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Wyoming Environmental Quality Council

Elaine Crumpley, Mary Lynn Worl, Tina Rock, Citizens United for Responsible Energy Development ("CURED"), Upper Green River Valley Coalition, Petitioners.	)	**Petition for Rulemaking** Petition to Establish Primary and Secondary Wyoming Ambient Air Quality Standards for Ozone that are More Stringent than the National Ambient Air Quality Standards

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List of Acronyms and Abbreviations

ALA …….…….. American Lung Association
AQS ……EPA Air Quality System Data Base
ATS …….. American Thoracic Society
BLM ……..……. Bureau of Land Management
CARB ……..…….. California Air Resources Board
CASAC ……..……...……. EPA Clean Air Scientific Advisory Committee
CHPAC ……...…… EPA Children's Health Protection Advisory Committee
CO ……..……. Carbon monoxide
CO_2 ……..…… Carbon dioxide
COPD ……..……...… Chronic obstructive pulmonary disease
DEQ ……..……. Wyoming Department of Environmental Quality
EPA ……..…….. U.S. Environmental Protection Agency
EQC ……..…… Wyoming Environmental Quality Council
FEV_1 ……... Forced expiratory volume over one second
HO_2 ……..…… Hydroperoxy radical
H_20_2 ……...…… Hydrogen peroxide
IENR …..... Ruckelshaus Institute of Environment and Natural Resources
LAER ……..…….. Lowest achievable emissions reduction
NAAQS ……...……. National Ambient Air Quality Standard
NOAA …… National Oceanic and Atmospheric Administration
NO ……..…… Nitric oxide
NO_2 ……..…….. Nitrogen dioxide
NO_X ……..…..…….…… Nitrogen oxides
O_2 ……...…….. Oxygen
O_3 ……..…….. Ozone
PAN ……..……...…..…… Peroxy acetyl nitrate
PM …… Fine particulate matter
$PM_{2.5}$ ……...…….. Fine particulate matter ≤ 2.5 µm in aerodynamic diameter
ppb ……..…… parts per billion
ppm …… parts per million
RACT ……...…… Reasonably available control technology
RIA ……...…….. EPA Regulatory Impact Analysis
SIP ……...…….. State Implementation Plan
SO_2 ……..…….…….. Sulfur dioxide
VOC ……..…….. Volatile organic compounds
WAAQS ……...…….. Wyoming Ambient Air Quality Standard
WAQSR ……..……. Wyoming Air Quality Standards and Regulations

SUMMARY

In this Petition by citizens of the Upper Green River Valley the Petitioners ask the Environmental Quality Council ("EQC") to establish primary and secondary State standards for ozone that are more stringent than the national standards in Sublette County, Wyoming. They ask that the Wyoming Ambient Air Quality Standard ("WAAQS") for ozone in Sublette County be set at a level of 0.065 parts per million rather than a level of 0.075 ppm, which is the current national ambient air quality standard ("NAAQS"). Compliance with this standard, as with the current NAAQS, would be determined based on the three-year average of the annual fourth highest daily maximum 8-hour concentrations of ozone. Sublette County would not be in compliance with this standard and in fact it is likely not in compliance with the current 0.075 ppm NAAQS because average ozone levels in this area have reached 0.08 ppm in some areas.

Setting the ozone standard to 0.065 ppm is necessary to protect public health, "with an adequate margin of safety," as required by the Clean Air Act. Scientific support for setting the WAAQS at 0.065 ppm is overwhelming, and is documented in this petition. The Environmental Protection Agency's ("EPA") Clean Air Scientific Advisory Committee ("CASAC"), which is required under the Clean Air Act to provide recommendations to the EPA on NAAQS sufficient to protect the public health from air pollution, stated in a letter to the EPA that its consensus, professional opinion was that the 0.075 ppm NAAQS "fails to satisfy the explicit stipulations of the Clean Air Act that you ensure an adequate margin of safety for individuals, including sensitive populations." It went on to state that "the members of the CASAC Ozone Review Panel do not endorse the new primary ozone standard [0.075 ppm] as being sufficiently protective of public health." The seven-member CASAC and its supporting 23-member ozone review panel were composed of Ph.D and M.D. level specialists in air pollution and related science and health matters. In other letters to the EPA the CASAC had stated it "unanimously recommends a range of 0.060 to 0.070 ppm for the primary ozone NAAQS." Other professionals, including over 100 scientists and M.Ds, the American Lung Association, the EPA's Children's Health Protection Advisory Committee, and the American Thoracic Society have recommended that the ozone NAAQS be set below the current national standard, with most recommending that it be set at 0.060 ppm, and none supporting the 0.075 ppm level.

The public health impacts of ozone at 0.075 ppm, the current NAAQS, are well established and the research shows that reducing the standard to below 0.070 ppm is needed to adequately protect the public health from the impacts of ozone pollution. The EPA recognizes a "pyramid of effects" associated with ozone pollution. In this pyramid, a two-way sliding scale is recognized where there are a number of relatively lesser effects affecting many people extending up to very severe effects (even death) that impact fewer people. This pyramid of effects includes increased inflammation of the respiratory tract that affects many people up to increased emergency department visits and hospital admissions and finally even death for a relatively few. Impacts of ozone pollution include increased lung function decrements, respiratory symptoms, pulmonary inflammation, increased airway responsiveness (sensitivity), respiratory hospital admissions, emergency department visits, school absences, increased mediation usage, and even death. Some people are especially vulnerable or susceptible to these effects, including the very young and old, asthmatics, people who work outside or recreate vigorously outside, and those

with preexisting lung or respiratory ailments, like bronchitis or emphysema. The scientific evidence from controlled human exposure studies, epidemiological studies, animal toxicological studies, and large multi-city studies has increasingly shown impacts to human health at levels well below 0.075 ppm. This evidence is based on literally hundreds of recent studies, many of which are reviewed in EPA documents that are discussed in the petition.

In setting a NAAQS, the EPA is only allowed to consider whether the level protects the public health, with "an adequate margin of safety." It cannot consider the costs of compliance with the standard. This view has been required by a unanimous Supreme Court. Under the Wyoming Environmental Quality Act, WAAQS are to be set "as may be necessary to prevent, abate, or control pollution." And "air pollution" is defined in the Wyoming Environmental Quality Act as being contaminants in such quantities that they "may be injurious to human health or welfare, animal or plant life, or property, or unreasonably interfere[ ] with the enjoyment of property." Thus, even though the Wyoming Environmental Quality Act does allow for some consideration of economics when setting a WAAQS we believe it is clear these considerations are distinctly secondary to protecting public health, just as is true with a NAAQS. This view is supported by Wyoming Supreme Court precedent where it stated the EQC's obligation is to "promulgate rules and regulations necessary to prevent, reduce and eliminate pollution" and that other factors like economics mentioned in the Environmental Quality Act may be referred to, but there is "no express statutory requirement that the Council conform its decision-making" to these other factors. Thus, again, the Petitioners feel that the sole basis for setting the ozone WAAQS should be considerations of public health, and as documented in this petition the science is overwhelming that a level of 0.075 ppm does not protect the public health, with an adequate margin of safety, and a more stringent standard should be set.

As indicated, Sublette County will not comply with a WAAQS set at 0.065 ppm and in fact it likely does not meet the current NAAQS of 0.075 ppm. But the implications of this are not draconian or necessarily devastating to the economy or social structure of the State. Numerous actions by the state are already under way or said to be under way in Sublette County due to the high ozone levels that have been monitored, including an offsets policy for new permitting, more stringent Best Available Control Technology ("BACT") requirements, and a voluntary drill rig permitting program. In addition, the Wyoming Department of Environmental Quality itself—anticipating nonattainment with the NAAQS—has stated publicly that actions to ensure compliance with a standard will not shut down industry in Sublette County, and will not require immediate compliance—there is some flexibility in achieving compliance. And the Wyoming Environmental Quality Act is even more explicit in this regard, allowing the Air Quality Division Administrator to "grant such time as he shall find to be reasonable and necessary for owners and operators of air contaminant sources to comply with applicable standards or requirements." Thus, the standard should be set at a level needed to protect the public health, and achieving compliance with the standard can be flexibly achieved after the standard is set. But the Petitioners feel we should aspire to the right target—a level sufficient to protect the public health, with an adequate margin of safety, and the current NAAQS of 0.075 ppm simply does not ensure this. In contrast, a WAAQS set at 0.065 ppm would adequately protect the public health, with an adequate margin of safety, and thus the Petitioners request this action.

PETITION

Introduction.

This Petition requests the Wyoming Environmental Quality Council ("EQC") to adopt a rule specifying that the primary and secondary Wyoming Ambient Air Quality Standards ("WAAQS") for ozone are set at a level of 0.065 parts per million ("ppm"), daily maximum 8-hour average, in Sublette County, Wyoming. The EQC has authority to take this action pursuant to the Wyoming Department of Environmental Quality ("DEQ") Rules of Practice and Procedure, the Wyoming Administrative Procedure Act, and the Wyoming Environmental Quality Act. DEQ Rules of Practice and Procedure Ch. III § 2; W.S. §§ 16-3-103, 16-3-106; W.S. § 35-11-112.

We believe this requested action would further the policy and purposes of the Wyoming Environmental Quality Act, which recognizes that "pollution of the air water and land of this state will imperil public health and welfare . . ." and therefore seeks for the State "to prevent, reduce, and eliminate pollution; to preserve and enhance the air, water and reclaim the land of Wyoming . . . ." W.S. § 35-11-102.

