IN THE UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 06-2131

STATE OF NORTH CAROLINA *ex rel.*
Roy Cooper, Attorney General,

Plaintiff-Appellee,

v.

TENNESSEE VALLEY AUTHORITY,

Defendant-Appellant.

On Appeal Under 28 U.S.C. § 1292(b)
from the United States District Court
for the Western District of North Carolina

BRIEF AMICI CURIAE AMERICAN LUNG ASSOCIATION AND AMERICAN THORACIC SOCIETY IN SUPPORT OF PLAINTIFF-APPELLEE STATE OF NORTH CAROLINA

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World Watch Institute, World Watch Paper 94, Cleaning the Air: A Global Agenda (1994) 16

INTRODUCTION

Air pollution can have severe, even fatal, health effects. Coal-fired power plants, like those operated by Tennessee Valley Authority ("TVA"), emit dangerous air pollutants, which in turn contribute to the formation of particulate matter and ozone. Exposure to these pollutants can cause a myriad of health impacts, as well as significant social welfare costs. Due to these harmful effects, North Carolina has brought a common law nuisance action against TVA to protect its citizens from the adverse health effects caused by TVA's operation of power plants in neighboring states.

The Clean Air Act, 42 U.S.C. §§ 7401 et seq., sets minimum federal standards, which do not always adequately protect public health. As public nuisance law "extends to everything that endangers life or health," Yarbrough v. Louisville & N. R. Co., 1930 WL 1661, *7 (Tenn. App. 1930), amici American Lung Association and American Thoracic Society support North Carolina in its endeavor to further protect the health and welfare of its citizens, beyond the protections of the Clean Air Act. Therefore, amici respectfully request that this Court affirm the District Court's denial of TVA's motion to dismiss, and allow the case to be reviewed on its merits.

INTEREST OF AMICI

The American Lung Association ("ALA"), a nonprofit organization founded in 1904, is one of the nation's oldest voluntary health organizations. ALA's mission is to prevent lung disease and promote lung health. ALA engages in research, public education, and advocacy to reduce air pollution and its accompanying threats to lung health. ALA has published many reports on air pollution, most notably the annual American Lung Association State of the Air report. Through its advocacy programs, ALA has participated in the development and enforcement of laws and regulations related to lung health at the national, state, and local levels, and played a major role in the passage of the Clean Air Act ("CAA") Amendments of 1977 and 1990. The North Carolina chapter of the ALA actively advocated for passage of the 2002 North Carolina Clean Smokestacks Act.

The American Thoracic Society ("ATS"), an international educational and scientific organization, was founded in 1905. ATS, and the approximately 18,000 physicians and scientists it represents, help prevent and fight respiratory disease around the globe through research, education, patient care, and advocacy. ATS publishes a number of scientific journals that include studies on air pollution and health. In fact, the United States Environmental Protection Agency ("EPA") has consulted ATS guidelines to characterize the adverse effects of exposure to air

pollution. See, e.g., National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,856, 38,860 (July 18, 1997) (codified at 40 C.F.R. §§ 50.9, 50.10).

ALA and ATS support North Carolina's position because of the significant negative health effects associated with emissions from TVA's coal-fired power plants.

ARGUMENT

Coal-fired power plants, which are comprised of individual electric generating units ("EGUs"), are major sources of harmful pollutants, including particulate matter ("PM"), nitrogen oxides ("NO_x"), and sulfur dioxide ("SO_2").[1] High-temperature fossil fuel combustion processes, such as those occurring in coal-fired EGUs, are the primary outdoor sources of NO_x and SO_2 emissions.[2] Not only are these pollutants harmful themselves, but NO_x and SO_2 also contribute to the formation of additional PM, and NO_x is an essential precursor to the creation of ozone.[3] Power plant emissions, and their contribution to the formation of these secondary pollutants, have significant and severe impacts on public health, even when the pollutants are present at levels below the federal air quality standards

