BEFORE
THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

IN RE PETITION FOR THE U.S ENVIRONMENTAL PROTECTION AGENCY TO 1) PROMPTLY REQUIRE OIL AND GAS OWNERS AND OPERATORS TO MONITOR FOR OZONE AND 2) TO ISSUE CONTROL TECHNIQUES GUIDELINES FOR OIL AND NATURAL GAS OPERATIONS IN NON-ATTAINMENT AREAS

Respectfully Submitted by:

*** * * CALIFORNIA KIDS IAQ * * * CITIZENS CAMPAIGN FOR THE ENVIRONMENT**
*** * * CLEAN AIR TASK FORCE * * * CLEAN WATER ACTION**
*** * * COALITION FOR A SAFE ENVIRONMENT * * * COMMUNITY DREAMS**
*** * * DELAWARE RIVERKEEPER NETWORK * * * ENVIRONMENTAL DEFENSE FUND**
*** * * ENVIRONMENTAL LAW AND POLICY CENTER * * * ENVIRONMENT AMERICA**
*** * * ENVIRONMENT CALIFORNIA * * * ENVIRONMENT COLORADO**
*** * * ENVIRONMENT ILLINOIS * * * ENVIRONMENT MARYLAND**
*** * * ENVIRONMENT NEW MEXICO * * * ENVIRONMENT NEW YORK**
*** * * ENVIRONMENT NORTH CAROLINA * * * PENNENVIRONMENT * * * ENVIRONMENT TEXAS**
*** * * MOM'S CLEAN AIR FORCE * * * NATIONAL AUDUBON SOCIETY**
*** * * NATIONAL PARKS CONSERVATION ASSOCIATION * * * NATIONAL WILDLIFE FEDERATION**
*** * * NATURAL RESOURCES DEFENSE COUNCIL**
*** * * NEW MEXICO ENVIRONMENTAL LAW CENTER**
*** * * POWDER RIVER BASIN RESOURCE COUNCIL * * * SKYTRUTH * * * SIERRA CLUB**
*** * * TEXAS LEAGUE OF CONSERVATION VOTERS * * * WYOMING OUTDOOR COUNCIL**

December 19, 2012

I. INTRODUCTION

Oil and natural gas development has expanded swiftly in recent years, transforming the American landscape. The development of unconventional oil and natural gas resources accounts for much of this expansion, as shale gas development has grown from 2 percent of total U.S.

natural gas production in 2001 to 23 percent in 2010.[1] The U.S. Department of Energy projects that shale gas production will increase even more dramatically in the future.[2] For many Americans, oil and natural gas development – once distant – is now a nearby feature of daily life as development intensifies and approaches urban and suburban communities. And regions like Pennsylvania, Texas, North Dakota, and Colorado, where significant development is already underway, and others like New York, Ohio, and California, where aggressive development is on the horizon, are grappling with significant health and environmental impacts.

In his State of the Union Address, the President underscored the need to develop oil and natural gas responsibly, committing to "take every possible action to safely develop this energy [and that] America will develop this resource without putting the health and safety of our citizens at risk."[3] While EPA has taken important first steps toward reducing pollution from oil and natural gas development, the industry's rapid expansion has outpaced many important public health and environmental protections.

Ozone pollution associated with oil and natural gas development is one such problem. Section 109 of the Clean Air Act requires that EPA set National Ambient Air Quality Standards ("NAAQS") for ozone that that are "requisite to protect the public health" with "an adequate margin of safety."[4] EPA and states must have ozone air pollution data to implement and enforce these health-protective standards. Accordingly, the Act recognizes the necessity of comprehensive ozone monitoring and requires both EPA and states to ensure adequate

[1] ENERGY INFORMATION ADMINISTRATION ("EIA"), ANNUAL ENERGY OUTLOOK 2012 3 (June 2012), *available at* http://www.eia.gov/forecasts/aeo/pdf/0383(2012).pdf [hereinafter "Annual Energy Outlook 2012"].

[2] *Id.* (indicating shale gas production will account for 49 percent of domestic production by 2035).

[3] BARACK OBAMA, REMARKS BY THE PRESIDENT IN STATE OF THE UNION ADDRESS (Jan. 24, 2012), *available at* http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address.

[4] 42 U.S.C. § 7409(b)(1); *see Whitman v. American Trucking Assns., Inc.*, 531 U.S. 457, 465 (2001).

monitoring.[5] Despite the considerable smog-forming pollution emitted by oil and natural gas operations, however, ozone monitoring in most oil and gas basins is either extremely limited or entirely lacking. As a result, the NAAQS do not function to protect public health in these areas, as the Act requires, unlawfully subjecting communities to the threat of unsafe levels of smog-pollution.

Accordingly, Petitioners respectfully urge the Environmental Protection Agency ("EPA") to take two actions that will provide important public health protections for communities faced with ozone pollution from this swift development:

- First, we urge EPA to require broad deployment of ozone air quality monitors in oil and natural gas development areas. Section 114 of the Clean Air Act provides EPA with manifest authority to require owners and operators of oil and gas activities to install and operate ozone monitors, arising from its responsibilities under the Act to protect air quality, public health, and welfare. Requiring the necessary air monitors will also provide Americans with clear, transparent information about ozone pollution from oil and natural gas operations in their communities to guide their own actions in protecting the environment and their health.[6]
- Second, we respectfully ask that EPA provide communities with tools to help reduce smog-forming pollution from oil and gas development by issuing control technology guidelines ("CTGs") for oil and gas equipment. These clean air measures can be some of the single most cost-effective methods for reducing smog-forming pollution in areas that violate the National Ambient Air Quality Standards ("NAAQS") for ozone as well as those areas seeking to attain and maintain the NAAQS under the Ozone Advance Program.

Swiftly moving forward on both of these fronts also partially fulfills an important recommendation of the Secretary of Energy Advisory Board ("SEAB") Natural Gas Subcommittee, which urged both that the oil and gas industry "be required, as soon as practicable, to measure and disclose air pollution emissions, including greenhouse gases, air

[5] *See* 42 U.S.C. § 7403 (EPA requirement); *id.* § 7410(a)(2)(B) (State infrastructure SIP requirement).

[6] 42 U.S.C. § 7414.

toxics, ozone precursors and other pollutants" and that rigorous standards be adopted for "new and existing sources of methane, air toxics, ozone precursors and other air pollutants from shale gas operations."[7] As a result, we urge EPA to move rapidly to address this serious challenge to public health and the environment.

II. OZONE AND OIL AND GAS DEVELOPMENT

A. Smog Impacts Human Health and the Environment

Elevated ozone concentrations contribute to adverse health effects, including decreased lung function, particularly in children active outdoors; increased hospital admissions and emergency room visits; inflammation and possible long-term damage to the lungs; and premature mortality.[8] Children are highly susceptible to these risks because they have a higher respiratory rate in comparison to their size and often spend significant time outside in the summers.[9] In fact, studies have shown children with asthma are especially vulnerable to ozone,[10] as are people engaged in vigorous outdoor activity.[11] In 2008, EPA completed a review of the ozone NAAQS,

[7] SECRETARY OF ENERGY ADVISORY BOARD, SHALE GAS PRODUCTION SUBCOMMITTEE 90-DAY REPORT 16 (Aug. 18, 2011), *available at* http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf [hereinafter "SEAB 90-Day Report"].

[8] EPA, 2006 AIR QUALITY CRITERIA FOR OZONE AND RELATED PHOTOCHEMICAL OXIDANTS, (Feb. 2006); Michelle L. Bell, Roger D. Peng, & Francesca Dominici, *The Exposure-response Curve for Ozone and Risk of Mortality and the Adequacy of Current Ozone Regulations*, 114 ENVIRON. HEALTH PERSPECT., 532-536 (2006); Michelle L. Bell, Aidan McDermott, Scott L. Zeger, Jonathan M. Samet, & Francesca Dominici, *Ozone and Short-term Mortality in 95 U.S. Urban Communities, 1987-2000*, 292 JAMA, 292, 2372, 2378 (2004); Jonathan I. Levy, Susan M. Chemerynski, & Jeremy A. Sarnat, *Ozone Exposure and Mortality: An Empiric Bayes Metaregression Analysis*, 16 EPIDEMIOLOGY, 458, 468 (2005).

[9] EPA, FACT SHEET: HEALTH AND ENVIRONMENTAL EFFECTS OF GROUND-LEVEL OZONE, (July 17, 1997); *Ozone Air Pollution: What Are Its Health Effects?*, AMERICAN LUNG ASSOCIATION (last visited Dec. 2, 2012), http://www.lung.org/healthy-air/outdoor/resources/ozone.html; *see also* National Ambient Air Quality Standards for Ozone, 75 Fed. Reg. 2938, 2948 (proposed Jan. 19, 2010).

[10] EPA, *supra* note 5; Janneane F. Gent, Elizabeth W. Triche, Theodore R. Holford, Kathleen Belanger, Michael B. Bracken, William S. Beckett, & Brian P. Leaderer, *Association of Low-Level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma*, 290 JAMA, 1859, 1867 (2003); *see also* 75 Fed. Reg. at 2938.

[11] 75 Fed. Reg. at 2947.

and revised the standard to 0.075 parts per million ("ppm"),[12] though studies included in the record showed ozone levels as low as 0.060 ppm caused breathing impairment.[13]

Elevated ozone levels also damage the environment by causing direct harm to vegetation and by impeding plant growth and vitality. These adverse impacts can decrease crop yields by up to 15 percent.[14]

In addition, according to the Intergovernmental Panel on Climate Change ("IPCC"), ozone is the third-largest contributor to global climate change after carbon dioxide and methane,[15] further exacerbating ozone's deleterious impacts on public health, crops, and other plant life.[16]

B. Oil and Gas Development Produces Smog-Forming Pollution

Oil and gas activities release pollutants that mix together in the atmosphere to form ground-level ozone or smog, including volatile organic compounds ("VOCs"), nitrogen oxides ("NOx"), and methane. While the recently revised NSPS are expected to reduce a significant amount of the ozone precursors produced by the sector, the rules leave the vast majority of such pollution uncontrolled.

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[12] 73 Fed. Reg. 16,436 (Mar. 27, 2008).

[13] *See id.* at 16,454 (discussing Adams Chamber studies).