As will be discussed in detail below, setting the primary WAAQS at 0.065 ppm is requisite to protect the public health, with an "adequate margin of safety," as required by the Clean Air Act. 42 U.S.C. § 7409(b). It will also ensure that this ambient air standard is set "as may be necessary to prevent, abate, or control pollution," as required by the Wyoming Environmental Quality Act. W.S. § 35-11-202(a). Focusing this stricter standard on Sublette County is appropriate due to the very high levels of ozone pollution that have been observed in this area, and thus the elevated risk to the public health. Moreover, establishing a stricter standard for this area is appropriate because of the natural conditions that are making it susceptible to high ozone levels (inversions and snow conditions on sunny days), coupled with the massive natural gas development occurring in the area that emits large quantities of ozone "precursors," in close proximity to populated areas like the towns of Pinedale and Boulder.

The current primary and secondary WAAQS for ozone are set at a level of 0.08 ppm, daily maximum eight hour average. Wyoming Air Quality Standards and Regulations ("WAQSR") Ch. 2 §§ 6(a)-(b). This level corresponds with the National Ambient Air Quality Standards ("NAAQS") for ozone that were in effect prior to March 27, 2008. However, on March 27, 2008 the U.S. Environmental Protection Agency ("EPA") promulgated new NAAQS for ozone that set a lower primary and secondary level than the prior NAAQS. The new primary and secondary NAAQS for ozone are set at a level of "0.075 parts per million (ppm), daily maximum 8-hour average, measured by a reference method based on Appendix D to this part and designated in accordance with part 53 of this chapter or an equivalent method designated in accordance with part 53 of this chapter." 73 Fed. Reg. 16,436, 16,511 (March 27, 2008) (codified at 40 C.F.R. §§ 50.15(a)-(b)). The new national rule became effective on May 27, 2008. *Id.* at 16,436.

Given that the NAAQS have been reduced to a level below the current WAAQS, the State of Wyoming must in any event reduce the level of its ozone WAAQS. *See* 42 U.S.C. § 7410(a) (providing that state implementation plans ("SIP") required under the Clean Air Act must provide for implementation, maintenance, and enforcement of primary and secondary NAAQS). At a minimum the state must reduce the level of the current WAAQS by 6.25 percent to comply with the new NAAQS. But we are asking that the WAAQS be reduced by 18.75 percent, from 0.08 ppm to 0.065 ppm, so as to more adequately protect the public's health, with the adequate margin of safety required by the Clean Air Act. 42 U.S.C. § 7409(b). An "adequate margin of safety" helps ensure vulnerable or susceptible populations such as asthmatics, those with other respiratory conditions like bronchitis and emphysema, and outdoor workers are protected.

Because it addressed many of the issues that will be discussed in this petition we note that the University of Wyoming Ruckelshaus Institute of Environment and Natural Resources ("IENR") held an information forum in Pinedale on October 7, 2008 about ozone. The very useful information from the four professional presentations at that forum can be viewed at http://uwyo.edu/ENR/IENR/. As can be seen, presentations were made by Drs. Derek Montague (addressing atmospheric chemistry of ozone); Fred Miller (addressing health effects of ozone); Rogene Henderson, chair of the EPA's Clean Air Scientific Advisory Committee ("CASAC") during its most recent ozone NAAQS revision (addressing the NAAQS setting process); and Peter Hess (addressing regulatory implementation of ozone standards). In addition, due to the very high ozone levels that were monitored in Sublette County during the winter 2008, the DEQ made five public presentations regarding ozone issues in the area that provide useful information. Those presentations can be viewed at http://deq.state.wy.us/Sublettecountyozone.htm and they and the IENR presentations will be referred to a number of times below.

Introduction to the Adverse Health Effects of Ozone.

The scientifically recognized adverse health effects of breathing elevated levels of ozone are increasing. Breathing ozone can cause a suite of adverse health effects, including decreased lung function, particularly in children active outdoors; increased airway responsiveness (sensitivity); and inflammation of the lungs.[1] Epidemiological studies show that elevated ozone concentrations are associated with increased numbers of hospital admissions and emergency room visits for respiratory problems in children and adults with preexisting respiratory diseases such as asthma, and with increased mortality rates.[2] Two large studies in the United States and Europe recently linked total mortality, cardiovascular mortality and respiratory mortality to short term increases in ozone levels.[3]

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[1] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Fact Sheet: Health and Environmental Effects of Ground-Level Ozone, July 17, 1997, available at http://www.epa.gov/Region7/programs/artd/air/quality/o3health.htm; American Lung Association, Children and Ozone Air Pollution Fact Sheet, available at http://www.lungusa.org/site/pp.asp?c=dvLUK900E&b=44567.

[2] *Id.*

[3] Bell, M.L., *et al.* 2004. Ozone and Short-term Mortality in 95 US Urban Communities, 1987-2000. *J. American Medical Association*, 292:2372–2378; Gryparis, A. *et al.* 2004. Acute Effects of Ozone on Mortality from the "Air Pollution and Health a European Approach" *Project. Am. J. Respir. Crit. Care Med.* 170:1080–1087.

Children are particularly at risk of adverse respiratory effects from breathing ozone because their lungs are not fully developed and so their airways are narrow, and their respiration rates are higher than those of adults in relation to their size.[4] Studies conducted in recent years have linked ozone with school absences due to sore throats, coughs, and asthma attacks; decreased lung function in girls with asthma; and long-term lung damage in children.[5] A recent study demonstrated that children who use maintenance medication for asthma had an increased likelihood of wheezing and chest tightness when ozone levels increased.[6] One major study associated exposure to ozone with the onset of asthma in children not previously diagnosed with asthma.[7, 8] The elderly and those who are active outdoors are susceptible to adverse health effects from breathing elevated levels of ozone.

In its proposed rule for the most recent ozone NAAQS revision, the EPA provided an overview of the mechanisms by which these health effects occur. 72 Fed. Reg. 37,818, 37,825 (July 11, 2007). Ozone affects the epithelial lining of the lungs and this initial step in the process "activates a cascade of events that lead to oxidative stress, injury, inflammation, airway epithelial damage, and increased alveolar permeability to vascular fluids." *Id.* Airway responsiveness (sensitivity) can be increased and inflammation can alter the ability to respond to infectious agents, allergens, and toxins. *Id.* Indications of lung injury become apparent within three hours, and "[r]epeated respiratory inflammation can lead to a chronic inflammatory state with altered lung structure and lung function and may lead to chronic respiratory diseases such as fibrosis and emphysema." *Id.*

Dr. Miller's presentation at the IENR ozone information forum in Pinedale provides a useful and thorough review of ozone's health effects.[9] http:// uwyo.edu/ENR/IENR/ (presentation of Dr. Fred Miller). He observes that the reactions leading to lung damage are extremely fast and irreversible. *Id.* (slide number 4). The EPA in its proposed rule for the ozone

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[4]U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Fact Sheet: Health and Environmental Effects of Ground-Level Ozone, July 17, 1997, available at http://www.epa.gov/Region7/programs/artd/air/quality/o3health.htm; American Lung Association, Children and Ozone Air Pollution Fact Sheet, available at http://www.lungusa.org/site/pp.asp?c=dvLUK900E&b=44567.

[5] F.D. Gilliland *et al.* 2001. The Effects of Ambient Air Pollution on School Absenteeism Due to Respiratory Illnesses, *Epidemiology* 12:43–54; L. Chen *et al.* 2000. Elementary School Absenteeism and Air Pollution, *Inhalation Toxicology* 12: 997–1016; J.M. Peters *et al.* 1999. A Study of Twelve Southern California Communities with Differing Levels and Types of Air Pollution, *American Journal of Respiratory and Critical Care Medicine* 159: 768-775; T. Frischer *et al.* 1999. Lung Function Growth and Ambient Ozone: A Three-Year Population Study in School Children, *American Journal of Respiratory and Critical Care Medicine* 160:390–396.

[6] Gent, J.F., *et al.* 2003. Association of low level ozone and fine particles with respiratory symptoms in children with asthma, *J. American Medical Association* 290:1859–1867.

[7] McConnell, R., *et al.* 2002. Asthma in exercising children exposed to ozone: a cohort study, *Lancet* 359:386–391.

[8] The U.S. EPA recently concluded "evidence from newer epidemiologic studies supports the 1996 O_3 AQCD [Air Quality Criteria Document] conclusions that children are more likely at increased risk for O_3-induced health effects. Notably, epidemiologic studies have indicated adverse respiratory health outcomes associated with O_3 exposure in children. In addition, recently published epidemiologic studies also suggest that older adults (aged >65 years) appear to be at excess risk of O_3-related mortality or hospitalization." U.S. EPA. Air Quality Criteria for Ozone and Related Photochemical Oxidants (Final). E-22, U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-05/004aF-cF, 2006.

[9] Dr. Miller, like Dr. Rogene Henderson who also presented at the IENR forum in Pinedale, was a member of the EPA's CASAC during the most recent ozone NAAQS revision.

NAAQS revision also observed that animal toxicological studies strongly suggest that chronic exposure to ozone can lead to apparently irreversible changes in the lung that may exacerbate the progression and development of chronic lung disease. 72 Fed. Reg. at 37,844. A more comprehensive discussion of the health and public health effects of ozone at varying levels is provided later in this petition.

The Petitioners.

Elaine Crumpley is a recently retired Sublette County science school teacher and has seen many dramatic changes in Sublette County over the past 28 years and feels that these changes implicate the health, beauty and permanence within her community. She feels that once pristine air and Class1 viewsheds have become polluted with toxins and haze, abundant wildlife is vanishing, and our community has lost its soul, all because of the push for a massive gas production industry in Sublette County. She feels that Sublette County youth deserve a better future than this. She believes we need to clean up our air pollution problems now, before it is too late, and thus she joins in this petition.