[1] U.S. Envtl. Prot. Agency, Evaluating Ozone Control Programs in the Eastern United States: Focus on the NOx Budget Trading Program, 2004, EPA/454/K-05-001 (August 2005), 1-4, available at http://www.epa.gov/airtrends/2005/ozonenbp.pdf#page=1 (last visited Jan. 22, 2007);
[2] U.S. Envtl. Prot. Agency, Office of Air Quality Planning and Standards, EPA/454/R-3-005, National Air Quality and Emissions Trends Report 2003 Special Studies Edition (2003) 17, 43 available at http://www.epa.gov/air/airtrends/aqtrnd03/ (last visited Jan. 18, 2007).
[3] U.S. Envtl. Prot. Agency, EPA/600/P-99/002aF, 1 Air Quality Criteria for Particulate Matter 2-2 (2004), available at http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=435945 (last visited Jan. 18, 2007); U.S. Envtl. Prot. Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Health and Environmental Effects of Ground-Level Ozone (1997), available at http://www.epa.gov/ttn/oarpg/naaqsfin/o3health.html (last visited Jan. 18. 2007).

mandated by the CAA. See Staff of Senate Committee on the Environment and Public Works, 95th Cong., A Legislative History of the Clean Air Act Amendments of 1977, 6634-55 (Comm. Print 1978) (statement of the House Committee on Interstate and Foreign Commerce) (discussing multiple ways in which attainment of CAA standards does not adequately protect public health). Plumes from power plants spread emissions great distances, impacting PM and ozone levels in areas well beyond their place of origin, and compromising the public health of people living in regions downwind of the plants.[4]

Children are especially vulnerable to the health impacts of air pollution because they breathe more air per pound of body weight than adults and because most of the human respiratory capacity is developed after birth and before the age of eighteen.[5] Moreover, because children are outside for longer periods of time and are usually more active when outdoors, they inhale more polluted air than adults typically do.[6]

[4] U.S. Envtl. Prot. Agency, EPA/454/K-03-001, Latest Findings on National Air Quality 28-29, available at http://www.epa.gov/air/airtrends/aqtrnd02/2002_airtrends_final.pdf (noting that downwind flow of air pollution in the U.S., Canada, and Mexico is "well known and documented").
[5] Rodney R. Dietert et al., Workshop to Identify Critical Windows of Exposure for Children's Health: Immune and Respiratory Systems Workgroup Summary, 108 Envtl. Health Persp. 483 (2000); Blanka Binková et al., The Effects of Air Pollution on Children's Health and Development: a Review of the Evidence, WHO Regional Office for Europe (2004), available at http://www.euro.who.int/document/EEHC/execsum.pdf (last visited Jan. 18, 2007).
[6] Am. Academy of Pediatrics, Committee on Environmental Health, Ambient Air Pollution: Health Hazards to Children, 114 Pediatrics 1699 (2004).

A. Health Impacts of Particulate Matter

According to the U.S. Environmental Protection Agency, PM is a "mixture of microscopic solids and liquid droplets suspended in the air" made up of a number of different components, including acids, chemicals, metals, soils, dust, and allergens, such as pollen. U.S. Envtl. Prot. Agency, Office of Air and Radiation, EPA-452/F-03-001, Particulate Pollution and Your Health (2003), available at http://www.epa.gov/airnow/particle/pm-color.pdf. The particles that make up PM vary in size, but the most recent research has focused on particles that are one-seventh (10 microns) to one-thirtieth the diameter of a strand of human hair (2.5 microns) or smaller. Researchers categorize PM according to size – generally speaking, coarse particles are between 2.5 and 10 microns in diameter ($PM_{10-2.5}$); fine particles are 2.5 microns in diameter or smaller ($PM_{2.5}$); and ultrafine particles are smaller than 0.1 micron in diameter.[7] Because of the relatively small size of individual particles, PM is often visible only as the haze that forms when millions of particles in the air blur the spread of sunlight.

Coal-fired power plants produce PM through both mechanical and chemical processes. Burning coal mechanically produces coarse PM and larger, visible particles by breaking or reducing large chunks of coal into smaller ash and soot,

[7] U.S. Envtl. Prot. Agency, EPA/600/P-99/002aF, 1 Air Quality Criteria for Particulate Matter 2-7 to 2-37 (2004), available at http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=435945 (last visited Jan. 18, 2007).

with the material itself remaining the same chemically.[8] Burning coal also emits elemental carbon, SO_2, and NO_x, which chemically react with water and other compounds in the atmosphere to form fine and ultrafine particles of different chemical compounds.[9]

Because of PM's size, these particles get trapped in the smaller airways and alveoli of the lungs, and the fine and ultrafine PM can even pass through the alveoli into the blood stream, traveling throughout the body.[10] Although PM may vary in size and method of formation, the interaction of all sizes of PM with the body can have serious consequences.