[14] Fitzgerald L. Booker, Joseph E. Miller, & Edwin L. Fiscus, *The Ozone Component of Global Change: Potential Effects on Agricultural and Horticultural Plant Yield, Product Quality and Interactions with Invasive Species*, 51 J. INTEGRATIVE PLANT BIOLOGY, 337, 342-43 (2009).

[15] Piers Forster & Venkatachalam Ramaswamy, *et al.*, *Changes in Atmospheric Constituents and in Radiative Forcing*, in CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 152 (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds, 2007))., *available at* hhttp://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf.

[16] *See, e.g.* Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,499 (Dec. 15, 2009) (describing negative effects of global climate change on the public health and welfare).

Oil and natural gas operations emit VOCs from well completion activities, pneumatic devices and pumps, storage vessels, glycol dehydrators, compressors, and leaking equipment, seals, and valves.[17] Several different analyses have found these emissions to be significant[18]:

- In its recent inventory of oil and gas exploration and development emissions across the western United States, the Western Regional Air Partnership ("WRAP") estimated that oil and gas activities emitted 257,000 tons of VOCs in 2006 and projected these sources would account for 273,000 tons of VOCs in 2010/2012.[19] These emissions contribute more ozone causing pollution than all of the electric generating units in Colorado, which generated 235,000 tons of VOCs in 2008.[20]

- A separate Colorado Department of Public Health analysis determined that the smog-forming emissions from oil and gas operations in Colorado exceed vehicle emissions for the entire state.[21]

- A summer 2012 report by the American Petroleum Institute and the American Natural Gas Alliance shows significant emissions from well completions and liquids unloading activities.[22]

- In North Dakota, EPA's recent Federal Implementation Plan for the Fort Berthold Indian Reservation concluded that a typical, uncontrolled well pad in the area produces 4,330 tons of VOCs per year.[23]

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[17] *See* WESTERN REGIONAL AIR PARTNERSHIP, 2006 BASELINE TECHNICAL MEMOS FOR DENVER-JULESBURG, NORTH AND SOUTH SAN JUAN, PICEANCE, WIND RIVER, AND UINTA BASINS (Apr. 30, 2008) *available at* http://www.wrapair.org/forums/ogwg/documents/2008-04_'06_Baseline_Emissions_DJ_Basin_Technical_Memo_(04-30).pdf.

[18] The following estimates are from analyses prior to the effective date of NSPS Subpart OOOO, which will reduce some but not all of the VOC emissions from these sources.

[19] *Id.*

[20] *2008 National Emissions Inventory Data*, EPA (Apr. 10, 2012), http://www.epa.gov/ttn/chief/net/2008inventory.html (to replicate calculations, under "Sector Summaries – Criteria and Hazardous Air Pollutants by 60 EIS Emission Sectors," select "create CSV file," with criteria set for "region" = "national"; "geographic aggregation" = "Region 8 – Colorado"; "pollutant" = "HAP – VOC"; and "sector" = "all".

[21] Colo. Dept. of Public Health & Env't, Air Pollution Control Division, *Oil and Gas Emission Sources*, Presentation for the Air Quality Control Commission Retreat, at 3-4 (May 15, 2008) (on file with author).

[22] *See* Terri Shires & Miriam Lev-On, API/ANGA, *Characterizing Pivotal Sources of Methane Emissions from Unconventional Natural Gas Production* ("API/ANGA Report") (June 2012). Though this survey reports methane emissions, application of EPA emission factors yields VOC data.

- The Pennsylvania Department of Environmental Protection has attributed elevated levels of VOCs, including BTEX compounds, naphthalene, and methylbenzenes, found in studies of two separate regions of the state, to shale gas development activities.[24]

Engines used to power compressors, drill rigs, and other equipment are the primary sources of NOx emissions from the oil and gas sector. According to the same WRAP inventory, oil and natural gas sources accounted for 96,000 tons of NOx in 2006 and a projected 77,000 tons in 2010/2012.[25] In 2008, NOx emissions from compressor engines and drill rigs in the Denver-Julesberg basin in Northeast Colorado alone exceeded the NOx emissions from the Craig power plant – the largest point source of NOx in the state of Colorado.[26]

In addition, oil and natural gas operations are the largest domestic source of methane, which both contributes to background levels of ozone pollution and destabilizes the climate.[27] EPA estimated that natural gas systems release 10.5 million metric tons of methane, corresponding to just over 2 percent of gross U.S. natural gas production.[28] A recent empirical study in the Denver-Julesberg basin suggests that the rate may be almost twice as high as EPA's

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[23] *See* Federal Implementation Plan for Oil and Natural Gas Well Production Facilities; Fort Berthold Indian Reservation (Mandan, Hidatsa, and Arikara Nations), North Dakota, Docket No. EPA-R08-OAR-2012-0479, 77 Fed. Reg. 48,878, 48,878 (Aug. 15, 2012).

[24] *See* PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, NORTHEASTERN PENNSYLVANIA MARCELLUS SHALE SHORT-TERM AMBIENT AIR SAMPLING REPORT, 1, 22-23 (Jan. 12, 2011), *available at* http://www.dep.state.pa.us/dep/deputate/airwaste/aq/aqm/docs/Marcellus_NE_01-12-11.pdf; PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, SOUTHWESTERN PENNSYLVANIA MARCELLUS SHALE SHORT-TERM AMBIENT AIR SAMPLING REPORT, 1, 20-21 (Nov. 1, 2010), *available at* http://www.dep.state.pa.us/dep/deputate/airwaste/aq/aqm/docs/Marcellus_SW_11-01-10.pdf.

[25] Western Regional Air Partnership, *supra* note 12.

[26] 2008 National Emissions Inventory Data, EPA (Apr. 30, 2008), http://www.epa.gov/ttn/chief/net/2008inventory.html (to replicate calculations, under "Additional Summary Data," download "facility level by pollutant," and sort by "State," "Pollutant_Name" and "Total_Emissions").

[27] *See* EPA, *Human-Related Sources in the United States* (Apr. 18, 2011), http://epa.gov/methane/sources.html; *see also* EPA, *Ground Level Ozone* (Nov. 1, 2012) http://epa.gov/air/ozonepollution/. *See also* Jason J. West, Arlene M. Fiore, Larry W. Horowitz, & Denise L. Mauzerall, *Global Health Benefits of Mitigating Ozone Pollution with Methane Emission Controls*, 118 PNAS 3988, 3988 (2006).

[28] EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2010 at 3-2 (Apr. 2012), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Chapter-3-Energy.pdf.

estimate,[29] and though NREL estimated a 1.3 percent methane leak rate in the Barnett Shale, even this relatively low estimate is associated with a substantial amount of methane pollution.[30] Due to methane's role as a surface-level ozone precursor, reducing methane emissions has been shown to reduce surface-ozone-associated human mortality.[31]

C. Oil and Gas Emissions Are Linked to Ozone Air Quality Problems

Emissions of smog-forming pollution from the oil and natural gas sector can cause ozone air quality problems that have been documented in urban areas, rural communities, and national parks and wilderness areas across the country.

Oil and gas development in Texas's Barnett Shale contributes to ozone non-attainment in the Dallas-Fort Worth area. A recent analysis in the Barnett shale sought to estimate the near-source impacts of oil and gas activities on smog formation and concluded that "under average midday conditions in June, regular emissions mostly associated with compressor engines may increase ambient ozone in the Barnett Shale by more than 3 ppb beginning at about 2 km downwind of the facility, assuming there are no other major sources of ozone precursors."[32] The study also found certain sustained flare volumes can impact peak ozone, concluding "additional peak ozone from the hypothetical flare can briefly exceed 10 ppb about 16 km downwind."[33] These impacts, the study concluded, will make ozone attainment challenging in "major

[29] Gabrielle Pétron et. al., *Hydrocarbon Emissions Characterization in the Colorado Front Range: A Pilot Study*, 117 J. GEOPHYSICAL RESEARCH D04304, D04304 (2012).

[30] Logan *et al*, NATURAL GAS AND THE TRANSFORMATION OF THE U.S. ENERGY SECTOR 5 (Nov. 2012).

[31] Jason J. West, Arlene M. Fiore, Larry W. Horowitz, & Denise L. Mauzerall, *Global Health Benefits of Mitigating Ozone Pollution with Methane Emission Controls*, 118 PNAS 3988, 3988 (2006).

[32] Eduardo P. Olaguer, *Potential Near Source Ozone Impacts of Upstream Oil and Gas Industry Emissions*, 62 J. AIR & WASTE MGMT. ASS'N 966 (2012).

[33] *Id.*

metropolitan areas in or near shale formations . . . unless significant controls are placed on emissions from increased oil and gas exploration and production."[34]

Oil and gas development can also have harmful impacts in rural communities. A 2007 study documented rising ozone concentrations in rural areas across the Western United States, concluding that oil and gas operations were potentially to blame for the elevated emissions.[35] Several other studies have identified ozone concentrations of up to 80 ppb (exceeding EPA NAAQS requirements) in various parts of rural Colorado near heavy oil and gas development.[36]

Parts of Wyoming and Utah with extensive oil and gas development have also experienced unsafe wintertime ozone levels.[37] In designating Sublette County and portions of Lincoln and Sweetwater Counties in Wyoming as failing to attain the 2008 ozone standard, EPA noted that the ozone air quality problems were "primarily due to local emissions from oil and gas activities: drilling, production, storage, transport and treatment of oil and natural gas."[38] The Wyoming Department of Environmental Quality provided a similar assessment[39] and then-Governor Freudenthal recommended that parts of the Upper Green River Basin be designated as

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[34] *Id.*

[35] Dan Jaffe & John Ray, *Increase in Surface Ozone at Rural Sites in the Western US*, 41 ATMOSPHERIC ENVT. 5452, 5461-62 (2007).

[36] *See, e.g.*, Lisa M. McKenzie, Roxana Z. Witter, Lee S. Newman, & John L. Adgate, *Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources*, 424 SCIENCE OF THE TOTAL ENVIRONMENT, 79, 86 (2012); ROXANA WITTER, KAYLAH STINSON, HOLLY SACKETT, STEFANIE PUTTER, GREGORY KINNEY, DANIEL TEITELBAUM, & LEE NEWMAN, POTENTIAL EXPOSURE-RELATED HUMAN HEALTH EFFECTS OF OIL AND GAS DEVELOPMENT: A WHITE PAPER, University of Colorado at Denver School of Public Health, 19-20 (Sept. 15, 2008).