Mary Lynn Worl is a Pinedale resident who is concerned about the negative health impacts of ozone on citizens living and/or working in Sublette County, especially the impacts on babies and children. She is also concerned about the synergistic effects of ozone in combination with other air pollutants that may compound health risks. She observes that people in high-elevation Sublette County only have about 77 percent of the oxygen available when they take a breath compared to people at sea level, but currently there are few or no studies considering the consequences to human health of elevated ozone levels at high elevations. She feels that the health of citizens in this area is of paramount importance and should not be compromised by unhealthy levels of ozone or other air pollutants.

Mary Lynn was raised in Pinedale and after retiring moved back to the area in 2000. She has always been an avid outdoor person and continues to engage in many of the activities she enjoyed doing with her family while growing up in Sublette County. These include camping, hiking, fishing, exploring, and rock hunting. Mary Lynn has a Ph.D. from the University of Utah, specializing in exercise physiology. She taught human anatomy and physiology and health related courses at Walla Walla Community College in Walla Walla, Washington for 31 years. Currently, she works part-time as Pandemic Influenza Coordinator for Sublette County Public Health. In addition, she oversees a Sublette County wellness program called Healthy Sublette.

Tina Rock is a 54 year old California transplant, having moved to Pinedale in 1982. She grew up in Los Angeles and knows all about breathing city air. A working vacation brought her to Cora, Wyoming, and the Bar Cross Ranch in 1982. From the minute she arrived in the Upper Green River Valley, she knew that she would never call California home again. Wyoming is where she feels she belongs. The reason she joins this petition is clear. She wants to live in a clean and healthy environment. She wants to breathe clean air. She wants to be able to see the mountains every day. She wants to keep hunting those awesome Brown Trout. She does not want to have to worry when the next ozone warning will be. She wants the term “ozone season” to go away forever. She would like to think that her generation did all it could to ensure that future

generations can enjoy that which she so dearly loves each day. She understands the need for energy development. She is not against it. But she is against human health and the natural environment taking a backseat to the corporate bottom line. She feels that everyone, all of us, need to use our natural resources in a responsible manner. She feels we need to have an ozone standard that protects *all* of us. The *science* shows that the current 0.075 ppm standard is not adequate. Setting the standard at 0.065 ppm will be a step in the right direction in her view. Thus, she joins this petition.

Citizens United for Responsible Energy Development ("CURED") is a grassroots local citizens' organization and Wyoming nonprofit corporation devoted to ensuring the massive energy development occurring in Sublette County does not harm the air and water quality, wildlife, and open spaces that they and many others in this area want to see maintained. Maintaining these environmental and quality of life benefits is key to the purpose of this organization and is the reason its members are affiliated with it. There is no doubt that the members of CURED are interested in the status of air quality in Sublette County and are personally affected by air quality in the area, including through impacts to their health. Thus, CURED petitions the EQC to take the requested action.

The Upper Green River Valley Coalition is also a grassroots citizens' organization based in Sublette County. It has been very active in many Bureau of Land Management ("BLM") oil and gas development projects in this area, including the Jonah and Pinedale Anticline fields and the plans for developing them. The Upper Green River Valley Coalition has increasingly focused on air quality problems in Sublette County largely resulting from these fields and it has become a leader in seeking protection of local air quality. There is no doubt that the Upper Green River Valley Coalition is interested in the status of air quality in Sublette County. It and its members are affected by the air quality in the area, including impacts to their health as well as their aesthetic enjoyment of the area due to impacts of air pollution on visibility that affects views of the magnificent Wind River Mountains.

Elements of the Ozone NAAQS and WAAQS and Determinations of Violations—Primary Versus Secondary Standards.

As indicated above, the Petitioners are asking that the *level* for the primary and secondary ozone WAAQS be set at 0.065 ppm. But a NAAQS or WAAQS has several other components. Elements include the indicator, averaging time, form, and level. Ozone (O_3) has been used as the most appropriate indicator for the class of chemicals known as photochemical oxidants, and the EPA continues to conclude that this is appropriate. 73 Fed. Reg. at 16,472. We agree with this assessment and do not ask the EQC to establish an alternative indicator. The current averaging time for the ozone NAAQS and WAAQS is set at 8-hours and again the EPA has concluded that maintenance of this averaging period is appropriate for the protection of human health. *Id.* at 16,474. Again, we accept this conclusion and do not ask the EQC to adopt a different averaging period. The "form" of the ozone NAAQS and WAAQS is currently specified as the 3-year average of the annual fourth-highest daily maximum 8-hour concentrations. WAQSR Ch. 2 § 6(b); 40 C.F.R. § 50.15(b); 73 Fed. Reg. at 16,511. As indicated in those regulations, a violation of the NAAQS or WAAQS occurs when the level of the standard is exceeded based on the three-

year average of the annual fourth-highest daily maximum 8-hour concentrations. We do not disagree with this form of the standards and do not ask that it be changed.

The last element of the NAAQS/WAAQS is the level of the standard, the concentration of the pollutant that cannot be exceeded. As indicated, it is this element of the standards that we are asking to be changed. We ask the State of Wyoming to establish a level of the primary standard that is lower than the current WAAQS and the current NAAQS—0.065 ppm rather than 0.08 ppm (the current WAAQS) or 0.075 ppm (the current NAAQS).[10] We are also asking that the secondary standard be set at a level of 0.065 ppm.

Under the Clean Air Act, both primary and secondary ambient air quality standards are established. 42 U.S.C. §§ 7409(b)(1)-(2). The State of Wyoming adheres to these requirements. *See, e.g.*, WAQSR Ch. 2 §§ 6(a)-(b) (setting the primary and secondary ozone WAAQS at 0.08 ppm and giving them the same form). Currently the primary and secondary NAAQS are set at the same level (0.075 ppm) and have the same form and averaging time. A primary standard is to be set so as to protect the public health, with "an adequate margin of safety." 42 U.S.C. § 7409(b)(1). A secondary standard is to be set so as to "protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air." *Id.* § 7409(b)(2). Welfare is very broadly defined and includes effects on such things as soils, waters, crops, materials, and visibility. *Id.* §7602(h). As indicated, we are asking that the level of both the primary and secondary ozone WAAQS be set at 0.065 ppm, with both also having the same form and averaging time.

We would note, however, that a substantial area of debate in EPA's recent revision of the ozone NAAQS was whether to give the secondary standard a distinctly different form, averaging time, and level than the primary standard. The science is quite clear at this point that the secondary standard should be distinctly different than the primary standard because crops and other vegetation respond to ozone differently than humans do; plants respond to the cumulative effects of ozone over the course of a growing season, not average highpoints. Nevertheless, the EPA in its recent rulemaking chose to continue setting the primary and secondary standards at equivalent levels, forms and averaging times. Because, as will be discussed below, the ozone problems in Sublette County appear to be limited to the winter we are not asking that a different secondary standard be set, even though the science strongly supports doing so, because crops and other plants are largely dormant during the winter.

[10] In the latest rulemaking conducted by EPA, consideration was given to whether the level of the standard should continue to be specified to the nearest hundredth ppm (two decimal places, e.g., 0.08 ppm) or whether the degree of precision should be increased to the nearest thousandth ppm (three decimal places, e.g., 0.075 ppm). The effect of this is to specify the level in parts per billion ("ppb"). The EPA concluded, partly based on the CASAC's analysis, that current monitoring technology allows for accurate measurement of ozone levels to the thousandth place, and the EPA therefore specified the NAAQS to the nearest thousandth place in the most recent final rule. The effect of this was to eliminate the troubling "rounding" convention that had effectively made the old NAAQS 0.084 ppm rather than the stated 0.08 ppm. We ask this Council to set the level of the 8-hour ozone WAAQS at three significant places, to 0.065 ppm or 65 ppb.

Background on Ozone and the NAAQS and WAAQS Setting Process.

Ozone Formation and Chemistry—Unique Elements in Sublette County.

Ozone is a gaseous triatomic form of oxygen (O_3).[11] Ozone, the main component of photochemical smog, forms in the lower atmosphere when nitrogen oxides ("NOx") and volatile organic compounds ("VOC") react in the presence of sunlight. Because of its serious effects on human health and on vegetation, ozone has been regulated as a criteria pollutant under the Clean Air Act since 1971. In that year, the EPA set NAAQS for photochemical oxidants, of which ozone is the primary example. The designation of the indicator for this standard was changed to ozone in 1979.

Nitrogen oxides are produced through high temperature combustion processes, including in wildfires and prescribed burns as well as in power plants and internal combustion engines such as oil and gas drilling rigs and natural gas compressor engines. Volatile organic compounds are released into the atmosphere from evaporation of liquid fuels and organic solvents, incomplete combustion of fuels and other materials containing organic compounds, and from vegetation. Carbon monoxide (CO), another product of incomplete combustion, is also an important "precursor" of ozone.

Because it forms through atmospheric reactions, and is generally not emitted directly, ozone is known as a "secondary" air pollutant. The atmospheric chemistry leading to ozone formation is complex and nonlinear, and is highly sensitive to a large number of factors, including the intensity of sunlight, atmospheric temperature and mixing, pressure, humidity, and the quantity and detailed chemical composition of the VOC and NO_X that contribute to ozone formation. The term "VOC" refers to all gas- or vapor-phase organic compounds present in the atmosphere, and includes alkanes, alkenes, aromatics, aldehydes, alcohols, and halogenated organic compounds. Hundreds of different VOCs and several different NO_X are present in the atmosphere in both rural and urban areas; each of them reacts at a different rate and through different chemical pathways in contributing to ozone formation, as well as to the formation of other photochemical oxidants such as peroxy acetyl nitrate ("PAN"), and hydrogen peroxide (H_2O_2).