Exposure to PM can kill.[11] When PM levels in the air are high, deaths can occur immediately (i.e., on that day or soon thereafter), or within one to two months, by inducing heart attacks and strokes.[12] In addition, daily exposure to PM, even at low levels, can lead to death by causing life-threatening diseases.[13] Unfortunately, PM does not just make people die a few days earlier than they

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[8] Id.
[9] Id.
[10] Gunter Oberdorster et al., Nanotoxicology: An Emerging Discipline Evolving from Studies of Ultrafine Particles, 113 Envtl. Health Persp. 823 (2005).
[11] C. Arden Pope III et al., Health Effects of Fine Particulate Air Pollution: Lines that Connect, J. Air & Waste Mgmt. Ass'n 56:709-742 (2006).
[12] Francesca Dominici et al., On the Use of Generalized Additive Models in Time-Series Studies of Air Pollution and Health, 156 Am. J. Epidemiology 193 (2002); Yun-Chul Hong et al., Effects of Air Pollutants on Acute Stroke Mortality, 110 Envtl. Health Persp. 187 (2002); Shang-Shyue Tsai et al., Evidence for an Association Between Air Pollution and Daily Stroke Admissions in Kaohsiung, Taiwan, 34 Stroke 2612 (2003).
[13] Douglas W. Dockery et al., An Association Between Air Pollution and Mortality in Six U.S. Cities, 329 New Engl. J. Med. 1753 (1993); C. Arden Pope III et al., Particulate Air Pollution as a Predictor of Mortality in a Prospective Study of U.S. Adults, 151 Am. J. Respir. & Crit. Care Med. 669 (1995); Daniel Krewski et al., Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality (Health Effects Institute 2000).

might otherwise; these are premature deaths that would not have occurred until months or years later, if the air were cleaner.[14]

In addition to premature death, sharp increases in PM levels in air pollution have been linked to other serious health effects, including increased numbers of heart attacks (especially among the elderly and people with cardiovascular disease),[15] increased hospitalization for cardiovascular disease (including strokes and congestive heart failure),[16] increased emergency room visits for patients suffering from acute respiratory ailments,[17] and inflammation of lung tissue in otherwise healthy young adults.[18] Scientific evidence additionally shows that chronic exposure to PM can shorten life one to three years by increasing the risk of dying from lung cancer and cardiovascular diseases,[19] as well as by inflicting significant damage to the small airways of the lungs.[20]

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[14] Antonella Zanobetti et al., The Temporal Pattern of Respiratory and Heart Disease Mortality in Response to Air Pollution, 111 Envtl. Health Persp. 1188 (2003); Francesca Dominici et al., Airborne Particulate Matter and Mortality: timescale effects in four US cities, 157 Am. J. Epidemiology 1055 (2003).

[15] Daniela D'Ippoliti et al., Air Pollution and Myocardial Infarction in Rome: a Case-Crossover nalysis, 14 Epidemiology 528 (2003); Antonella Zanobetti & Joel Schwartz, The Effect of Particulate Air Pollution on Emergency Admissions for Myocardial Infarction: A Multicity Case-Crossover Analysis, 113 Envtl. Health Persp. 978 (2005).

[16] Kristi B. Metzger et al., Ambient Air Pollution and Cardiovascular Emergency Department Visits in Atlanta, Georgia, 1993-2000, 15 Epidemiology 46 (2004); Shang-Shyue Tsai et al., Evidence for an Association Between Air Pollution and Daily Stroke Admissions, supra note 12; Gregory Wellenius et al., Particulate Air Pollution and Hospital Admissions for Congestive Heart Failure in Seven United States Cities, 97 Am. J. Cardiology 404 (2006); Gregory Wellenius et al., Particulate Air Pollution and the Rate of Hospitalization for Congestive Heart Failure among Medicare Beneficiaries in Pittsburgh, Pennsylvania, 161 Am. J. Epidemiology 1030 (2005).

[17] Stephen Van Den Eeden et al., Final Report to the California Air Resources Board, Contract 97-303, Particulate Air Pollution and Morbidity in the California Central Valley: a High Particulate Pollution Region (2002).