[37] Russell C. Schnell, Samuel J. Oltmans, Ryan R. Neely, Maggie S. Endres, John V. Molenar, & Allen B. White, *Rapid Photochemical Production of Ozone at High Concentrations in a Rural Site during Winter*; 2 NAT. GEOSCI. 120, 120 (2009).

[38] 77 Fed. Reg. 34221 *et. seq; see also* EPA, TECHNICAL SUPPORT DOCUMENT, WYOMING AREA DESIGNATIONS FOR THE 2008 OZONE NATIONAL AMBIENT AIR QUALITY STANDARDS (2012), *available at* http://www.epa.gov/ozonedesignations/2008standards/ documents/ R8_WY_TSD_Final.pdf (Wyoming)

[39] *Id.* at viii.

an ozone non-attainment area[40], which EPA did in May of 2012.[41] Similarly, wintertime ozone concentrations in Utah's Uinta Basin – also the site of significant oil and gas development – exceeded federal air quality standards almost 70 times in the first three months of 2010 and have sometimes reached levels almost twice as high as the federal standard.[42] The Bureau of Land Management (BLM) determined that the multitude of oil and gas wells in the region were the primary cause of the ozone pollution.[43]

Pristine national parks and wilderness areas near oil and gas development have also experienced higher ozone concentrations.[44] Many national parks have struggled for decades with elevated ozone concentrations and its effects on the health of park staff, visitors, vegetation and wildlife.[45] A recent study documented the first case of foliar damage caused by ozone to cutleaf coneflower (Rudbeckia laciniata) in Rocky Mountain National Park.[46] In 2012 alone there were 288 exceedances of the national ambient air quality standard for ozone in national parks with ozone monitoring.[47]

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[40] Letter to Ms. Carol Rushin, Acting Regional Administrator from Governor Dave Freudenthal (March 12, 2009), http://deq.state.wy.us/AQD/Ozone/Gov%20Ozone%20to%20EPA%20(Rushin)_Final_3-12-09.pdf

[41] 77 Fed. Reg. 30,088, 30,157 (May 21, 2012).

[42] Scott Streater, *Air Quality Concerns May Dictate Uintah Basin's Natural Gas Drilling Future*, N.Y. TIMES, Oct. 1, 2010, *available at* http://www.nytimes.com/gwire/2010/10/01/01greenwire-air-quality-concerns-may-dictate-uintah-basins-30342.html?pagewanted=1 (last visited Sept. 28, 2011).

[43] BLM, GASCO ENERGY INC. UINTA BASIN NATURAL GAS DEVELOPMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT at 3-13 (Oct. 2010), *available at* http://www.blm.gov/ut/st/en/fo/vernal/planning/nepa_/gasco_energy_eis.html.

[44] Marco A. Rodriguez, Michael G. Barna, & Tom Moore, *Regional Impacts of Oil and Gas Development on Ozone Formation in the Western United States*, 59 J. AIR & WASTE MGMT. ASS., 1111, 1111 (2009).

[45] National Park Service, *Air Quality in National Parks: 2009 Annual Performance & Progress Report* (2010), http://www.nature.nps.gov/air/Pubs/pdf/gpra/AQ_Trends_In_Parks_2009_Final_Web.pdf

[46] Kohut, Robert; Flanagan, Colleen; Cheatham, James; Porter, Ellen, *Foliar Ozone Injury on Cutleaf Coneflower at Rocky Mountain National Park, Colorado*. Western North American Naturalist vol. 72 issue 1 April 2012.

[47] National Park Service, Ozone Standard Exceedances in National Parks 2012, http://www.nature.nps.gov/air/monitoring/exceed.cfm.

Rapid expansion of oil and gas activities in northern New Mexico and Colorado is contributing to ozone levels at Mesa Verde National Park, San Pedro Parks Wilderness Area, Bandelier Wilderness Area, Pecos Wilderness Area, Wheeler Peak Wilderness, and the Weminuche Wilderness.[48] Modeling has shown that oil and gas activities have "the potential to put [Mesa Verde National Park and Weimenuche Wilderness Area] out of compliance with the new EPA [ozone] standard."[49] A similar rise in ozone levels is being recorded at Grand Teton National Park in Wyoming, and is thought to be linked to rapid expansion of oil and gas drilling in the Pinedale, Wyoming area.[50] Each of the aforementioned parks and wilderness areas is afforded "Class I" air quality status under the Clean Air Act, which places an enhanced duty on EPA to protect their air resources from oil and gas activities.[51]

D. Absent Rigorous Controls, Ozone Problems Will Worsen as Oil and Gas Development Expands

As development expands into new areas in North Dakota, South and Northeast Texas, Northwest Louisiana, Arkansas, and the Northeast, the problem of ozone pollution associated with oil and gas development will only increase. As noted above, though the NSPS will reduce smog forming pollution, a significant amount of this pollution will remain uncontrolled. And U.S. shale production is expected to increase threefold from 2009 to 2035, with shale gas accounting for 49% of domestic natural gas production by 2035.[52]

The prevalence of shale oil and gas throughout the country, and the likelihood that these resources will be developed, means that ozone precursor emissions are likely to rise in many

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[48] *Id.* at 1112.

[49] *Id.* at 1116.

[50] See, e.g., Wyoming Department of Environmental Quality, *Wyoming Ambient Air Monitoring Annual Network Plan* (2011), http://deq.state.wy.us/aqd/downloads/AirMonitor/Network_Plan_2011.pdf

[51] Clean Air Act, 42 U.S.C. 7472, 7473, 7491 *et. seq*.

[52] ANNUAL ENERGY OUTLOOK 2012, *supra* note 1 at 93.

parts of the United States, absent additional controls. While the recently revised NSPS are expected to reduce a significant amount of the ozone precursors produced by the sector, the rules leave the vast majority of such pollution uncontrolled. Emissions increases will likely be particularly significant in the Rocky Mountain, Gulf and Northeast regions. A study in the Haynesville Shale, located in Northwest Texas and Northeast Louisiana, estimated that between 2009 and 2020 NOx emissions from oil and gas operations would increase by 124% and, during the same period, VOC emissions would increase by 271%.[53] The study concluded that these "increases are sufficiently large that it is necessary to evaluate their ozone impacts."[54] Likewise, the Rocky Mountain region is expected to see approximately a 15% increase in natural gas production between 2009 and 2035.[55] Shale oil production in the Eagle Ford in Texas alone could reach 1.5 million barrels per day by 2015.[56]

Several studies predict that growth in this sector will elevate ozone levels near oil and gas activities. A study modeling anticipated ozone concentrations in oil and gas areas in the West concluded that as "oil and gas development in the western United States continues to accelerate, there is significant potential that emissions from these sources will exacerbate the existing [ozone] problem."[57] The study predicted both incremental and peak ozone concentration increases, concluding the data "does indicate a clear potential for oil and gas development to negatively affect regional O_3 concentrations in the western United States, including several

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[53] Susan Kemball-Cook et. al., *Ozone Impacts of Natural Gas Development in the Haynesville Shale*, 44 ENVTL. SCIENCE & TECHNOLOGY, 9357-9363 (2010).

[54] *Id.*

[55] ANNUAL ENERGY OUTLOOK 2012, *supra* note 1 at 93.

[56] BIPARTISAN POLICY CENTER, SHALE GAS: NEW OPPORTUNITIES, NEW CHALLENGES at 8 (Jan. 2012), *available at* http://www.bipartisanpolicy.org/sites/default/files/BPC%20Shale%20Gas%20Paper.pdf.

[57] Rodriguez *et al.*, *supra* note 35, at 1111-12.

treasured national parks and wilderness areas."[58] A study from Wyoming's Upper Green River Basin concluded that "similar low-temperature ozone formation is probably occurring in other regions of the western US . . . where fossil fuel extraction occurs in similar terrain and under similar meteorological conditions," but that "[a]t present, ozone measurements in most of these regions in winter are non-existent."[59] Regional air quality models predict that gas development in the Haynesville shale will increase ozone pollution in northeast Texas and northwest Louisiana and may lead to violations of ozone NAAQS.[60] Even under slow-development scenarios, this analysis suggests that "emissions from exploration and production activities will be sufficiently large that their potential impacts on ozone levels in Northeast Texas and Northwest Louisiana may affect the ozone attainment status of these areas."[61]

III. OZONE MONITORS ARE INSUFFICIENT TO CHARACTERIZE OZONE AIR QUALITY PROBLEMS IN MANY AREAS OF OIL AND GAS DEVELOPMENT

Despite the strong link between oil and gas emissions and ozone air quality problems, many areas surrounded by this development lack ozone monitors, as the below figure demonstrates. Absent monitoring, citizens are left to guess at the air quality impacts of oil and gas development in their communities and EPA and states lack critical data they need to protect public health and the environment.

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[58] *Id*. at 1118.

[59] Schnell *et al.*, *supra* note 29, at 122.

[60] *See* Kemball-Cook, *supra* note 39 at 9362.

[61] *Id*.