The only significant reaction in the lower atmosphere that leads directly to ozone formation is the photolysis (i.e., reaction with sunlight) of nitrogen dioxide (NO_2). This reaction breaks off an oxygen atom from the NO_2 molecule. The oxygen atom can then combine with molecular oxygen (O_2) to form ozone (O_3). Most emissions of NO_X are in the form of nitric oxide (NO), which must be oxidized to NO_2 before ozone can form. Oxidation of NO to NO_2 occurs through two distinct pathways with very different implications. In the first pathway, NO reacts with O_3 to form NO_2. No net accumulation of ozone results when NO_2 is produced by this route and then photolyzes to form O_3. On the other hand, the second oxidation pathway involves the reaction of NO with peroxy radicals (e.g., the hydroperoxy radical, HO_2), which have been

[11] Much of the discussion in this section was originally prepared by Dr. Jana Milford, an Associate Professor in Mechanical Engineering and the Center for Combustion and Environmental Research, and director of the Environmental Engineering Program, at the University of Colorado at Boulder.

formed through the oxidation of VOC and CO. When this pathway is active, the ozone formed in the subsequent NO_2 photolysis reaction can accumulate, because it is not destroyed in the next cycle of NO oxidation. This same basic process of ozone formation occurs throughout the troposphere (the troposphere in the lowest region of the atmosphere near the earth's surface), in urban, rural, and remote settings, as long as NO_X and VOCs and/or CO are present. Ozone and its precursors cease to participate in photochemical cycles with direct impacts on local and regional-scale air pollution when they are converted to stable forms (e.g., carbon dioxide, CO_2, in the case of organic compounds) or removed from the troposphere by deposition to the surface.

Ozone concentrations respond to changes in precursor concentrations in a complex and nonlinear fashion. Where NOx concentrations are relatively low (most commonly in rural areas not near significant anthropogenic sources), the net production of ozone increases as NOx emissions increase. At the other extreme, if NOx is present in abundance compared to VOCs, the direct reaction of NO with O_3 can dominate the chemistry so that increased NOx emissions lead to locally reduced ozone concentrations. Rural areas are often, though not always, "NOx-limited" because VOCs from vegetation (i.e., biogenic VOCs) are more abundant than NOx in these areas. In other instances a "VOCs-limited" condition can prevail. *See* http://uwyo.edu/ENR/IENR/ (presentation of Dr. Derek Montague at the IENR ozone information forum at slides 8 and 9, discussing NO_X-limited and VOC-limited conditions). Furthermore, reference is sometimes made to "good" ozone that is present in the stratosphere and which performs the vital function of shielding the earth from harmful ultraviolet radiation versus tropospheric (ground level) ozone that can be harmful in high concentrations, and which can also be a greenhouse gas. *See id.* (slide 4).

Traditionally ozone problems have been thought of as a summertime problem that plagues large urban areas. But the events that have occurred in Sublette County demonstrate that is not always true. In Sublette County the ozone problems have proven to be a wintertime problem in a rural area. The DEQ has determined that the reason for this is a combination of strong temperature inversions, still air, extensive snow cover, sunshine, and the presence of ozone precursors. DEQ presentations in Sublette County where it has provided this information to citizens in the area can be found at http://deq.state.wy.us/Sublettecountyozone.htm (providing five DEQ presentations in Pinedale and Marbleton in 2008). Essentially, the snow reflects and intensifies the ultraviolet energy from the sun to a level one might not expect during the wintertime and when coupled with the still air conditions and presence of ozone precursors the chemical reactions that create ozone can be enhanced. This mechanism has been confirmed by a recent publication of the National Oceanic and Atmospheric Administration ("NOAA"), which also concluded that intrusion of ozone from the stratosphere was unlikely to be the cause of the high ozone levels in Sublette County.[12]

Furthermore, while ozone can be generated by sources of ozone precursors (or ozone) that are far away—Salt Lake City is often mentioned with respect to the high ozone levels in Sublette County although evidence supporting that contention does not seem to be available—

[12] Schnell, R.C., *et al.* 2009. Rapid photochemical production of ozone at high concentrations in a rural site during winter. *Nature Geoscience* 2:120-122 (January 18, 2009), available at http://www.nature.com/ngeo/journal/v2/n2/abs/ngeo415.html.

there seems to be little doubt that local sources of ozone precursors are playing a substantial role in creating the ozone problems being seen in Sublette County. This is especially likely since the high ozone levels are seen when the air is very still (strong inversions are present), so little air is moving into the area from outside, at least at ground level. As stated several times in the DEQ presentations referenced above, "[the Air Quality Division of DEQ] can no longer conclude that increases in NO_X and/or VOC in Sublette County can be justified." As these presentations also show, 51 percent of the NO_X emissions in Sublette County come from oil and gas drill rigs and 57 percent of the VOC are emitted by natural gas dehydrators . The NOAA report also indicates that ozone precursors are locally produced. Thus, there seems to be little doubt that the ozone problems in Sublette County are created to a substantial degree by local emissions sources coupled with specific local weather conditions and that in all likelihood the massive oil and gas development occurring in this area is an important source of those precursor emissions.

That the ozone problems in Sublette County are locally generated and not created by sources of emissions outside of the county has just been confirmed by the DEQ. In its just released "Technical Support Document I For Recommended 8-Hour Ozone Designation For the Upper Green River Basin, WY", available at http://deq.state.wy.us/Sublettecountyozone.htm (click on "Technical Support Document"), the DEQ stated, "sources outside the recommended nonattainment area would not have a significant impact on the Boulder monitor due to the presence of an inversion and very low wind speeds, which significantly limit precursor and ozone transport from sources located outside of the [Upper Green River Basin]."[13] Technical Support Document Executive Summary at vi. DEQ also stated, "[s]ources outside the recommended nonattainment area would not have a significant impact on the Boulder monitor due to the presence of an inversion and the very low wind speeds, which influence the transport of emissions." *Id.* at vii. And, "[t]he analysis conclusively shows that elevated ozone at the Boulder monitor is primarily due to local emissions from oil and gas (O&G) development activities: drilling, production, storage, transport, and treating." *Id.* at viii.

Dr. Montague's presentation at the IENR ozone information forum in Pinedale provides a useful and thorough review of the atmospheric chemistry of ozone. http://uwyo.edu/ENR/IENR/ (presentation of Dr. Derek Montague).

Setting National Ambient Air Quality Standards.

Under the Clean Air Act the EPA is to reconsider NAAQS every five years. 42 U.S.C. § 7409(d)(1). As indicated above, the EPA just completed this periodic review of the ozone standard, promulgating a final revised rule on March 27, 2008. 73 Fed. Reg. 16,436 (March 27, 2008) (revising the primary and secondary ozone NAAQS to a level of 0.075 ppm from the prior standard of 0.08 ppm). In conducting a review of a NAAQS and promulgating any changes, two key documents that are prepared, besides formal rulemaking notices that appear in the Federal

[13] The Technical Support Document was part of the package of materials the State provided to the EPA on March 12, 2009 when it recommended that Sublette County and portions of Lincoln and Sweetwater Counties be designated in nonattainment with the ozone NAAQS. This recommendation will be discussed in more detail below. And as will also be discussed below, the Boulder monitor that is referred to is the air quality monitor near the town of Boulder where very high ozone levels have been monitored.

Register, are the Air Quality Criteria Document ("Criteria Document") and the EPA Staff Paper ("Staff Paper"). Both of these documents are exhaustive scientific, medical, and technical analyses of issues relevant to the NAAQS. In addition to these documents, in the most recent review of the ozone NAAQS, the EPA also prepared extensive ozone exposure analyses, health risk assessments, and a regulatory impact analysis. Many of these documents will be relied on and cited below to support the Petitioners' view that Wyoming should promulgate WAAQS for ozone that are set at a level of 0.065 ppm. These and other documents related to the EPA's recent rulemaking can be viewed on the EPA's website at http://www.epa.gov/ttn/naaqs/ standards/ o3/s_o3_index.html.

The Criteria Document is prepared by the EPA with major input from its Clean Air Scientific Advisory Committee ("CASAC") and the public. The CASAC is required and established under the terms of the Clean Air Act. 42 U.S.C. § 7409(d)(2)(A). The CASAC is specifically charged with reviewing NAAQS and the related "criteria" for air pollutants required pursuant to section 108 of the Clean Air Act[14] and it "shall recommend to the Administrator [of EPA] any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate . . . ." *Id.* § 7409(d)(2)(B). The CASAC is also charged with advising the Administrator "of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance" of NAAQS. *Id.* § 7409(d)(2)(C)(iv). Thus, the CASAC plays a major role in ensuring that a primary standard is based on the best possible science and protects the public health with "an adequate margin of safety," and with ensuring that secondary standards protect the public welfare.

