://www.epa.gov/sab/panels/casacorpanel.html.

[72] 72 Fed. Reg. 37818, July 11, 2007.

[73] CASAC, Letter to Administrator Johnson Re: "Clean Air Scientific Advisory Committee's (CASAC) Peer Review of the Agency's 2nd Draft Ozone Paper," October 24, 2006, available at: http://www.epa.gov/sab/panels/casacorpanel.html.

[74] *Id.* Dr. Barbara Zielinska, "Comments on the Ozone Final Staff Paper, Chapter 6: Staff Conclusions and Recommendations on the Primary O_3 NAAQS."

[75] World Health Organization. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. *Global update 2005,* p. 324. Summary of risk assessment available at: http://www.who.int/phe/health_topics/outdoorair_aqg/en/index.html

[76] *Review of National Ambient Air Quality Standards for Ozone Final Staff Paper,* p. 6-86.

[77] *Id.*

[78] *Id.*

[79] 72 Fed. Reg. 37878 – 37880, July 11, 2007.

[80] *Id* , p. 37882.

[81] p. 3, *Canada-wide Standards for Particulate Matter and Ozone: Five Year Report: 2000-2005*, Canadian Council of Ministers of the Environment, November 2006, http://www.ccme.ca/assets/pdf/pm_oz_2000_2005_rpt_e.pdf.

[82] Terms of Reference: PM & Ozone CWS Review Coordinating Committee, May 1, 2007, at http://www.ccme.ca/assets/pdf/pmorcc_tor_e.pdf.

[83] Unless otherwise indicated, where values for a jurisdiction were given only in $\mu g/m^3$, the following conversion factor was used: 1 $\mu g/m^3 \approx 0.5$ ppb, based on normal conditions at 25°C and 760 mm Hg.

[84] http://www.ccme.ca/assets/pdf/pmozone_standard_e.pdf

[85] http://www.umweltbundesamt.at/en/umweltkontrolle/ukb2004/

[86] Reid, N. (2007), A Review of Background Ozone in the Troposphere, Ontario Ministry of the Environment

[87] http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l_067/l_06720020309en00140030.pdf

[88] http://www.env.go.jp/en/air/aq/aq.html
[89] http://www.mnp.nl/mnc/i-en-0237.html

[90] http://www.miljomal.nu/english/obj2.php

[91] http://www.bafu.admin.ch/luft/00632/00634/index.html?lang=en#sprungmarke3_23

[92] http://www.airquality.co.uk/archive/standards.php

[93] http://www.epa.gov/ttn/naaqs/standards/ozone/s_o3_index.html

[94] http://www.arb.ca.gov/newsrel/nr042805.htm

[95] http://whqlibdoc.who.int/hq/2006/WHO_SDE_PHE_OEH_06.02_eng.pdf

[96] *Report to the Canadian Council of Ministers of the Environment: An Update in Support of the Canada-wide Standards for Particulate Matter and Ozone.* Joint Action Implementation Coordinating Committee (JAICC), February 2005. Available at http://www.ccme.ca/assets/pdf/pm_o3_update_2005_e.pdf.

[97] 72 Fed. Reg. 37882.

[98] *See* NAPS Network, http://www.etc-cte.ec.gc.ca/NAPS/naps_summary_e.html

[99] 35 Am. J. Int'l. L. 684 (1941).

[100] 11 I.L.M. 1416, 1420.

[101] Restatement of the Foreign Relations Law of the United States, Third § 601. *See also* Principle 2 of the Rio Declaration on Environment and Development, June 13, 1992, U.N. Doc. A/CONF. 151/5 rev. 1, 31 I.L.M. 874.

THIS PAGE INTENTIONALLY LEFT BLANK

Table 7-7: Illustrative Strategy to Attain 0.065 ppm: Estimated Annual Reductions in the Incidence of Morbidity Associated with Ozone Exposure (Incremental to Current Ozone Standard, 95% Confidence Intervals in Parentheses)[A,B]

Morbidity Endpoint	*National Modeled Partial Attainment*	*National Rolled Back Full Attainment*
Hospital Admissions (ages 0-1)	700 (310--1,100)	2,700 (1,300--4,000)
Hospital Admissions (ages 65-99)	420 (-190--1,100)	3,200 (74--6,200)
Emergency Department Visits, Asthma-Related[C]	550 (-57--1,500)	1900 (-130--5,500)
School Absences	300,000 (77,000--560,000)	1,100,000 (320,000--1,800,000)
Minor Restricted Activity Days	810,000 (350,000--1,300,000)	2,900,000 (1,300,000--4,400,000)

[A] All estimates rounded to two significant figures. As such, confidence intervals may not be symmetrical and totals will not sum across columns.

[B] This table reflects full attainment in all locations of the U.S. except two areas of California. These two areas, which have high levels of ozone, are not planning to meet the current standard until after 2020. The estimates in the table do not reflect benefits for the San Joaquin and South Coast Air Basins.