Active Rigs, Ozone Monitors, and Population Density

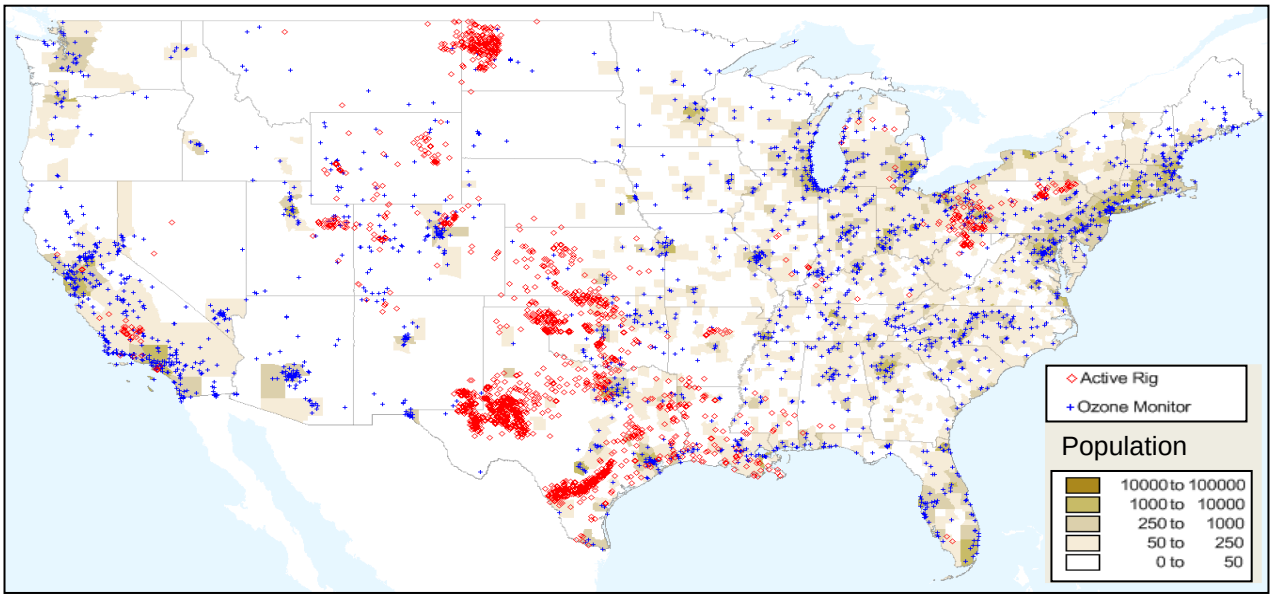

Figure 1: Red dots represent active rigs as of September, 2012. Blue dots represent existing ozone monitors and the shaded areas depict population density.[62]

A. The Current Ozone Monitoring Network Does not Adequately Capture Ozone Problems Associated with Oil and Gas Development

EPA's ozone monitoring network requirements ensure air quality in large urban areas meets federal National Ambient Air Quality Standards. The agency has noted, however, that the network design leaves "significant gaps" in ozone monitoring, especially in rural areas in the West and Midwest[63] and has concluded that additional monitoring would provide an "assessment of population exposure due to elevated ambient O_3 levels in smaller communities located outside of the larger urban [Metropolitan Statistical Areas]."[64]

[62] Data Sources are Ventyx Velocity, EPA Air Data, RigData (active status of rigs as of Sep 14, 2012), and U.S. Census Bureau data.

[63] 74 Fed. Reg. 34,525, 34,528-530 (July 16, 2009).

[64] Id. at 34530.

State efforts are equally inadequate. Certain states with significant oil and gas development have deployed monitors in some areas, though limited state resources and swiftly expanding oil and gas operations have resulted in mixed successes.[65] Other states with burgeoning development have added no additional monitors in oil and gas development areas. For example, despite ozone air quality problems near the South San Juan Basin in New Mexico, the state has not added any special purpose monitors to measure ozone or ozone precursors in the area.[66] State efforts to address possible ozone pollution stemming from the rapid development of the Bakken shale oil play and the Eagle Ford have also been very limited.[67]

[65] Wyoming is gathering additional information on ozone levels in areas of concentrated oil and gas development due to the ozone non-attainment problem in the Upper Green River Basin. *See* Wyoming Department of Environmental Quality, Wyoming Ambient Air Monitoring Annual Network Plan (2011), *available at* http://deq.state.wy.us/aqd/downloads/AirMonitor/Network_Plan_2011.pdf (describing the Boulder, Juel Spring, Pinedale, S. Daniel, and Wamsutter monitors). Despite these efforts, monitoring in the Powder River Basin and Niobrara is still quite limited. Utah has expanded monitoring in the Uinta, but despite these efforts, Utah's Department of Environmental Quality has noted "ozone is potentially much more of a regional problem in the Western United States than was originally thought" concluding that "[further] analysis may result in the need for an expanded ozone monitoring network." *Uintah Basin: Air Quality and Energy Development*, Utah Department of Environmental Quality (Aug. 21, 2012), *available at* http://www.deq.utah.gov/Issues/uinta_basin/index.htm. Colorado has also made some efforts to provide additional ozone monitoring related to oil and gas development, adding ozone monitors in the towns of Rifle and Cortez to characterize ozone pollution related to development on the western slope. *See* COLORADO DEPARTMENT OF PUBLIC HEALTH, COLORADO ANNUAL MONITORING NETWORK PLAN, 2011-2012 3, A-13, A-18 (June 30, 2011), http://www.colorado.gov/airquality/documents/2011AnnualNetworkPlan.pdf.

[66] NEW MEXICO ENVIRONMENT DEPT., AIR QUALITY BUREAU, 2009 NETWORK REVIEW (July 2010), http://www.epa.gov/ttnamti1/files/networkplans/NMPlan2010.pdf.

[67] North Dakota added one monitor in 2005 to understand whether oil and gas development in Colorado, Wyoming, and Montana is affecting ozone levels in North Dakota. See North Dakota Ozone Monitoring Network Plan 2010-2011 at 11, *available at* http://www.ndhealth.gov/aq/ambient/nwrev_09_2.pdf.

Bakken/North Dakota: Active Rigs, Ozone Monitors, and Population Density

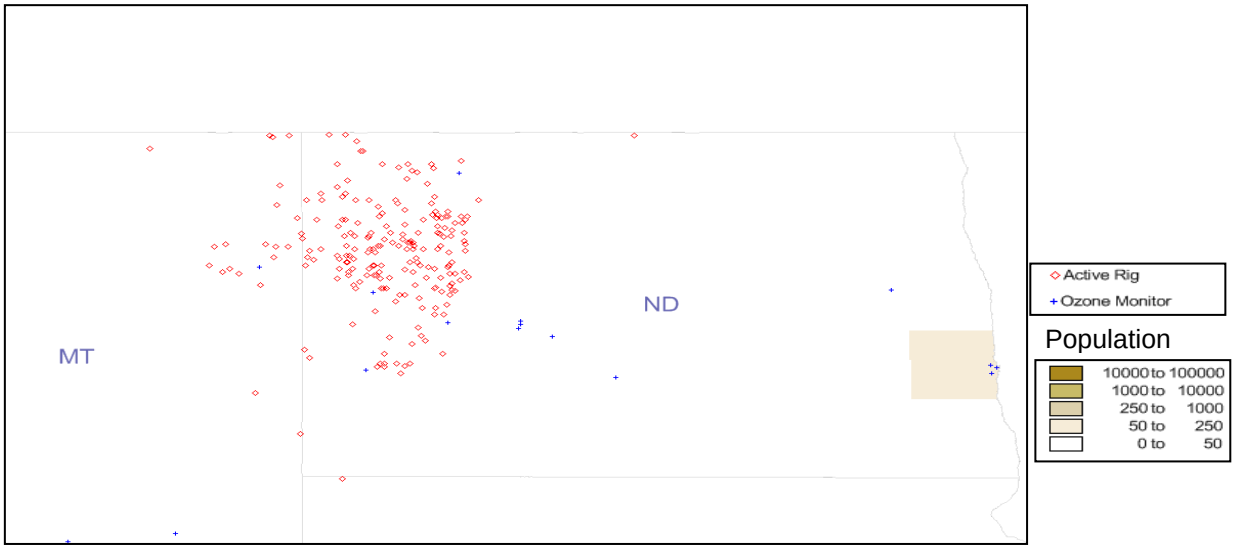

Figure 2: Red dots represent active rigs as of September, 2012. Blue dots represent existing ozone monitors and the shaded areas depict population density.[68]

B. The Deficient Ozone Monitoring in the Eagle Ford Epitomizes this Pressing Problem

Drilling is expanding rapidly in the Eagle Ford shale play in southern Texas: gas production grew from 67 well permits issued in 2009, to 158 in 2010, and to 550 in 2011[69]; and oil production similarly skyrocketed from zero permitted wells in 2008 to 40 in 2009, 72 in 2010, and to 368 in 2011.[70] As of May 14, 2012, there were a total of 4,030 permitted oil and gas wells in the Eagle Ford play, with an additional 1,376 oil wells and 603 gas wells scheduled to be permitted (see figure below).[71] And production at Eagle Ford is expected to continue to expand.

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[68] Data Sources are Ventyx Velocity, EPA Air Data, RigData (active status of rigs as of Sep 14, 2012), and U.S. Census Bureau data.

[69] *Eagle Ford Information*, TEXAS RAILROAD COMMISSION, (updated Nov. 13, 2012), www.rrc.state.tx.us/eagleford/index.php.

[70] *Id.*

[71] *Wells Permitted and Completed in the Eagle Ford Shale Play*, TEXAS RAILROAD COMMISSION (May 14, 2012), www.rrc.state.tx.us/eagleford/images/EagleFordShalePlay201205-large.jpg.

The 30 million barrels of oil equivalent it produced in 2011 is expected to grow to 1.2 million barrels of oil equivalent *per day* by 2015, with permits surging to 25,000 per year.[72] Another study projected that Eagle Ford shale oil production alone would reach 1.5 million barrels per day by 2015, a volume that would exceed the current throughput of the Trans Alaska Pipeline.[73]

There are only four air quality monitoring stations in the entire 23-county[74] Eagle Ford shale region.[75] Two monitors, located in Laredo, are located at the extreme southwestern edge of the shale play, and another, located in College Station, is located at the extreme northeast edge.[76] These monitors are inadequate to capture emissions data from the roughly 400-mile swathe between them. Only a single monitor, located in unincorporated Fayette County, is even close to the center of the Eagle Ford shale play.[77] Texas Commission on Environmental Quality ("TCEQ") data for the rural Fayette County site, which only measures ozone levels between April and October, shows 12 days in 2011 with ozone levels above 75 ppb, with ozone levels spiking above 80 ppb on three of those days, and reaching 85 ppb on August 28th.[78] As of July, data for 2012 shows two days with ozone levels above 75 ppb.[79] Without more than a single

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[72] Keith Schaefer, *Investing in the Eagle Ford Shale Oil Play*, OIL AND GAS INVESTMENTS BULLETIN (May 25, 2012), *available a*t http://oilandgas-investments.com/2012/investing/investing-in-the-eagle-ford-shale-oil-play/.

[73] Bipartisan Policy Center, *supra* note 42 (quoting FBR CAPITAL MARKETS, EAGLE FORD: PREDICTABLE NATURE OF THE LEARNING CURVE PORTENDS MATERIAL REVALUATION YET TO COME, at 1 (July 6, 2011).