The seven-member CASAC that was in place during the most recent revision of the ozone NAAQS is shown in Exhibit 1. In addition, the EPA also convened a 23-member subject matter expert panel specifically for the ozone rulemaking, and the membership of that panel is also shown. It is clear that the CASAC and the expert panel bring to bear the strongest possible scientific and medical credentials and experience. The committee represents scientists, doctors and engineers from throughout the country (and Canada) from many prestigious institutions and universities, and government. Attached as Exhibit 2 are the biographical sketches for several speakers who recently appeared at the IENR ozone information forum in Pinedale, including Dr. Rogene Henderson who was the chair of the CASAC during the most recent ozone NAAQS revision.[15] As can be seen, Dr. Henderson brings the highest level of credentials to the CASAC, with years of involvement at the highest levels of science in the fields of toxicology and public health. And with respect to the CASAC as a whole, it is difficult to imagine a more highly qualified group to make recommendations regarding what the ozone NAAQS should be in order to protect the public health.

As will be discussed below, the CASAC (including the expert panel), "*unanimously* recommend[ed] a range of 0.060 to 0.070 ppm for the primary ozone NAAQS" (emphasis added)

[14] Air quality criteria "shall accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities." 42 U.S.C. § 7408(a)(2).

[15] As pointed out in *supra* note 9, Dr. Fred Miller, who also presented at the IENR forum in Pinedale, was also a member of the CASAC.

but this expert recommendation was rejected by the EPA when it set the NAAQS at 0.075 ppm.[16] That this panel would *unanimously* recommend a primary standard within this range is remarkable and to a large extent serves as the basis for our asking the EQC to adopt a primary WAAQS for ozone set at a level of 0.065 ppm, which is in the midrange of the CASAC's recommendation. We think this request has the strongest possible scientific and medical basis for being a level that is requisite to protect the public health, with an adequate margin of safety, as required by the Clean Air Act, particularly since it represents the *unanimous* view of a large, diverse group of preeminent scientists, doctors, and engineers from throughout the country.

Dr. Henderson's presentation at the IENR ozone information forum in Pinedale provides a useful review of the NAAQS-setting process and is especially notable since she was chair of the CASAC during the most recent ozone NAAQS revision. http://uwyo.edu/ ENR/IENR/ (presentation of Dr. Rogene Henderson).

Establishing Wyoming Ambient Air Quality Standards.

Under the Wyoming Environmental Quality Act, the Administrator of the Air Quality Division, after consulting with the Air Quality Advisory Board, is to "*recommend*" to the Director of the DEQ ambient air standards "as may be necessary to prevent, abate, or control pollution." W.S. § 35-11-202(a) (emphasis added). In "*recommending*" these standards the Administrator shall "*consider*" all the facts and circumstances that bear on the reasonableness of the emissions involved, including injuries resulting from the pollution (including the health and physical well being of the people), the social and economic value of the sources creating the pollution, the priority of locating the pollution source in the area involved, technical and economic implications of reducing the pollution, and the social welfare and aesthetic values at issue. *Id.* §§ 35-11-202(b)(i)(A)-(E) (emphasis added). Thus, while unlike in setting a NAAQS where only the public health is considered in setting a primary standard, other issues can be considered when the Administrator recommends a WAAQS to the DEQ Director; however, we would note that under the specific terms of the Environmental Quality Act, these are only *factors* in the *recommendations* made by the *Air Quality Division Administrator* as to what the ambient air standard should be, they are not binding requirements that this *Council* is obliged to strictly abide by.

"Air pollution" is defined in the Wyoming Environmental Quality Act and means "the presence in the outdoor atmosphere of one (1) or more air contaminants in such quantities and duration which may be injurious to human health or welfare, animal or plant life, or property, or unreasonably interferes with the enjoyment of life or property." W.S. § 35-11-103(b)(ii). We believe that this definition makes it clear that when setting an ambient air standard "as may be necessary to prevent, abate, or control pollution," *id.* § 35-11-202(a), the primary focus is on protection of human health and welfare, as also specified in the Clean Air Act, 42 U.S.C. §§ 7409(b)(1)-(2). The view that the factors specified in the Environmental Quality Act are not

[16] Letter from the CASAC to EPA Administrator Stephen Johnson dated October 24, 2006. *See also* similar letters dated March 26, 2007 and April 7, 2008 making similar statements. The relevant portions of these letters are included as Exhibits 3-5 and the full text of these letters is available at http://yosemite.epa.gov/sab/sabproduct.nsf/WebReportsbyTopicCASAC!OpenView.

binding on this Council was confirmed by the Wyoming Supreme Court in *Tri-State Generation & Transmission Ass'n v. Environmental Quality Council*, 590 P.2d 1324, 1332 (Wyo. 1979) where the Court held that the Council's obligation is to "promulgate rules and regulations necessary to prevent, reduce and eliminate pollution" and that while it may be advantageous to refer to the various factors specified in the Wyoming Environmental Quality Act, there is "no express statutory requirement that the Council conform its decision-making to § [35-11-202]." *See also* W.S. § 35-11-102 (policy and purpose of the Environmental Quality Act includes enablement of the State to "prevent, reduce and eliminate pollution").

Furthermore, the Wyoming Environmental Quality Act is explicit that ambient air standards "may vary from area to area."[17] W.S. § 35-11-202(a). The standards are to be as appropriate "to facilitate accomplishment of the purposes of this act," and "in order to account for varying local conditions." *Id.* As will be discussed, there is no doubt that ozone levels in Sublette County have been much higher than those in other parts of the State and present much more severe threats to the public health in the area. So the Petitioners feel it is appropriate to establish a more stringent WAAQS focused on Sublette County.

The Current NAAQS is Not Sufficient to Protect the Public Health With an Adequate Margin of Safety So a More Stringent WAAQS Should be Established.

Views of the CASAC and Other Scientific and Health Organizations.

The CASAC's Views.

In its October 24, 2006 letter to the EPA Administrator regarding the CASAC's review of the EPA's second draft ozone Staff Paper, the CASAC stated that it unanimously concluded that the then-existing 0.08 ppm standard had no scientific justification and that "[t]he primary 8-hour NAAQS needs to be *substantially* reduced to protect human health, particularly in sensitive populations." Exhibit 3 at 1-2 (emphasis added). Accordingly, "*the CASAC unanimously recommends a range of 0.060 to 0.070 ppm for the primary ozone NAAQS.*" *Id.* at 2. The CASAC stated that these views were "the Committee's consensus report on this subject." *Id.* The committee then went on to review the scientific basis for the analysis and conclusions in the second draft Staff Paper, summarizing the existing state of our knowledge, and on that basis reiterated its conclusion that the level that should be considered for the new NAAQS "*be from 0.060 to 0.070 ppm, with a range of concentration-based forms from the third- to the fifth-highest daily maximum 8-hour average concentration*." *Id.* at 3-5.

In its March 26, 2007 letter to the EPA Administrator the CASAC provided its review of the final ozone Staff Paper. The CASAC praised EPA for its responsiveness to their review of the second draft Staff Paper and for the clarity of the final document. Exhibit 4 at 1. The

[17] *See also* W.S. § 35-11-110(a)(ix) (providing power to the Air Quality Division Administrator to recommend that "any rule, regulation, or standard or any amendment adopted hereunder may differ in its terms and provisions as between particular types, characteristics, quantities, conditions and circumstances of air, water, or land pollution and its duration, as between particular air, water and land pollution services and as between particular areas of the state").

CASAC then made six recommendations relative to the primary standard for consideration in the EPA's then-pending proposed rule for ozone. *Id.* at 2-3. The CASAC reiterated the point made in its March 24, 2006 letter that it unanimously recommended "*that the level of the current primary ozone standard should be lowered from 0.08 ppm to no greater than 0.070 ppm.*" *Id.* at 2 (underline added). The CASAC stated that its October 24 letter and the EPA's Criteria Document and Staff Paper "provide overwhelming scientific evidence for this recommendation." *Id.*

The last of these letters provided by the CASAC was its April 7, 2008 letter sent to the EPA Administrator just after the final rule was adopted on March 27, 2008. It again made clear its unanimous view that the primary standard should be set between 0.060 and 0.070 ppm. Exhibit 5 at 1, 2. But furthermore, it made clear that its consensus, professional, scientific opinion regarding the new primary standard, which was set at a level of 0.075 ppm, was that it "fails to satisfy the explicit stipulations of the Clean Air Act that you ensure an adequate margin of safety for all individuals, including sensitive populations." *Id.* at 2 (underline added). Thus, "*the members of the CASAC Ozone Review Panel do not endorse the new primary ozone standard as being sufficiently protective of public health.*" *Id.* The CASAC noted that this view was taken not only by it but also by "numerous medical organizations and public health groups," which had "expressed their support of these CASAC recommendations." *Id.* Some of the views of these other groups will be discussed below. Knowing the new EPA rule was a final rule, the CASAC expressed a hope that then-EPA-Administrator Johnson or his successor would ensure "these recommendations be considered during the next review cycle for the Ozone NAAQS that will begin next year."[18] *Id.* at 1.

We feel it is clear that the most authoritative scientific body regarding issues of ozone air pollution and public health is of the unanimous view that the new NAAQS level of 0.075 ppm is not reflective of the best available scientific and medical evidence and consequently the existing ozone NAAQS is not sufficient to protect the public health, with an adequate margin of safety. Thus, in the Petitioners' view the WAAQS should be set at a level lower than the national standard.