[18] Andrew J. Ghio et al., Concentrated Ambient Air Particles Induce Mild Pulmonary Inflammation in Healthy Human Volunteers, 162 Am. J. Respir. & Crit. Care Med. 981 (2000).

[19] C. Arden Pope III, Epidemiology of Fine Particulate Air Pollution and Human Health: Biological Mechanisms and Who's at Risk?, 108 Envtl. Health Persp. 713 (2000); C. Arden Pope III et al., Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine Particulate Air Pollution, 287 J. Am. Med. Ass'n 9 (2002); C. Arden

Those at the greatest risk of adverse health effects from chronic exposure to PM pollution include children (18 years and younger), the elderly (65 years and older), people with chronic lung diseases (such as asthma, chronic bronchitis, and emphysema), people with chronic cardiovascular disease, and people with diabetes.[21] Children are among the most vulnerable to continual exposure to PM, beginning even before they are born and shaping the future of their bodies' ability to function. Chronic exposure to PM has been linked to increased risk of premature birth and slowed lung function growth in children and teenagers.[22] Short-term increases in PM levels are especially harmful to children, causing increased severity of asthma attacks and increased hospitalization for asthma.[23]

Pope III et al., Cardiovascular Mortality and Year-round Exposure to Particulate Air Pollution: Epidemiological Evidence of General Pathophysiological Pathways of Disease, 109 Circulation 71 (2004).

[20] Andrew Churg et al., Chronic Exposure to High Levels of Particulate Air Pollution and Small Airway Remodeling, 111 Envtl. Health Persp. 714 (2003).

[21] U.S. Envtl. Prot. Agency, Air Quality Criteria for Particulate Matter, supra note 7; Antonella Zanobetti & Joel Schwartz, Are Diabetics More Susceptible to the Health Effects of Airborne Particles?, 164 Am. J. Respir. & Crit. Care Med. 831 (2001).

[22] Sharon K. Sagiv et al., A Time Series Analysis of Air Pollution and Preterm Birth in Pennsylvania, 1997-2001, 113 Envtl. Health Persp. 602 (2005); W. James Gauderman et al., Association between Air Pollution and Lung Function Growth in Southern California Children: results from a second cohort, 166 Am. J. Respir. & Crit. Care Med. 76 (2002); W. James Gauderman et al., The effect of air pollution on lung development from 10 to 18 years of age, 351 New Engl. J. Med. 1057 (2004).

[23] James C. Slaughter et al., Effects of Ambient Air Pollution on Symptom Severity and Medication Use in Children with Asthma, 91 Ann. Allergy Asthma & Immunology 346 (2003); Mei Lin et al., The Influence of Ambient Coarse Particulate Matter on Asthma Hospitalization in Children: Case-Crossover and Time-Series Analyses, 110 Envtl. Health Persp. 575 (2002); Gary Norris et al., An Association Between Fine Particles and Asthma Emergency Department Visits for Children in Seattle, 107 Envtl. Health Persp. 489 (1999); Paige E. Tolbert et al., Air Quality and Pediatric Emergency Room Visits for Asthma in Atlanta, Georgia, 151 Am. J. Epidemiology 798 (2000).

B. Health Impacts of Ozone

Ozone is a dangerous pollutant that forms when NO_x in the air combines with volatile organic compounds in the presence of heat and sunlight.[24] Recent studies have shown that acute exposure to ground level ozone can kill. Two studies published in 2004, one looking at ninety-five cities across the United States and the other examining twenty-three European cities, found that even on days when ozone levels were below the current national standards, an increase in ozone significantly increased the risk of premature death.[25] Three subsequent studies reviewed other data and confirmed that short-term exposure to high levels of ozone can shorten life.[26]

Premature deaths from exposure to ozone occur because "[o]zone is capable of causing inflammation in the lung at lower concentrations than any other gas, . . . [which] would be a hazard to anyone with heart failure and pulmonary congestion, and would worsen the function of anyone with advanced lung disease." David V. Bates, Ambient Ozone and Mortality, 16 Epidemiology 427, 428 (2005). In

[24] U.S. Envtl. Prot. Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Health and Environmental Effects of Ground-Level Ozone (1997), available at http://www.epa.gov/ttn/oarpg/naaqsfin/o3health.html (last visited Jan. 18. 2007).