[74] According to the Texas Railroad Commission, the 23 county region includes Atacosa, Bee, Brazos, Burleson, DeWitt, Dimmit, Fayette, Frio, Gonzales, Grimes, Karnes, LaSalle, La Vaca, Lee, Leon, Live Oak, Maverick, McMullen, Milam, Robertson, Webb, Wilson, and Zavala counties. *See* Railroad Commission of Texas, *supra* note 53.

[75] Two stations are located in the city of Laredo in Webb County, one is located in unincorporated Fayette County, and one is located in the City of College Station in Brazos County. TEXAS DEPARTMENT OFT OF ENVIRONMENTAL QUALITY, GEOGRAPHICAL TEXAS AIR MONITORING (last visited Dec. 2, 2012) http://gis3.tceq.state.tx.us/geotam/index.html.

[76] *Id.*

[77] *Id.*

[78] TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, CAMS 601 OZONE SUMMARY FOR 2011, available at http://www.tceq.state.tx.us/cgi-bin/compliance/monops/yearly_summary.pl (last visited Dec. 2, 2012) (monitoring site = CAMS 601; year = 2011; pollutant = ozone).

monitor located in the 400-mile long and 50-mile wide Eagle Ford Shale basin, it is impossible to know just how much of the area might record similarly dangerous levels of ozone.

The Eagle Ford shale is located in the center of four major metropolitan areas (San Antonio (population 2,194,927), Austin (population 1,783,519), Houston (population 6,086,538), and Corpus Christi/Galveston (population 431,381).[80] Regional air quality officials are already investigating the potential for oil and gas development in the region to contribute to ozone non-attainment. Notably, the San Antonio Metro area is already on the threshold of violating the 75 ppb EPA standard.[81] Some San Antonio officials have expressed concern about emissions from the Eagle Ford shale play contributing to ozone pollution in San Antonio, as the region's prevailing winds send emissions from the area directly into the city.[82] Indeed, the *New York Times* recently quoted the natural resources director for the San Antonio-area Alamo Area Regional Council of Governments expressing concern about this possibility at a time when "San Antonio is teetering on the edge of non-attainment."[83] San Antonio is not the only metro area impacted by the Eagle Ford Shale with an ozone problem. The Houston-Galveston-Brazoria metropolitan area, just east of the Eagle Ford shale, is already designated in ozone non-attainment as of the April-May 2012 period.[84]

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[79] *Id.*

[80] *Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1 2010 to July 1, 2011*, UNITED STATES CENSUS BUREAU (last visited Dec. 2, 2012),http://www.census.gov/popest/data/metro/totals/2011/tables/CBSA-EST2011-01.csv.

[81] Dean Danos, *Impact of the Eagle Ford Shale on South Texas Communities*, ALAMO AREA COUNCIL OF GOVERNMENTS 15-18 (Apr. 13, 2012), *available at* http://www.aacog.com/DocumentCenter/Home/View/4208.

[82] *See, e.g.*, Vickie Vaughan, *Shale Play a Worry for Bexar Ozone*, SAN ANTONIO EXPRESS-NEWS, (May 23, 2012), *available at* http://www.mysanantonio.com//business/article/Shale-play-a-worry-for-Bexar-ozone-3581077.php.

[83] Kate Galbraith, *2011 Proving to be a Bad Year for Air Quality in Texas*, N.Y. TIMES (Dec. 11, 2011), *available at* http://www.nytimes.com/2011/12/11/us/2011-proving-to-be-a-bad-year-for-air-quality.html.

[84] *Non-attainment Designations for the 2008 Ozone Standards – Counties by State April 30, 2012 and May 31, 2012*, EPA (June 5, 2012), , *available at* http://www.epa.gov/ozonedesignations/2008standards/final/finaldes.htm.

Inadequate monitoring in the Eagle Ford shale play is not only a problem for the 10.5 million citizens of the four major metropolitan areas surrounding it. The 23-county area that the Eagle Ford shale underlies has a population of 907,844 on its own.[85] The ozone pollution issues in these rural areas raise not only public health concerns, but also environmental justice concerns. 54.72% of the residents of the 23-county Eagle Ford area are Hispanic.[86] In Webb, Zavala, and Maverick Counties, 93% of the population is Hispanic.[87] Under Executive Order 12898, EPA, as a federal agency, must "collect, maintain, and analyze information assessing and comparing environmental and human health risks borne by populations identified by race, national origin, or income."[88] The near-complete lack of ozone monitoring data in the 20,000-square-mile, majority-Hispanic Eagle Ford shale region constitutes a failure to address the requirements of E.O. 12898. Until adequate monitoring data is available, it will be impossible to know how ozone pollution from oil and gas drilling is affecting public health in the region.

[85] Population Estimates for Texas Counties, United States Census Bureau (last visited Dec. 2, 2012), *available at* http://www.census.gov/popest/data/counties/totals/2011/tables/CO-EST2011-01-48.xls (calculations on file with author, and based on summing 2011 population estimates for all 23 counties listed as within the Eagle Ford Shale by the Texas Railroad Commission).

[86] *Census 2010 Interactive Map: Texas Population By Race, Hispanic Origin*, UNITED STATES CENSUS BUREAU, accessed through Ryan Murphy and Matt Stalls, *Census 2010 Interactive Map*, TEXAS TRIBUNE,(Jan. 4, 2012), *available at* http://www.texastribune.org/library/data/census-2010/ (calculations on file with author, and based dividing 2010 census data on population of Hispanic or Latino origin by 2011 population estimates for all 23 counties listed as within the Eagle Ford Shale by the Texas Railroad Commission).

[87] *Id.*

[88] Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994) at § 3-302(a).

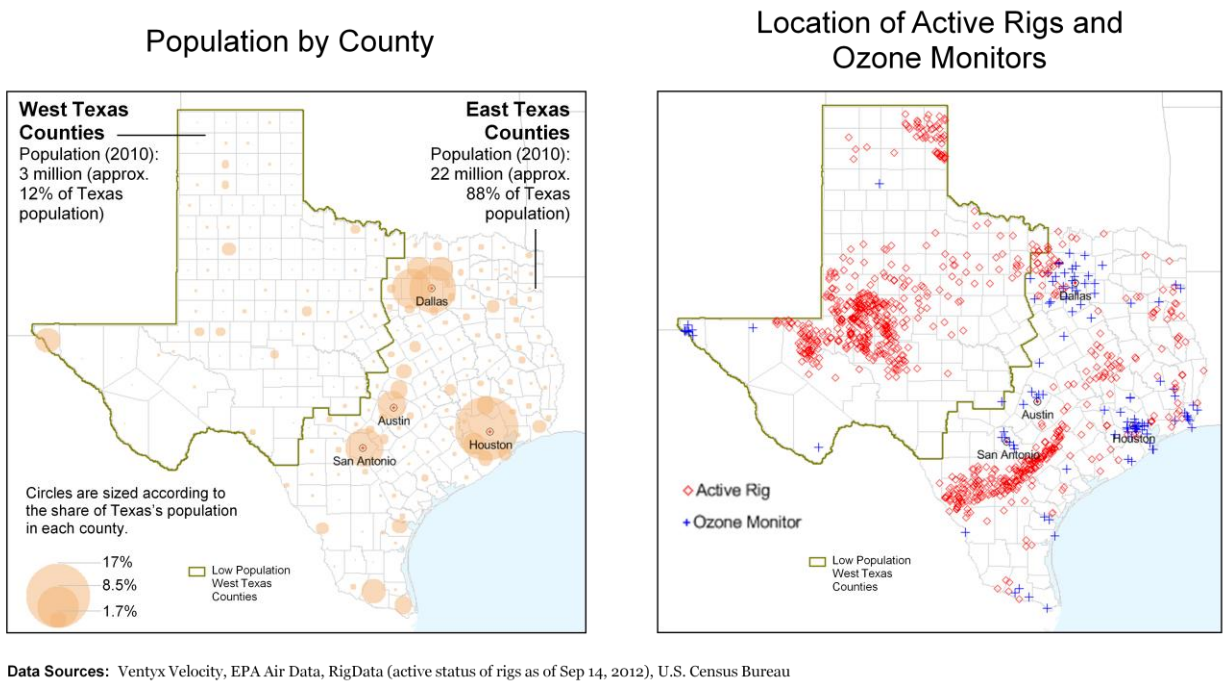

Figure 3: Red dots represent active rigs as of September, 2012. Blue dots represent existing ozone monitors and the shaded areas depict population density.[89]

C. Industry Deployment of Ozone Monitors Can Reveal Ozone Air Quality Problems and Support Federal and State Efforts

In the past, EPA has required oil and gas operators to monitor ozone as part of consent decrees for violations of the Clean Air Act. For instance, in 2007, the agency entered into a consent decree with Kerr-McGee, requiring the company to install air quality monitoring stations "designed to monitor ozone, NOx and PM2.5 concentrations."[90] As a result of extremely high ozone readings from these monitors, both EPA and the state of Utah identified ozone problems in

[89] Data Sources are Ventyx Velocity, EPA Air Data, RigData (active status of rigs as of Sep 14, 2012), and U.S. Census Bureau data.

[90] Consent Decree, United States and State of Colorado v. Kerr-McGee Corporation, *available at* http://www.epa.gov/compliance/resources/decrees/civil/caa/kerr-mcgee-cd.pdf.

the Uinta.[91] As evidenced by experience in the Uinta, widespread deployment of ozone monitors in oil and gas development areas can help to identify areas experiencing significant ozone problems.

IV. THE CLEAN AIR ACT PROVIDES FOR OZONE MONITORING IN AREAS OF OIL AND GAS DEVELOPMENT

Ambient air quality data is a baseline necessity for ensuring that regions across the country meet the health- and welfare-based NAAQS, a dual obligation of EPA and the states. Thus it is entirely reasonable for EPA to require, pursuant to Section 114, owners and operators to "install, use, and maintain such monitoring equipment…" as is necessary to assess the impact of oil and gas development on ozone concentrations.[92]

Ozone is one of six criteria pollutants for which EPA sets national ambient air quality standards. Section 109 of the Act requires EPA set primary ozone NAAQS at levels that are "requisite to protect the public health" with "an adequate margin of safety."[93] Under Section 107 of the Act, states and EPA then work collaboratively to designate geographic areas around the country as attainment, non-attainment, or unclassifiable with respect to the standard.[94] States have "the initial and primary responsibility for deciding what emissions reductions will be

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[91] Subsequently, the state has deployed additional monitoring resources in the area and EPA has designated the counties as "unclassifiable" while the state gathers additional data. Despite the agency's reluctance to utilize data from these industry monitors, we believe the agency has a legal duty to do so when making designations.