It should be noted that these three letters hardly constituted the extent of the CASAC's involvement in the most recent revision of the ozone standard. As described by the chair of the CASAC—Dr. Rogene Henderson—in testimony before Congress, the CASAC engaged in extensive, face-to-face, public reviews of the Criteria Document, health assessment plan, environmental assessment plan, and the Staff Paper on a number of occasions between 2005 and 2007. Exhibit 6 at 2. *See also* 73 Fed. Reg. at 16,436, 16,437-438 (describing further these involvements in the NAAQS revision) As noted by Dr. Henderson, all of these meetings allowed for public comment and there were highly productive discussions between EPA staff, the public, and the CASAC. These efforts clearly represent extensive "peer review," adding further credibility to the CASAC's views. The EPA commented that "[t]he rigor of [this] review makes these studies [the Criteria Document and the Staff Paper], and their integrative

[18] In fact, the EPA has begun the next five-year review of the ozone NAAQS. *See* 73 Fed Reg. 56,581 (Sept. 29, 2008) (calling for information for science assessment for next ozone NAAQS revision). Implications of the next revision of the ozone NAAQS will be mentioned below.

assessment, the most reliable source of scientific information on which to base decisions about the NAAQS . . . ." *Id.* at 16,438. And it was on the basis of the Criteria Document and Staff Paper that the CASAC grounded its unanimous recommendation to set the NAAQS at 0.060 to 0.070 ppm.

The Views of Other Scientific and Health Organizations.

The strong views of the CASAC are shared by other scientific and health professionals. On April 4, 2007 more than one hundred Ph.D and M.D. level scientists and medical professionals submitted a letter to the EPA Administrator where they "strongly and solemnly request that you follow the recommendations of the Clean Air Scientific Advisory Committee and reduce the eight-hour primary ozone standard to a range between 0.060 and 0.070 ppm." Exhibit 7 at 2. They pointed out that the "strongly worded consensus statements" of the CASAC "are unusual for this panel of scientists, which are deliberately selected to represent a variety of viewpoints." *Id.* at 1. And that "[t]hese unambiguous, unanimous recommendations to your office reflect the strong body of scientific literature indicating significant harms to adults and children from exposures to ozone at and below the current standard . . . ." *Id.* This large array of medical and scientific professionals from throughout the country also observed that recent studies "demonstrate that some of the people tested experience these adverse effects at concentrations of 0.06 ppm and below." *Id.* at 2.

The EPA's own Children's Health Protection Advisory Committee ("CHPAC") recommended that the EPA set the primary standard at 0.060 ppm in a letter to the EPA dated March 23, 2007. Exhibit 8 at 1, 2, 3. *See also* http://yosemite.epa.gov/ochpweb.nsf/content/whatwe_advisory.htm (presenting EPA website describing the CHPAC). This group of Ph.D and M.D. level expert advisors to EPA on children's health matters reviewed the conditions that make children particularly vulnerable to ozone pollution, including their greater level of physical activity, higher ventilation rates, more frequent outdoor play, and extensive lung growth occurring during childhood (alveoli development), citing nineteen scientific studies in support of their views. On September 4, 2007 the CHPAC submitted a second letter in response to EPA's proposal to set the primary standard at 0.070 to 0.074, reiterating its view that the standard should be set at 0.060 ppm and providing additional explanation of the medical basis for this expert opinion. Exhibit 9. They especially emphasized that studies of healthy adults may not adequately capture the impacts of ozone on the health of children and again cited considerable scientific evidence showing that children experience negative impacts at levels well below 0.075 ppm.

The American Lung Association too urged the EPA to establish the primary standard at 0.060 ppm "to protect against known and anticipated adverse health effects and to provide a margin of safety to protect sensitive populations as required by the Clean Air Act." Exhibit 10 at 3. Besides the American Lung Association, this letter was signed by the American Academy of Pediatrics, the American Public Health Association, Alliance for Healthy Homes, Asthma and Allergy Foundation of America, Physicians for Social Responsibility, Trust for America's Health, Union of Concerned Scientists, and a number of conservation organizations. The American Lung Association observed that "EPA's risk assessment demonstrates that a standard

at the lower end of this range [of 0.060 to 0.070 ppm] will save more lives, avoid more hospitalizations, and avert more incidences of respiratory symptoms and depressed lung function in children." *Id.* at 2.

The American Thoracic Society ("ATS") also endorsed a 0.060 ppm eight-hour ozone NAAQS in an editorial where it stated,

> Based on the strength of the scientific knowledge base regarding the adverse health effects of ozone air pollution, and the magnitude of public health impact such pollution has on the United States' population, especially on children, the American Thoracic Society has recommended that the EPA take action now to issue a stricter ozone standard of 0.060 ppm/hours. . . . . Any action less stringent than a 0.060-ppm standard will effectively represent a failure of the EPA to fulfill its mandate under the Clean Air Act.[19]

Interestingly, the EPA itself looked to the guidelines published by the ATS in terms of what constitutes an adverse respiratory health effect in individuals, which were defined by the ATS as "medically significant physiologic changes" evidenced by a number of conditions, such as respiratory injury. 72 Fed. Reg. at 37,849. Yet the EPA then disregarded the ATS's recommendations regarding the NAAQS level that was required to protect people from these adverse respiratory health effects.

Finally, the World Health Organization has recommended an air quality guideline for ozone set at a level of 0.051 ppm.[20] This recommendation is presented in the book "Air Quality Guidelines, Global Update 2005," which is available on the worldwide web by doing a Google search using these key words. The World Health Organization states this level will provide "adequate protection of public health, though some health effects may occur below this level."

We feel the authority of the CASAC's views and analysis when coupled with those of these other health professional organizations and experts establishes that the clear weight of the scientific and medical evidence supports establishing a primary ozone WAAQS that is in the range of 0.060 to 0.070 ppm, and the 0.065 ppm level Petitioners have requested is in the middle of this range. A WAAQS at this level is necessary to protect the public health, with an adequate margin of safety, as recognized by literally hundreds of scientific and medical professionals.

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[19] Pinkerton, K.E., *et al.* 2007. Ozone, a malady for the ages, *American J. of Respiratory and Critical Care Medicine* 176:107-108. http://ajrccm.atsjournals.org/cgi/content/full/176/2/107.

[20] This guideline is actually expressed as 100 $\mu g/m^3$. To convert from $\mu g/m^3$ to ppm the following conversion, which is based on the Ideal Gas Law, is used. For atmospheric pressure and temperature of 25 ^oC, the conversion is given as Concentration ($\mu g/m^3$)=Concentration (ppm) x 48 x 40.9, where 48 is the molecular weight of ozone and 40.9 is the numerical value of the other factors in the Ideal Gas Law relationship. The conversion can be further shortened for ozone by recognizing that 48 x 40.9 = 1963. When this conversion is applied, 100 $\mu g/m^3$ = 0.051 ppm.

Health Impacts of Ozone—The Pyramid of Effects.

The EPA recognizes what it calls the "pyramid of effects" with respect to the health impacts of ozone. Exhibit 11 (presenting an EPA diagram showing the pyramid of effects). As shown in this diagram, effects can range from somewhat less severe to very severe and the proportion of the population affected can range from relatively few to many more. On this two-way sliding scale, effects on lung function, increases in inflammation of the respiratory tract, and increased susceptibility to infections and cardiac effects are relatively less severe but affect a larger proportion of the population, while effects like emergency department visits and hospital admissions are quite severe but affect a smaller proportion of the population. As can be seen from this Exhibit, the health effects of ozone include decreases in lung function, inflammation, susceptibility to infection, cardiac effects, respiratory symptoms, increased medication use, asthma attacks, doctor visits, school absences, emergency department visits, hospital admissions, and even death. While not shown on this diagram, symptoms of these effects can include coughing, sore or scratchy throat, pain with deep breathing (inspiration), fatigue, wheezing, production of phlegm, and shortness of breath. Certain members of the population are especially susceptible or vulnerable to these effects, including people with lung diseases such as asthma, children, older adults, and people who are outside more frequently such as outdoor workers.[21]

Based on the most recent research, it is apparent that exposure to ozone can produce a number of significant health effects. These include morbidity effects and mortality effects.[22] One area of impact where there is a clear causal association with short-term ozone exposure includes **lung function decrement, respiratory symptoms, pulmonary inflammation, and increased airway responsiveness**. 73 Fed. Reg. at 16,445. Research has shown statistically significant decrements and symptoms in lung function (the Forced Expiratory Volume over 1 second, or "FEV_1"[23]) at 0.060 ppm in some healthy adults. *Id.* at 16,444, 16,445, 16,449. And, "it is likely that more serious responses, and responses at lower levels, would occur in people with asthma and other respiratory diseases." *Id.* at 16,444. There is a "robust positive association between ambient O_3 concentrations and increased respiratory symptoms and increased medication use in asthmatic children." *Id.* at 16,445. Another effect is **respiratory hospital admissions and emergency department visits**. *Id.* There is a "positive and often statistically significant O_3 association[ ] with total respiratory hospitalizations as well as asthma- and chronic obstructive pulmonary disease (COPD)-related hospitalizations," especially in the summer. *Id.* at 16,446. Recent studies have provided "much more robust and credible information" regarding the effects of ozone on **mortality**. *Id.* These studies show significant associations between ozone and mortality and "suggest that the effect of ozone on mortality may be immediate but may also persist for several days." *Id.* The findings "are highly suggestive that short-term O_3 exposure directly or indirectly contributes to non-accidental and cardiorespiratory-related mortality" although mechanisms for these effects require further research. *Id.* at 16,446-447. Additionally, there are a "much broader array of potential O_3-

[21] In Wyoming, skiers, anglers, hunters and other outdoor recreationists might well also be included in this group.
[22] Morbidity means the rate or incidence of disease.
[23] FEV_1 is an index for assessing airway or airflow obstruction. It measures the volume of exhaled air during the first second of a forced expiratory maneuver started from the level of total lung capacity. Normally 75 to 80 percent of the total exhaled volume occurs in the first second. *See* http://www.spirxpert/com/indices7.htm (describing FEV_1).

related health endpoints" that are part of the pyramid of effects, including **school absences, increased medication use, and emergency department visits**, outcomes which "primarily affect members of at-risk groups." *Id.* at 16,449.