[25] See Michelle L. Bell et al., Ozone and Short-Term Mortality in 95 US Urban Communities, 1987-2000, 292 J. Am. Med. Ass'n 2372 (2004); Alexandros Gryparis et al., Acute Effects of Ozone on Mortality from the "Air Pollution and Health: A European Approach" Project, 170 Am. J. Respir. & Crit. Care Med. 1080 (2004).

[26] Michelle L. Bell et al., A Meta-Analysis of Time-Series Studies of Ozone and Mortality with Comparison to the National Morbidity, Mortality, and Air Pollution Study, 16 Epidemiology 436 (2005); Jonathan I. Levy et al., Ozone Exposure and Mortality: An Empiric Bayes Metaregression Analysis, 16 Epidemiology 458 (2005); Kazuhiko Ito et al., Associations Between Ozone and Daily Mortality: Analysis and Meta-Analysis, 16 Epidemiology 446 (2005); Steven N. Goodman, The Methodologic Ozone Effect, 16 Epidemiology 430 (2005).

addition, research indicates that chronic ozone exposure may lead to decreased lung function in the general population.[27]

Scientists have long recognized the harmful health effects of ozone exposure, including shortness of breath, chest pain when inhaling deeply, wheezing and coughing, increased susceptibility to respiratory infections, and increased risk of asthma attacks.[28] Children, senior citizens, people who work or exercise outdoors, people with lung diseases (such as asthma, chronic bronchitis, and emphysema), and otherwise healthy people who have enhanced ozone reactions are especially vulnerable to the effects of breathing ozone.[29]

For people with asthma, ozone exposure is especially harmful, increasing the need for medical treatment and for hospitalization.[30] Health experts warn that air pollution, including ozone, is "one of the most under-appreciated contributors to asthma exacerbation." George D. Thurston & David V. Bates, Air Pollution as an

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[27] Comm. of the Envtl. & Occup. Health Assembly of the Am. Thoracic Soc'y [hereinafter "ATS Comm."], Health Effects of Outdoor Air Pollution, 153 Am. J. Respir. & Crit. Care Med. 3, 26-27 (1996); Audrey Galizia & Patrick L. Kinney, Long-term Residence in Areas of High Ozone, 107 Envtl. Health Persp. 675 (1999).

[28] ATS Comm., Health Effects of Outdoor Air Pollution, supra note 27.

[29] Helene Desqueyroux et al., Effects of Air Pollution on Adults with Chronic Obstructive Pulmonary Disease, 6 Archives Envtl. Health 554 (2002); Peter Höppe et al., Environmental Ozone Effects in Different Population Subgroups, 206 Int'l J. Hygiene & Envtl. Health 505 (2003); Ralph J. Delfino et al., Emergency Room Visits for Respiratory Illnesses Among the Elderly in Montreal: Association with Low Level Ozone Exposure, 76 Envtl. Res. 67 (1998); John M. Peters et al., A Study of Twelve Southern California Communities with Differing Levels and Types of Air Pollution II: Effects on Pulmonary Function, 159 Am. J. Respir. & Crit. Care Med. 768 (1999); George D. Thurston et al., Summertime Haze Air Pollution and Children with Asthma, 155 Am. J. Respir. & Crit. Care Med. 654 (1997); Patrick L. Kinney & Mortin Lippmann, Respiratory Effects of Seasonal Exposures to Ozone and Particles, 55 Archives Envtl. Health 210 (2000).

[30] Janneane F. Gent et al., Association of Low-Level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma, 290 J. Am. Med. Ass'n 1859 (2003); Helene Desqueyroux et al., Short-Term Effects of Low-Level Air Pollution on Respiratory Health of Adults Suffering from Moderate to Severe Asthma, 89 Envtl. Res. 29 (2002); Richard T. Burnett et al., Association Between Ozone and Hospitalization for Respiratory Diseases in 16 Canadian Cities, 72 Envtl. Res. 24 (1997).