[92] *See* 42 U.S.C. § 7414(a)(i), (iii), and (1)(C).

[93] 42 U.S.C. § 7409(b)(1); *see Whitman v. American Trucking Assns., Inc.*, 531 U.S. 457, 465 (2001). Secondary ambient air quality standards must specify a level of air quality "requisite to protect public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air." 42 U.S.C.7409(b)(2). EPA has specifically acknowledged that secondary ambient air quality standards should protect sensitive vegetation and ecosystems, including forests, parks, wildlife refuges and wilderness areas from the effects of ozone pollution. *See* U.S. EPA, *Ozone National Ambient Air Quality Standards: Scope and Methods Plan for Welfare Risk and Exposure Assessment* (April 2011), http://www.epa.gov/ttn/naaqs/standards/ozone/data/2011_04_WelfareREA.pdf; U.S. EPA, *Proposed Revisions to National Ambient Air Quality Standards for Ozone*, 75 Fed. Reg. 2938 (January 19, 2010), http://www.gpo.gov/fdsys/pkg/FR-2010-01-19/pdf/2010-340.pdf

[94] *Id.* § 7407(d).

required from which sources"[95] and, through state implementation plans required by the Act, must implement protective, pollution reduction measures in areas that fail to meet the NAAQS.[96]

For this process to function as the Act contemplates, EPA and the states must possess rigorous, comprehensive information on ozone pollution levels and trends. The Act recognizes the need for comprehensive air quality data in provisions applicable to both EPA and the states. For instance, Section 103 directs EPA to establish a national research and development program for the prevention and control of air pollution.[97] As part of this mandate, Congress required EPA to establish "a national network to monitor, collect, and compile data with quantification of the certainty in the status and trends of air emissions . . . and to ensure the comparability of air quality data collected in different States and obtained from different nations."[98] Moreover, Section 103 specifically emphasizes the importance of ozone monitoring, requiring "[d]evelopment of improved methods and technologies for sampling, measurement, monitoring, analysis, and modeling to increase understanding of the sources of ozone precursors, ozone formation, ozone transport, [among others]."[99] Likewise, Section 110 requires that state plans "provide for establishment and operation of appropriate devices, methods, systems, and procedures necessary to-(i) monitor, compile, and analyze data on ambient air quality . . . ."[100] Sections 103 and 110 establish and underscore EPA's duty to ensure adequate monitoring of ozone pollution across the country.

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[95] *Whitman*, 531 U.S. at 465.

[96] *Id.* § 7502(a)(2) (setting forth attainment dates for nonattainment areas); *id.* § 7402(c) (describing required nonattainment plan provisions).

[97] 42 U.S.C. § 7403(a).

[98] *Id.* § 7403(c).

[99] *Id.* § 7403(c)(3).

[100] *Id.* § 7410(a)(2)(B). EPA may also require "the installation, maintenance, and replacement of equipment, and the implementation of other necessary steps, by owners or operators of stationary sources to monitor emissions from such sources" in state plans. *Id.* § 7410(a)(2)(F)(i).

Section 114 of the Act provides EPA with manifest authority to compel adequate ozone air quality data collection through use of monitors in oil and gas development areas. Under that provision, the Administrator can require regulated sources to provide information "[f]or the purpose (i) of developing or assisting in the development of any implementation plan under section 7410 . . . (ii) determining whether any person is in violation of . . . any requirement of such a plan, or (iii) carrying out any provision of [Chapter 85]."[101] To this end, Section 114 authorizes the Administrator to "require any person who owns or operates any emission source" to "install, use, and maintain such monitoring equipment, and use such audit procedures or methods; sample such emissions; . . . and provide such other information, as [s]he may reasonably require."[102] EPA has exercised this authority broadly,[103] and courts have recognized EPA's authority to require sources to monitor a wide range of pollutants and to enforce nearly every provision of the Clean Air Act.[104]

This broad, flexible authority clearly applies to facilities in the oil and natural gas production sector,[105] and EPA has recently used Section 114 to require these sources to monitor and report their methane emissions.[106] In this case, requiring ozone monitoring, as authorized by the Act, would help in "developing or assisting in the development of any [SIP]" in a number of ways. It would further assist EPA in meeting its duty to review the adequacy of state and local

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[101] 42 U.S.C. § 7414(a).

[102] Id. at § 7414(a)(1)(C)-(G).

[103] Mandatory Reporting of Greenhouse Gases; Proposed Rule, 74 Fed. Reg. 16,448, 16,454 (Apr. 10, 2009).

[104] *See, e.g, Stone Container Corp. v. E.P.A*, 103 F.3d 131 (6th Cir. 1996) (natural gas fired boiler); *Asarco, Inc. v. E.P.A.*, 616 F.2d 1153, 1161-63 (9th Cir. 1980) (§ 109 and § 110 PM regulations and SIP requirements); *U.S. v. Trident Seafoods Corp.*, 60 F.3d 556, 560 (9th Cir. 1995) (§ 112 asbestos regulations).

[105] Along with other harmful pollutants, oil and gas sources emit significant amounts of ozone precursors, including VOCs and methane, and therefore clearly fall within Section 114's expansive focus on "any emission source." 42 U.S.C. § 7414(a)(1) (emphasis added); *see Massachusetts v. EPA*, 549 U.S. 497, 529 n.25 (2007) (observing that "'any' . . . has an expansive meaning, that is, one or some indiscriminately of whatever kind") (*citing Department of Housing and Urban Development v. Rucker*, 535 U.S. 125, 131 (2002)).

[106] *See* 40 C.F.R. 98.230; see also 75 Fed. Reg. 74,458 (Nov. 30, 2010).

air quality monitoring plans submitted to it pursuant to 40 C.F.R. § 58.10(a).[107] Ozone monitoring at oil and gas development areas would likewise aid EPA and states in making ozone designations under Section 107 of the Act. As EPA has noted, where available, data on air quality violations in certain areas "clearly indicate the potential for violations of the NAAQS in some smaller communities located outside the boundaries of MSAs that currently have minimum monitoring requirements."[108] EPA has recognized the possibility of entities other than the states operating ozone monitors[109] and has manifest authority under Section 114 to require such monitoring.

Given the rapid pace of oil and gas development and the lack of ozone monitoring in such areas, we urge EPA to immediately use its Section 114 authority to fill the gap. Inadequate ozone monitoring in briskly expanding plays like the Bakken and Eagle Ford is a dynamic threat to public health and the environment. EPA has certified inexpensive, portable ozone monitors as a federal equivalent method that could help fill this dangerous gap.[110] Section 114 is an appropriate tool to broadly deploy ozone monitors and to begin ensuring EPA and states have adequate data on ozone pollution associated with this development. [111] For instance, EPA can

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[107] The state and local plans must meet several criteria, including "operat[ing] O_3 [monitoring] sites for various locations depending upon" a number of factors, including "geographic size, population density, complexity of terrain and meteorology, adjacent O_3 monitoring programs, air pollution transport from neighboring areas, and measured air quality in comparison to all forms of the O_3 NAAQS." 40 C.F.R. § 58 App. D 4.1, 4.2.

[108] 74 Fed. Reg. at 34,530.

[109] Ambient Ozone Monitoring Regulations: Revisions to Network Design Requirements, 74 Fed. Reg. 34525, 34531 (July 16, 2009).

[110] Small, affordable, portable ambient air ozone monitors exist and have received EPA certification as a federal equivalent method for ozone monitoring. Ambient Air Monitoring Reference and Equivalent Methods: Designation of One New Equivalent Model, 75 Fed. Reg. 22126 (April 27, 2010). We include EPA's certification of the specific monitor approved here as an example of the availability of cost-effective, portable ozone monitors. This example is not meant to indicate our endorsement of a particular technology or to suggest that the model certified by EPA represents the only or best available portable ozone monitor.

[111] We recognize that requiring industry to install and operate ozone monitors is one avenue for ensuring availability of comprehensive ozone air quality data. Revisions to the ozone monitoring network and an increase in state monitoring efforts could also address the issue of inadequate monitoring data. We focus here on requiring the oil

use Section 114 in a flexible manner to require targeted monitoring in oil and gas development areas where information is most urgently needed, and the agency can deploy Section 114 monitors without delay, responding to the swiftly changing landscape of oil and gas development. Though Section 114 is flexible, we urge the agency to ensure the data the program produces is rigorous and uniform by requiring robust quality assurance and quality control protocols. The agency has express statutory authority to do so, and comprehensive QA/QC requirements have been a central feature of past Section 114 rulemakings.[112] Accordingly, we respectfully petition EPA to expeditiously require oil and natural gas operators to install and begin operating ozone monitors.

V. THE CLEAN AIR ACT CALLS FOR EPA TO ISSUE GUIDANCE CONCERNING COST-EFFECTIVE POLLUTION CONTROL MEASURES

Accurately monitoring ozone oil and gas development areas is critical to ensure Americans have information concerning pollution in their communities, national parks, and wilderness areas. Equally important, EPA must provide guidance for communities seeking to reduce pollution from these sources – an important roadmap both for communities located in areas that violate the ozone NAAQS and for communities seeking to prevent such violations. Both Control Technique Guidelines ("CTGs") (in non-attainment areas) and the Ozone Advance Program (in attainment areas) provide frameworks through which EPA can issue guidance on cost-effective emission reduction technology for the oil and gas sector.

The Clean Air Act requires that State Implementation Plans ("SIPs") "provide for the implementation of all reasonably available control measures as expeditiously as practicable

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and gas industry to install monitors because this solution can be targeted to those areas where the need for additional data is greatest and can be accomplished expeditiously. Notwithstanding this request, we urge EPA to consider ozone monitoring network revisions and the adequacy of state infrastructure SIPs to ensure rigorous ozone monitoring in oil and gas development areas.

[112] *See* Mandatory Reporting of Greenhouse Gases, 74 Fed. Reg. 56,260 (Oct. 30, 2009).