[C] The negative 5th percentile incidence estimates for this health endpoint are a result of the weak statistical power of the study and should not be inferred to indicate that decreased ozone exposure may cause an increase in asthma-related emergency department visits.

emissions. As such, these estimates are strongly influenced by the assumption that all PM components are equally toxic. We also acknowledge that when implementing any new standard, states may elect to pursue a different ozone strategy, which would in turn affect the level of $PM_{2.5}$ co-benefits.

7. *Projecting key variables introduces uncertainty*. Inherent in any analysis of future regulatory programs are uncertainties in projecting atmospheric conditions and source-level emissions, as well as population, health baselines, incomes, technology, and other factors. In addition, data limitations prevent an overall quantitative estimate of the uncertainty associated with estimates of total economic benefits. If one is mindful of these limitations, the magnitude of the benefits estimates presented here can be useful information in expanding the understanding of the public health impacts of reducing ozone precursor emissions.

8. *This analysis omits certain unquantified effects due to lack of data, time and resources*. These unquantified endpoints include the direct effects of ozone on vegetation, the deposition of nitrogen to estuarine and coastal waters and agricultural and forested land, and the changes in the level of exposure to ultraviolet radiation from ground level ozone. EPA will continue to evaluate new methods and models and select those most appropriate for estimating the health benefits of reductions in air pollution. It is important to continue improving benefits transfer methods in terms of transferring economic values and transferring estimated impact functions. The development of both better models of current health outcomes and new models for additional health effects such as asthma, high blood pressure, and adverse birth outcomes (such as low birth weight) will be essential to future improvements in the accuracy and reliability of benefits analyses (Guo et al., 1999; Ibald-Mulli et al., 2001). Enhanced collaboration between air quality modelers, epidemiologists, toxicologists, and economists should result in a more tightly integrated analytical framework for measuring health benefits of air pollution policies. Readers interested in a more extensive discussion of the sources of uncertainty in human health benefits analyses should consult the PM NAAQS RIA.

6.5.6 Summary of Total Benefits

Table 6.51 presents the total number of estimated ozone and $PM_{2.5}$-related premature mortalities and morbidities avoided nationwide in 2020. Ranges within the mortality section reflect variability in the studies upon which the estimates associated with premature mortality were derived. The lower end of the range reflects the Expert K derived mortality functions, and the upper end of the range reflects the Expert E derived mortality functions. Figure 6.7 graphically presents the total number of estimated ozone and $PM_{2.5}$-related premature mortalities avoided in 2020 by standard. Tables 6.52 through 6.56 show the overall ozone, PM, and combined results with regional breakdowns.

Table 6.51: Summary of Total Number of Annual Ozone and $PM_{2.5}$ -Related Premature Mortalities and Premature Morbidity Avoided in 2020[A]

Combined Estimate of Mortality

Model or Assumption		*Combined Range of Ozone Benefits and $PM_{2.5}$ Co-benefits by Standard Alternative*[D]			
		0.079 ppm	0.075 ppm	0.070 ppm	0.65 ppm
NMAPS	Bell (2004)	140 to 1,300	260 to 2,000	560 to 3,500	940 to 5,500
	Bell (2005)	200 to 1,300	420 to 2,200	1,100 to 4,100	2,000 to 6,500
Meta-analysis	Ito	230 to 1,400	500 to 2,300	1,400 to 4,300	2,500 to 7,000
	Levy	230 to 1,400	510 to 2,300	1,400 to 4,400	2,500 to 7,100
No Causality		120 to 1,200	190 to 2,000	310 to 3,200	490 to 5,000

Combined Estimate of Morbidity

	Combined Ozone Benefits and $PM_{2.5}$ Co-benefits by Standard Alternative			
Acute Myocardial Infarction[B]	570	890	1,500	2,300
Upper Respiratory Symptoms[B]	3,100	4,900	8,100	13,000
Lower Respiratory Symptoms[B]	4,200	6,700	11,000	17,000
Chronic Bronchitis[B]	240	380	630	970
Acute Bronchitis[B]	640	1,000	1,700	2,600
Asthma Exacerbation[B]	3,900	6,100	10,000	16,000
Work Loss Days[B]	28,000	43,000	72,000	110,000
School Loss Days[C]	72,000	200,000	640,000	1,100,000
Hospital and ER Visits	890	1,900	5,100	9,400
Minor Restricted Activity Days	340,000	750,000	2,100,000	3,500,000

[A] Does not reflect estimates for the San Joaquin and South Coast Air Basins

[B] PM-related benefits only

[C] Ozone-related benefits only

[D] Includes ozone benefits, and $PM_{2.5}$ co-benefits. Range was developed by adding the estimate from the ozone premature mortality function to both the lower and upper ends of the range of the $PM_{2.5}$ premature mortality functions characterized in the expert elicitation.

Figure 6.7: Total Annual Ozone and $PM_{2.5}$-Related Premature Mortalities Avoided in 2020 by Standard Alternative