Underappreciated Cause of Asthma Symptoms, 290 J. Am. Med. Ass'n 1915, 1915 (2003). Even at levels currently considered safe, children with asthma are among those most vulnerable to ozone pollution.[31] A recent study suggests that year-round exposure to ozone may be associated with an increased risk of the development of asthma in children.[32] While more research is needed to confirm this finding, researchers tracked 3,500 students in Southern California and found an increased onset of asthma in children who took part in three or more outdoor activities in communities with high levels of ozone.[33]

C. Social Welfare Impacts

In addition to direct adverse health effects, air pollution caused by emissions from coal-fired power plants produces serious social welfare impacts. The costs associated with the myriad of health effects of air pollution are staggering. For example, as long ago as 1994, air pollution from coal-fired power plants in the Midwest was associated with $25 billion per year in health costs.[34] Air pollution also inflates social welfare costs through increased hospital admissions. Increases in PM and ozone pollution are associated with increased hospital admissions for respiratory diseases, including asthma, and cardiovascular disease.[35] Patients

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[31] Janneane F. Gent et al., Association of Low-Level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma, supra note 30.
[32] Rob McConnell et al., Asthma in Exercising Children Exposed to Ozone, 359 Lancet 386 (2002).
[33] Id.
[34] World Watch Institute, World Watch Paper 94, Cleaning the Air: A Global Agenda (1994) at 12.
[35] M. Medina-Ramón M et al., The Effect of Ozone and PM10 on Hospital Admissions for Pneumonia and Chronic Obstructive Pulmonary Disease: A National Multicity Study, 163(6) Am. J. Epidemiology 579, 579-588 (2006);

diagnosed with arrhythmia or congestive heart failure are particularly likely to be admitted to the hospital during periods of high air pollution.[36] In addition to hospital admissions, increased air pollution can also result in increased costs associated with standard doctors' office visits, prescription medications and other treatment of respiratory and cardiovascular illnesses, and lost work days.[37]

Because of the particular vulnerability of children to air pollution, another serious social and economic impact resulting from air pollution is lost school days. A recent study found that increases in ozone led to an increase in illness-related, particularly respiratory-based, absences from school.[38] Such school absences are costly to students, educators, and parents. Students who miss school are likely to suffer academically. Parents of children who are too sick to go to school often face a dilemma between missing work in order to care for their children, leaving their sick children home alone, or locating emergency childcare, a resource that may be scarce and costly.

William S. Linn et al., Air Pollution and Daily Hospital Admissions in Metropolitan Los Angeles, 108 Envtl. Health Persp. 427 (2000).

[36] F. Dominci et al., Fine Particulate Air Pollution and Hospital Admission for Cardiovascular and Respiratory Diseases, 295 J. Am. Med. Ass'n 1127, 1127-1134 (2006); Jennifer K. Mann et al., Air Pollution and Hospital Admissions for Ischemic Heart Disease in Persons with Congestive Heart Failure or Arrhythmia, 110 Envtl. Health Persp. 1247 (2002).

[37] See, e.g., Miriam G. Cisternas et al., A Comprehensive Study of Direct and Indirect Costs of Adult Asthma, 111 J. Allergy & Clinical Immunology 1212 (2003) (estimating that adult asthma patients spend an average of $5,000 annually on asthma related expenses); Cal. Envtl. Prot. Agency, Air Res. Bd., Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution (2004) at 4, available at http://www.arb.ca.gov/research/health/fs/pm-03fs.pdf (last visited Jan. 18, 2007) (estimating that air pollution in California results in about 2.8 million lost work days per year).

[38] Frank D. Gilliland et al., The Effects of Ambient Air Pollution on School Absenteeism Due to Respiratory Illness, 12 Epidemiology 43 (2001).

D. Public Health and Social Welfare Impacts of TVA's Power Plants

The harms from coal-fired power plants are not limited to the state in which they are located. As the emissions from the TVA power plants are widely dispersed, they adversely impact the health and social welfare of people living downwind of the plants throughout the eastern United States, including North Carolina.[39] A report on health impacts of power plants in the District of Columbia area noted the significant impact that emissions controls can have on air pollution levels as far as 250 miles away from the pollution source.[40] As a number of the TVA plants are located within a similar range of the North Carolina border,[41] the plumes from the TVA power plants are likely to spread emissions through some or all of North Carolina, particularly blanketing the western half of the state.