In addition to these impacts on public health, it is also widely known that ozone has substantial additional effects. Other effects include negative affects on materials and especially on plants and vegetation. *See generally* Criteria Document chs. 9 & 11; Staff Paper chs. 7 & 8.[24] While these other effects primarily relate to "human welfare," not public health, and thus issues related to secondary air quality standards, we feel it is likely that a stricter primary standard will also reduce these other, "welfare" impacts. In any event it is important to bear in mind these other, sometimes significant, effects caused by ozone.

It is also worth noting that currently the evidence does not establish the existence or lack of existence of a population level threshold below which these health effects are not observed. "[I]f a population level threshold level does exist, it would likely be well below the level of the current O_3 standard [0.08 ppm at that time] and possibly within the range of background levels." 73 Fed. Reg. at 16,444. *See also id.* at 16,446 (same); Staff Paper at 6-7 (same).

The Evidentiary Basis for Ozone Health Effects.

The evidentiary basis for the pyramid of effects is extensive. The "body of evidence includes hundreds of studies conducted in many countries around the world." 73 Fed. Reg. at 16,439. Moreover, these studies as reviewed in the Criteria Document "have undergone intensive scrutiny through multiple layers of peer review, with extended opportunities for review and comment by [the] CASAC Panel and the public." *Id.* at 16,439-440. The evidence includes results from controlled human-exposure studies, animal toxicological studies, epidemiological studies, temporal association studies between acute ozone exposure and emergency department visits and hospital admissions for respiratory problems, and several large multi-city studies. *See id.* at 16,440. These studies are reviewed at length in the Criteria Document and the Staff Paper as well as in the Federal Register notices associated with the EPA rulemaking. The weight of the evidence in these studies indicated an undeniable need to lower the standard from the previous 0.08 ppm and as will be discussed further below strongly supports lowering the standard to within the range of 0.060 to 0.070 ppm, as recommended by the CASAC.

A very useful summary of the controlled human exposure and epidemiological and field studies that provide much of the evidentiary basis for modifying the ozone standard is presented in EPA's proposed rule. 72 Fed. Reg. at 37,827-829. The exposure studies of Adams, which will be discussed several times below, are reviewed, *id.* at 37,828, 37,875, as are several other controlled human exposure studies. Additionally, several epidemiological studies that showed lung function reductions at ozone levels below 0.060 ppm are reviewed. *See id.* at 37,828-829

[24] *See also* Lessor, V.M., *et al*. 1990. Ozone Effects on Agricultural Crops: Statistical Methodologies and Estimated Dose-Response Relationships, *Crop Science* 30:148-155; Benton, J. J., *et al*. 2000. An International Cooperative Programme Indicates the Widespread Occurrence of Ozone Injury on Crops, *Agriculture, Ecosystems, and Environment* 78:19-30.

(citing Korrick et al. 1998; Mortimer et al. 2002; Gent et al. 2003). Further considering the epidemiological studies showing effects well below even 0.060 ppm, the EPA noted that while there is increasing uncertainty at lower levels the Staff Paper concluded that statistically significant associations between ambient ozone concentrations and several health effects "likely extend down to ambient O_3 concentrations that are well below the level of the current standard" and that the appropriate lower end for the standard that should be considered was 0.060 ppm because this was "the lowest-observed-effects level for potentially adverse lung function decrements and respiratory symptoms in some healthy adults." *Id.* at 37,875-876 (citing Bell et al. 2006; Mortimer et al. 2002).

On March 12, 2009, a new study regarding the long-term impacts of ozone exposure on mortality was published in the New England Journal of Medicine. Obviously this report was not considered in the recent EPA rulemaking. This study is presented in Exhibit 12. In this 18-year study of nearly half a million people the authors found that ozone contributed to increased annual mortality rates, even when a number of risk factors were controlled for, and that when considered with the effects of fine particulate matter ("$PM_{2.5}$"), ozone was significantly associated with death from respiratory causes. *Id.* at 1,092-93. These scientist and medical doctor authors also found that for every 10 ppb increase in ozone exposure a 2.9 percent increase in death from respiratory causes was observed when ozone was considered alone in a single-pollutant model, and a 4 percent increase was observed in two pollutant models considering ozone and $PM_{2.5}$ together. *Id.* at 1,093. "Although this increase may appear moderate, the risk of dying from a respiratory cause is more than three times as great in the metropolitan areas with the highest ozone concentrations as in those with the lowest ozone concentrations." *Id.* The highest ozone levels studied were in the range of 62.5 to 104.0 ppb; the lowest levels were 33.3 to 53.1 ppb. *Id.* at 1088.

The Criteria Document and Staff Paper Document Adverse Health Impacts of Ozone at Levels Below 0.075 ppm.

As is probably apparent at this point, the Criteria Document and the Staff Paper, along with several other technical documents, largely formed the basis for EPA's decision-making regarding the ozone NAAQS. Much of the analysis presented above regarding the health impacts of ozone even though citing to Federal Register commentary is based on these two documents. In this section we will review some of the significant points made in these documents regarding the adverse health impacts of ozone, which we feel provide further support for setting the primary WAAQS for ozone at 0.065 ppm.

<u>The Criteria Document.</u>

The final Criteria Document (actually entitled "Air Quality Criteria for Ozone and Related Photochemical Oxidants") is mammoth. It appears in three volumes and totals 2,118 pages. It can be viewed at http://www.epa.gov/ttnnaaqs/standards/ozone/s_o3_cr_cd.html. It was prepared by the EPA's National Center for Environmental Assessment, Office of Research and Development. Development of the most recent document took nearly 6 years and involved

extensive review by the CASAC and others. It updated and expanded on the earlier extensive Criteria Document prepared in the 1990s as part of that NAAQS revision.

The Criteria Document is required to be prepared by EPA under section 108 of the Clean Air Act, which requires the development of criteria (the scientific basis) for regulated air pollutants. It presents the latest available pertinent information on atmospheric science, air quality, exposure, dosimetry, health effects, and environmental effects of ozone and other related photochemical oxidants. Volume I includes 11 chapters addressing these issues, Volume II contains supplemental information on these issues, and Volume III contains an annex regarding the environmental effects of ozone. Here we will focus on the Executive Summary and Chapter 8 (the Integrative Synthesis: Exposure and Health Effects) that appear in Volume I.

Controlled human exposure (or clinical) studies "provide the clearest and most compelling evidence of human health effects directly attributable to acute exposures to [ozone] per se." Criteria Document at E-9. Reviewing these types of studies and impacts on lung function, the Criteria Document noted that in studies of exposure to 0.06 ppm ozone a greater than 10 percent lung function decline (FEV_1) occurred in 7 percent of the subjects in one study. *Id.* at E-12, 8-74. And even ambient levels of ozone in some areas can cause lung function responses in pre-adolescent children who are outdoors at summer camps. *Id.* Overall, short-term exposures to ozone are associated with both respiratory morbidity and cardiovascular morbidity effects, and mortality. Respiratory effects include impacts on lung function, respiratory symptoms (cough, wheezing, etc.), airway inflammation, airway responsiveness, and respiratory hospital admissions and emergency department visits. *Id.* at E-12 to E-16. Cardiovascular morbidity effects that are suggested by the research include contributions to blood clot formation that would increase the risk of stroke and heart attack, increases in arterial blood pressure, effects on heart rhythm and arrhythmias, and cardiovascular hospitalizations. *Id.* at E16 to E-17. "Results from several large U.S. multicity studies as well as several single-city studies indicate a positive association between increases in ambient [ozone] levels and excess risk of all-cause (non-accidental) daily mortality." *Id.* at E-17. Susceptibility or vulnerability to ozone effects is increased in people with preexisting pulmonary disease, including asthmatics and people with preexisting allergic airway disease, and new epidemiological evidence indicates people with COPD (chronic obstructive pulmonary disease) may be more likely to experience emergency room visits, hospital admissions, or premature mortality. *Id.* at E-20 to E-23. Children are more likely at increased risk for ozone-induced health effects, and some evidence indicates outdoor workers are more vulnerable and those who are physically active have differential responses. *Id.* at E-22.

Turning to Chapter 8, the Integrative Synthesis, the EPA reviewed current ozone concentrations and spatial patterns and trends, interactions between ozone and other pollutants, factors affecting human exposure to ozone, and provided a synthesis of information on ozone-related health effects. The EPA reviewed the studies by Adams (2002, 2006), which will be discussed in more detail below, and concluded his data showed that 7 percent of the subjects experienced an ozone-induced FEV_1 decrement in lung function of greater than or equal to 10 percent when exposed to 0.06 ppm ozone for 6.6 hours. Criteria Document at 8-18, 8-19 (Fig. 8-2), 8-69, 8-74. An equal percentage of subjects (7 percent) experienced a 10 percent ozone-

induced FEV_1 decrement at 0.04 ppm ozone. *Id.* While the EPA claimed in its Federal Register commentary the Adams studies were "too limited" and "very limited" (apparently because there were only two studies, not due to any flaws in the studies) to focus on for standard setting purposes, *see, e.g.*, 73 Fed. Reg. at 16,445, 16,478, 16,483, the EPA also had stated that these kinds of controlled human exposure studies "provide the clearest and most compelling evidence of human health effects directly attributable to acute exposures to [ozone] per se," *id.* at 16,445, Criteria Document at E-9. The Adams studies were done on healthy young adults during moderate exercise. An FEV_1 decrement of greater than 10 percent but less than 20 percent is viewed by the EPA as a moderate adverse health impact (impacts at this level are referred to as "notable" by EPA). Criteria Document at 8-66 to 8-69 (Tables 8-2 and 8-3). Further support for notable lung function decrements (>10%) among asthmatic children that "possibly occur in the range of 0.06 to 0.07 ppm" is provided by several epidemiological studies that EPA cites, specifically the study by Höppe et al. (2003). *Id.* at 8-69. The EPA closed Chapter 8 by providing a summary and conclusions, which reiterate the points made above. *Id.* at 8-73 to 8-78, 8-80 to 8-81. Based on this exhaustive analysis, it is clear that ozone levels well below 0.08 ppm, as low as 0.06 ppm, and even possibly below that, present risks to the public health.