(including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology [RACT]).”[113] The Administrator must issue CTGs for certain source categories of VOCs as well as certain consumer and commercial products.[114] EPA also can issue “such additional control techniques guidelines as the Administrator deems necessary.”[115] CTGs provide EPA’s guidance on the technologies that the agency considers presumptive RACT for VOC source categories and for pieces of consumer and commercial equipment. The agency has provided these guidelines in a wide variety of circumstances, helping to inform state plans for areas where ozone air quality is unsafe.[116]

Similarly, EPA’s Ozone Advance Program is a collaborative effort among EPA, states, tribes and local governments designed “to encourage emission reductions in ozone attainment areas nationwide to maintain the 2008 [NAAQS] for ozone.”[117] States or tribal areas that chose to participate in the program can “potentially receive ‘credit’ in State/Tribal Implementation Plans (SIPs/TIPs) in the event an area is eventually designated non-attainment with a Moderate or higher classification, either in terms of reflecting a lower baseline from which additional reductions are needed to meet reasonable further progress goals or, if they occur after the baseline year, as a measure that shows progress toward attainment.”[118]

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[113] 42 U.S.C. 7502(c)(1).

[114] *S*ee 42 U.S.C. §§ 7511B(a); *see also* id. § 7511B9(e)(3)(C) (requiring EPA to list “consumer and commercial products” that account for 80 percent of VOC emissions).

[115] *Id.* § 7511B(a).

[116] *See, e.g.*, Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals, EPA-450/2-77-026 (1977); Control of Volatile Organic Emissions from Bulk Gasoline Plants, EPA-450/2-77-035 (1977).

[117] EPA, OZONE ADVANCE GUIDANCE 1 (2012), *available at* http://www.epa.gov/ozoneadvance/pdfs/2012404guidance.pdf.

[118] *Id.*

As it develops guidance, EPA can draw from models in the agency's recently finalized NSPS for the oil and natural gas sector and state actions in Colorado and Wyoming. Both Colorado and Wyoming have shown that much of the technology that can cost-effectively reduce emissions from new sources can also be deployed on existing sources to reduce emissions. Like the Colorado and Wyoming standards, EPA's CTGs and Ozone Advance Program guidance could address these existing emissions sources:

- Pneumatic Controllers. Require existing pneumatic controllers to be low or no-bleed.[119]
- Well-site Fugitive Emissions. Require LDAR[120] to detect and repair leaking equipment located at oil and gas sites.
- Glycol Dehydrators. Require area source dehydrators with VOC emissions of less than 5 Tpy to control emissions by 98%.[121]
- Crude Oil / Condensate / Produced Water Tanks. Require existing condensate, crude oil and produced water tanks (including those that emit less than 6 tons per year VOCs) to control emissions by 98 percent.[122]

[119] *See* Colorado Department of Public Health and Environment, Air Pollution Control Division, Oil and Gas Exploration & Production Regulation No. 7 Requirement at 3 (Dec. 2011); 2 Colo. Code Regs. § 404-1:805(b)(2)(E) (2012) (Colorado Oil and Gas Conservation Commission Rule regarding pneumatic devices).

[120] LDAR (Leak Detection and Repair) requires operators check for fugitive leaks at specified thresholds and at regular intervals, and then repair leaks above thresholds within a certain time. (DI&M) Directed Inspection and Maintenance requires operators conduct a baseline survey to identify leaky equipment, and then only repair those that are cost-effective to fix. Subsequent leak detection surveys are designed based on data from prior surveys, allowing operators to concentrate repairs on those components most likely to leak and profitable to repair.

[121] Colorado currently requires single or co-located glycol dehydrators at adjacent or contiguous E&P sites, natural gas compressor stations, drip stations, or gas processing plants with total VOC emissions ≥15 Tpy must reduce emissions from still vents and vents from gas-condensate-glycol separators by 90%. 5 Colo. Code Regs. 1001-9:XII.A.4, XII.H; Colorado requires glycol dehydrators with the potential to emit 5 tons per year of VOCs to install controls. 2 Colo. Code Regs. § 404-1:805(b)(2)(C) (2012) (Colorado Oil and Gas Conservation Commission Rule regarding glycol dehydrators); Wyoming requires glycol dehydrators with 8 tons per year of VOCs to control emissions by 98%. Wyoming Department of Environmental Quality, Air Quality Division, Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance at 7 (Mar. 2010), *available at* http://deq.state.wy.us/aqd/Oil%20and%20Gas/March%202010%20FINAL%20O&G%20GUIDANCE.pdf ("Wyoming Guidance").

[122] Colorado currently requires existing and new tanks with 2 Tpy VOCs or more, under common ownership or operation in NA, NA/M, with cumulative emissions ≥30 Tpy must reduce overall emissions by 90% between May-Oct. and by 70% during the remainder of the year using a device capable of achieving 95% control efficiency (System-wide control strategy). *Id.* at XII.D.A; Wyoming requires storage tanks to control flashing emissions by 98%. Wyoming Guidance at 5.

- Pits / Impoundments. Require 98% control of VOCs from pits.[123]

- Gas Processing Plants. Extend EPA's leak detection and repair requirements to existing gas processing plants. [124]

- Compressors. Replace rod-packing every 26,000 hours for production and processing sources (reciprocating compressors) and 95% control of VOCs from wet seal centrifugal compressor. These extend the cost effective controls in EPA's NSPS to existing sources.

- Pneumatic Pumps. Require 98% VOC control.[125]

- Liquids Unloading Activities. Require operators minimize venting by using plunger lift systems or closed-loop systems during liquids unloading activities.[126]

- Well Completions and Recompletions at Co-producing Oil and Gas Wells. Require Reduced Emission Completions.

- Flaring. Limit flaring and venting of associated gas from oil wells and when flaring is necessary use well-engineered flares to reduce emissions.

- Reciprocating Internal Combustion Engines. Require post-combustion controls such as selective catalytic reduction for lean burn engines and non-selective catalytic reduction with air fuel controller for rich burn engines.[127]

The technologies needed to achieve these standards are available and highly cost effective. The cost effectiveness numbers developed for many of these measures fall far below

[123] *See* Ventura County Air Pollution Control District Rule 71.4(B); *see also* Santa Barbara County Air Pollution Control District Rule 344(D)(1)-(2).

[124] Colorado requires existing gas processing plants to comply with the leak detection and repair requirements contained in 40 C.F.R. Subpart KKK. Colorado Department of Public Health and Environment, Air Pollution Control Division, Oil and Gas Exploration & Production Regulation No. 7, XII.G.1 (2012).

[125] Wyoming Guidance at 9.

[126] See Susan Harvey, *Leaking Profits. The U.S. Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Make Money by Preventing Methane Waste*, 23-25 (March 2012) (discussing available technologies and practices to minimize venting from liquids unloading activities).

[127] All rich burn RICE in the Colorado ozone non-attainment area have NSCR controls due to requirements for such engines in Colorado's AQCC Regulation 7 and The Colorado Dept. of Health and Environment is considering additional post-combustion controls for other engines in the state. *See* RAQC Planning Tool.

the $15,000 per ton of VOC reduced threshold that EPA has used as a threshold for cost-effective ozone reduction measures.[128]

The highly cost-effective nature of emission reductions from the oil and gas sector provides further impetus for swift action to ensure guidance is in place to aid air quality planning in both attainment and non-attainment areas across the country. We respectfully urge EPA to expeditiously adopt CTGs and Ozone Advance guidance targeting emission reduction opportunities in the oil and gas sector.

VI. CONCLUSION

Oil and gas activities have already contributed to dangerous levels of ozone, including violations of the current 2008 standard, and oil and gas development is predicted to expand in locations across the nation. EPA's current ozone monitoring network is insufficient to monitor ozone in many oil and gas areas, and state and local efforts do not and cannot replace EPA's responsibility to protect and enhance air quality and ensure no visibility impairment. Accordingly, we hereby petition EPA to require oil and gas owners or operators in areas with known or potential ozone pollution and continued or increased development in areas that lack sufficient ozone monitoring to install ozone monitors as part of their operations. We likewise respectfully petition EPA to promulgate CTGs and Ozone Advance guidance applicable to oil and natural gas sources, providing communities with commonsense tools to reduce harmful smog-forming pollution. We urge EPA to swiftly put these protections in place so it can assure it

[128] *See, e.g.*, EPA, The Benefits and Costs of the Clean Air Act from 1990 to 2020 (March 2011), *available at* http://www.epa.gov/oar/sect812/feb11/fullreport.pdf (stating that "[w]e limited the application of these known controls to those with an estimated cost not exceeding $15,000 per ton for PM and ozone precursors (i.e., SO2, NOx, and VOCs). The rationale for incorporating this threshold into the analysis is that controls more costly than $15,000 per ton may not be cost effective."). For cost-effectiveness numbers, *see* EPA Doc. No. EPA-HQ-OAR-2010-0505 (Technical Support Document for Oil and Gas NSPS).

is protecting human health and welfare from dangerous levels of ground-level ozone, as the Clean Air Act requires.