Using EPA emissions data and relevant scientific research, researchers from Abt Associates[42] were able to assess the direct health impacts of air pollution from eight electric utility systems, including TVA.[43] The Abt Study found that air pollution from TVA's coal-fired power plants harmed public health and social

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[39] See Abt Associates, Inc., The Particulate-Related Health Benefits of Reducing Power Plant Emissions (October 2000) at E-2 [hereinafter "2000 Abt Study"], available at http://www.abtassociates.com/reports/particulate-related.pdf (last visited Jan. 18, 2007) (discussing calculation of impacts due to downwind air pollution). See also U.S. Envtl. Prot. Agency, Latest Findings on National Air Quality 28-29, supra note 4. http://www.epa.gov/air/airtrends/aqtrnd02/2002_airtrends_final.pdf (last visited Jan. 17, 2007) (noting that downwind flow of air pollution in the U.S., Canada, and Mexico is "well known and documented").

[40] Jonathan I. Levy et al., The Importance of Population Susceptibility for Air Pollution Risk Assessment: A Case Study of Power Plants Near Washington, DC (December 2002), at Fig. 1, Fig. 2.

[41] See Tennessee Valley Authority, TVA Reservoirs and Power Plants, at http://www.tva.com/sites/sites_ie2.htm, (fossil plants).

[42] Abt Associates is a scientific research and policy analysis consulting firm that EPA has employed to conduct research regarding air pollution. 2000 Abt Study at i, supra note 39. .

[43] Abt Associates, Inc., Particulate-Related Health Impacts of Eight Electric Utility Systems (April 2002) [hereinafter 2002 Abt Study], available at http://www.abtassociates.com/reports/rockefeller_pm_study_final_v2.pdf.

welfare throughout the nation.[44] Specifically, the study estimated that each year emissions from the TVA plants contributes to approximately 780 deaths, 863 hospital admissions, 590 cases of chronic bronchitis, and 20,000 asthma attacks, 230 of which result in emergency room visits.[45] The analysis calculated that the annual burden in North Carolina alone is high: roughly 54 deaths, 47 hospital admissions, 43 cases of chronic bronchitis and 1,500 asthma attacks occur each year because of air pollution from TVA's plants.[46]

In addition to direct health effects, these emissions cause serious social and economic impacts. For example, the Abt Study estimated that, each year, air pollution from TVA's power plants results in about 150,000 lost work days nationwide, including 11,000 in North Carolina.[47] Air pollution can also lead to days in which people do not feel able to participate fully in their normal activities and must restrict their behavior. See 2002 Abt Study at 3-13 (discussing "minor restricted activity days" or MRADs). The Abt Study estimated that each year, air pollution from TVA's plants leads to 790,000 restricted activity days, 57,000 of which occur in North Carolina.[48]

These various studies demonstrate the extensive nature of the harms caused by air pollution emissions from the TVA power plants. The adverse impacts are

[44] See generally id. at 4-3.
[45] Id.
[46] Id. at A-19.
[47] Id. at 4-3, A-19.
[48] Id.

not restricted to people living, working, learning, and playing in communities near the plants, but also cause significant public health and social welfare costs to children and adults in North Carolina and throughout the nation.

CONCLUSION

For the foregoing reasons, the American Lung Association and the American Thoracic Society respectfully request this Court to affirm the District Court's denial of TVA's Motion to Dismiss.

DATED: January 23, 2007.

Respectfully Submitted,

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CERTIFICATE OF COMPLIANCE WITH WORD VOLUME LIMITATIONS

I hereby certify that the foregoing brief of Petitioner complies with Fed. R. App. P 32(a)(7). The word count function of the word processing system used to prepare this brief indicates that it contains 4,392 words (inclusive of footnotes, headings, and citations, but exclusive as to certificates as to parties, rulings and related cases, tables of contents and authorities, glossary, and attorney's certificates).

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Hope M. Babcock

CERTIFICATE OF SERVICE

I hereby certify that on this 23rd day of January 2007, I caused a true copy of the foregoing Brief Amici Curiae American Lung Association and American Thoracic Society in Support of Plaintiff-Appellee State of North Carolina to be served, postage pre-paid, via the U.S. Postal Service, on counsel for Plaintiff-Appellee Christopher G. Browning, Jr., Solicitor General, 114 West Edenton Street, P. O. Box 629, Raleigh, NC 27602, and counsel for Defendant-Appellant Frank H. Lancaster, Office of the General Counsel, 400 West Summit Hill Drive, Knoxville, TN 37902-1401.

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