Respectfully Submitted,

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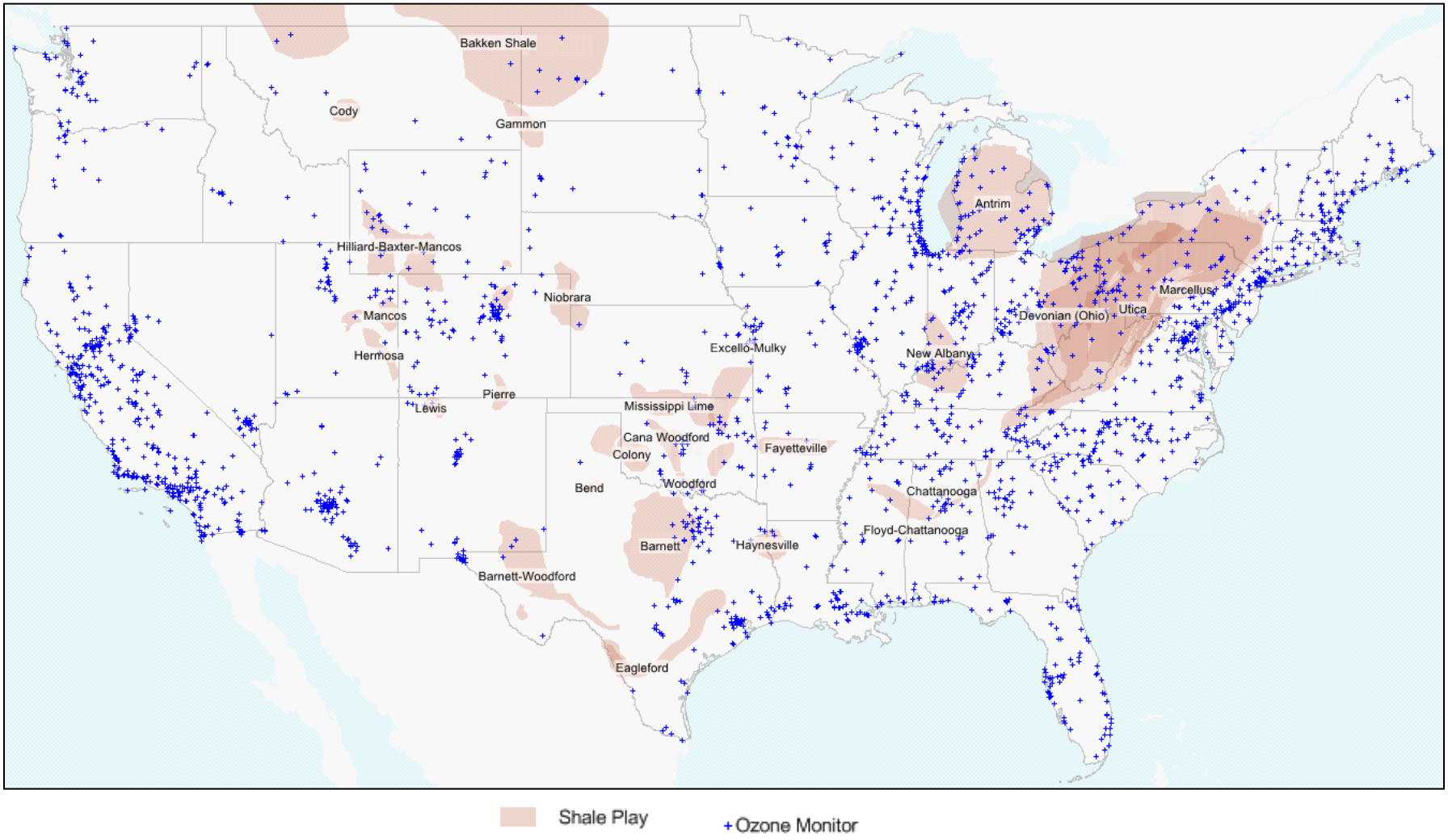
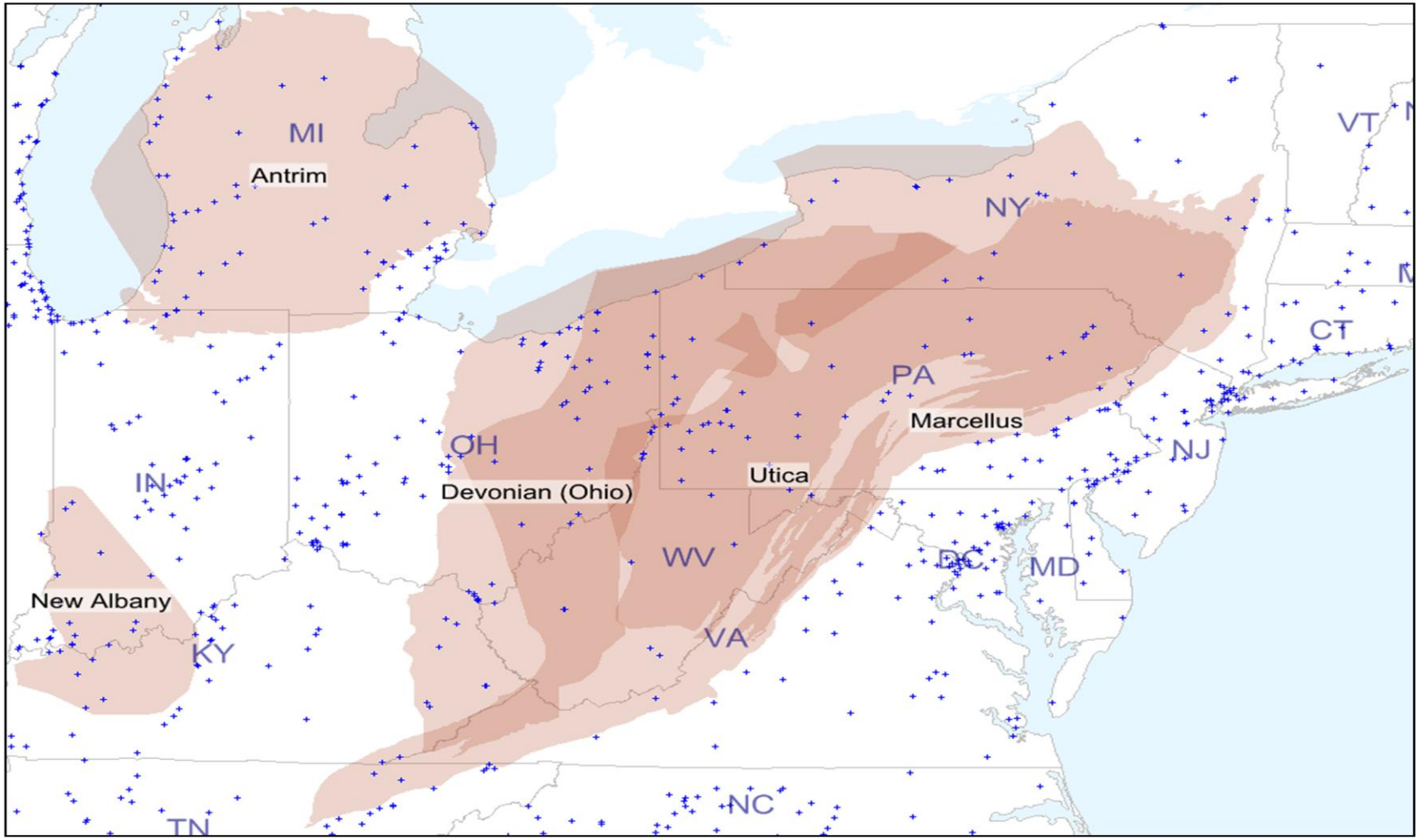
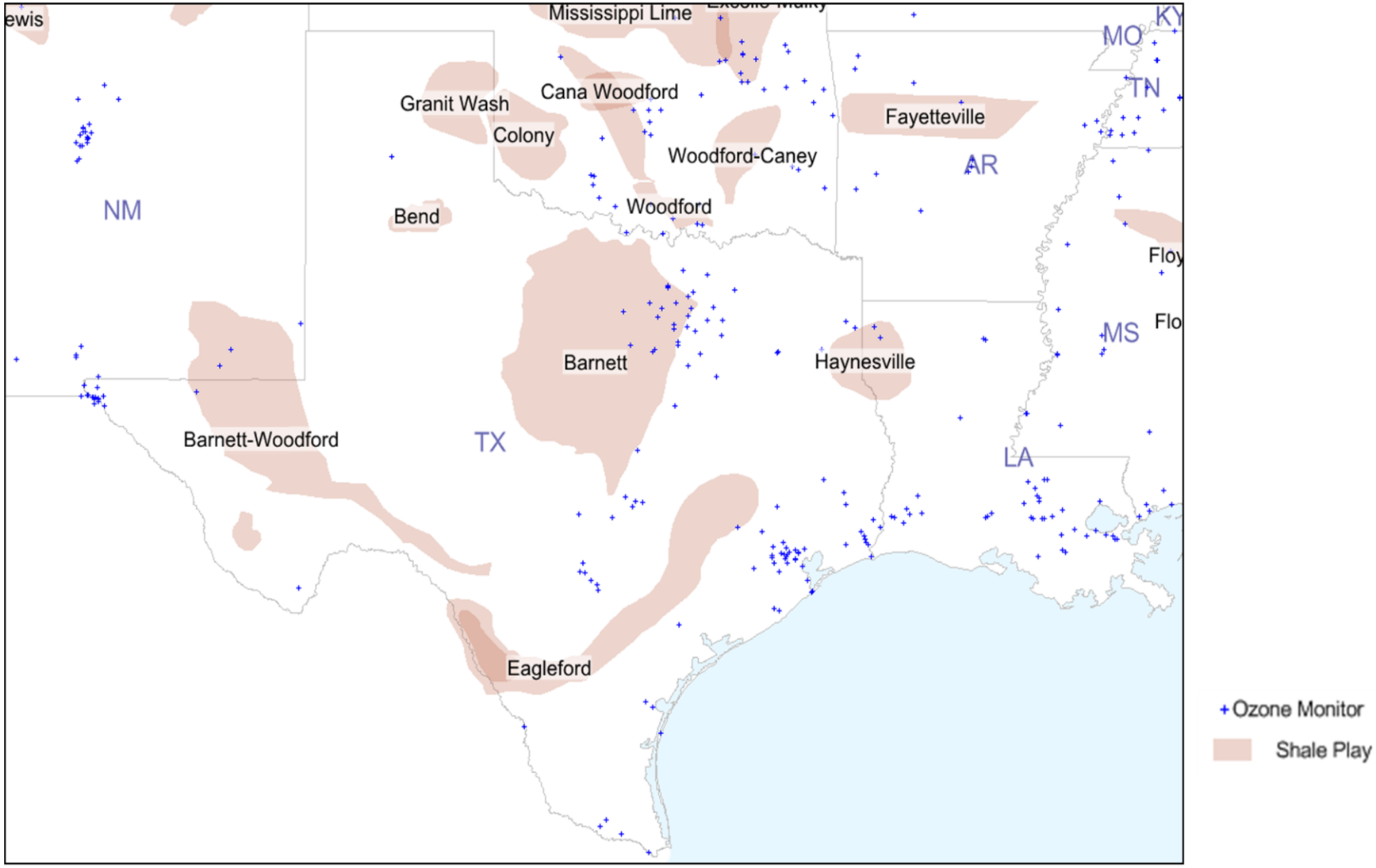
Appendix A: Shale Plays and Ozone Monitors[129]



[129] Data Sources are Ventyx Velocity, EPA Air Data, RigData (active status of rigs as of Sep 14, 2012), and U.S. Census Bureau data for all images in Appendix.



Data Sources: Ventyx Velocity, EPA Air Data, RigData (active status of rigs as of Sep 14, 2012), U.S. Census Bureau



Data Sources: Ventyx Velocity, EPA Air Data, RigData (active status of rigs as of Sep 14, 2012), U.S. Census Bureau