The Staff Paper.

The Staff Paper is also a kind of magnum opus—it is 855 pages long. It comes in two parts, the first being eight chapters addressing various issues and the second being an extensive set of appendices. The full title of the report is "Review of the National Ambient Air Quality Standard for Ozone: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper." It was prepared by the EPA's Office of Air Quality Planning and Standards. It is available at http://www.epa.gov/ttn/naaqs/standards/o3/s_o3_cr_sp.html. According to the EPA, the intent of the Staff Paper is to "bridge the gap" between scientific assessments in the Criteria Document and judgments required of the EPA Administrator in evaluating whether to retain or revise the ozone NAAQS. It too provides substantial evidence that the old NAAQS was not protective of public health and that the NAAQS needed to be substantially lowered to protect the public health.

Chapter 6 will be reviewed here. It is entitled "Staff Conclusions and Recommendations on the Primary O_3 NAAQS." The Staff Paper also reviewed the Adams studies and noted some additional points that were less apparent in the Criteria Document. His 2006 study may have shown a statistically significant, albeit small (less than 3 percent), *group mean* FEV_1 decrement at 0.06 ppm ozone versus filtered air (this is a consideration of group mean results as opposed to the subject level responses mentioned above). Staff Paper at 6-10. "Notably, total respiratory symptoms (which includes pain on deep inspiration, shortness of breath, and cough) following 5.6 and 6.6 [hour] exposures at 0.06 ppm . . . reached statistical significance." *Id.* Based on this information the EPA later stated that "potentially adverse lung function decrements have been demonstrated in controlled human exposure studies of healthy individuals at 0.060 ± 0.003 ppm O_3." *Id.* at 6-23 (also noting that the population subgroup experiencing the ozone level creates varying degrees of concern where "a high degree of protection is warranted against the effects that have been clearly demonstrated in healthy people, . . . especially for members of sensitive subgroups such as children or people with asthma or other lung disease.").

Based on this and other information reviewed, the EPA reached the following conclusions and recommendations regarding the level of the primary ozone standard. EPA staff concluded that "it is appropriate to consider a range of levels for the primary O_3 standard from somewhat below 0.080 ppm down to *at leas*t as low as 0.060 ppm." Staff Paper at 6-77 (emphasis added). "The lower end of this range reflects the lowest-observed-effects level for potentially adverse lung function decrements and respiratory symptoms in some health adults, 0.060 ppm, which is also a level likely to cause these adverse effects in sensitive groups, and is above the level where there is some indication of possible effects thresholds in epidemiological studies." *Id.* Based on these and a number of other considerations, the ultimate EPA staff recommendation was that the level of the primary NAAQS should be set "somewhat below 0.080 ppm to 0.060 ppm." *Id.* at 6-86. Thus, the level the Petitioners are proposing for the WAAQS is within the range of levels recommended by EPA professional staff in the Staff Paper.

American Lung Association Review of Scientific Studies Supporting a 0.060 Standard.

On August 30, 2007, shortly after the EPA released its proposed rule in the Federal Register, the American Lung Association ("ALA") provided testimony to the EPA regarding its views on why the NAAQS should be revised to 0.060 ppm at public hearings held in Philadelphia. In this testimony the ALA briefly and succinctly summarized the results of 10 studies that had shown adverse health effects of ozone at low concentrations. This testimony is very useful because it provides a brief and accessible summary of some the most important studies that have recently been conducted on ozone effects.

The ALA testimony is presented in Exhibit 13. It starts with what it considers the tenth most important study and steps up to the most significant, the studies by Adams. As can be seen, the ten studies reviewed have shown decreases in lung function, increases in respiratory symptoms (including COPD and pneumonia), increases in hospital admissions, pulmonary function effects, and mortality at levels near or below 0.060 ppm. These effects have been shown in people who are active outdoors such as bicyclists, farm workers, and mail carriers; the elderly; newborns; asthmatic children; as well as healthy people. The studies include "most compelling" controlled human exposure studies, as well as several studies of large numbers of people in various cities, and at least one study done in a rural area. Five of these ten studies were also cited in the EPA's Criteria Document and Staff Paper (the studies by Naeher, Brauer, Mortimer, Bell, and Adams). These studies provide a substantial body of evidence indicating that the current NAAQS of 0.075 ppm is not set at a level sufficient to protect the public health with an adequate margin of safety and that a lower level should be established in Sublette County.

The Studies of William C. Adams.

As has been indicated above, the most significant and important recent studies of the health effects of ozone were the 2002 and 2006 studies published by William C. Adams. Dr. Adams is at the University of California, Davis, Human Performance Laboratory, Exercise Biology Program. His 2002 and 2006 studies are included as Exhibits 14 and 15. The reasons

these studies are so significant is at least twofold. First, these studies were done at ozone exposure levels below the-then applicable standard of 0.08 ppm; subjects were exposed to ozone levels of 0.04 and 0.06 ppm.[25] Thus, they provide direct evidence of the consequences of ozone exposure at lower levels. Second, as noted above, these were controlled human exposure studies, which as EPA stated "provide the clearest and most compelling evidence of human health effects directly attributable to acute exposure to [ozone] per se."

We will not review the results of Dr. Adams' studies in detail here as they have been discussed above, but we will again point out the EPA's conclusions on the results and implications of these studies. When healthy young adults during moderate exercise are exposed to 0.06 ppm ozone, 7 percent of the subjects experienced declines in lung function that are viewed as moderate and notable by the EPA (i.e., FEV_1 decrements of greater than 10 percent but less than 20 percent). And based on the EPA's reanalysis of his data that will be discussed next, there was also a small but statistically significant group mean FEV_1 decrement at the 0.06 ppm level.

Because of the significance of the Adams studies, the EPA conducted an independent analysis of these studies that it presented in a June 14, 2007 memorandum. That memorandum is included as Exhibit 16. The memorandum addresses the subject of "[t]he effects of ozone on lung function at 0.06 ppm in healthy adults." The purpose of this memorandum was to review the statistical significance of Dr. Adams' results. The EPA considered the appropriate statistical tests that should be applied to Adams' data and concluded that a reevaluation using different statistical techniques was warranted because the statistical procedures Dr. Adams had used were very conservative and increased the likelihood of making a Type II error (falsely accepting the null hypotheses that there is no effect) relative to pre- to postexposure changes in FEV_1 between an air and an ozone exposure. Exhibit 16 at 4-5. Consequently the EPA applied "the standard approach used by other researchers," i*d.* at 5, the paired t-test.

Based on this reanalysis, the EPA concluded "the pre- to postexposure analysis conducted here shows that exposure to 0.06 ppm 0_3 also causes a relatively small but statistically significant decrease (post- minus preexposure) in group mean FEV_1 responses compared to filtered air." Exhibit 16 at 5. The EPA also concluded that the effects of exposure to ozone at the 0.06 ppm level were consistent with the trend in responses observed for exposures at 0.04 ppm and 0.08 ppm (i.e., there is a trend of increasing lung function decrement (FEV_1) as concentrations of ozone increase from 0.04 to 0.06 to 0.08 ppm). *Id.* at 5-6 (Fig. 2). *See also id.* at 2 (Fig. 1) (showing that after between about 5 to 7 hours of exposure differential effects on FEV_1 become apparent between these different exposure levels). The EPA closed with these statements:

> As illustrated in Figure 2, the average FEV_1 response to 0.06 ppm O_3 exposure is relatively small, but is important as this is an average response in young healthy adults. As observed in Attachment 1, there is considerable variability in responses between similarly exposed individuals, such that some experience distinctly larger effects even when small group mean responses are observed. . . .

[25] Subjects were also exposed to ozone levels of 0.08 ppm and even higher levels.

> . Larger decrements in FEV_1 than described here might be expected in more susceptible populations.
>
> In summary, exposure to 0.06 ppm O_3 causes a relatively small but statistically significant decrease (post- minus preexposure) in group mean FEV_1 responses in healthy young adults compared to filtered air responses. Some healthy individuals experience moderate (> 10%) decrements in FEV_1 when exposed to 0.06 ppm O_3 relative to filtered air (see Attachment 1). As noted by Adams (2006), [total symptom scores][26] are also increased relative to baseline by 5.6 hours of exposure to 0.06 ppm O_3. Based on the current body of literature, it is reasonable to expect susceptible populations, such as age-matched asthmatics, to experience at least equivalent or greater decrements in FEV_1. It would further be expected . . . that asthmatics experiencing moderate responses to 0.06 ppm O_3 exposure would limit their activity and increase their frequency of medication usage.

Exhibit 16 at 5-6.

EPA's Exposure and Risk Analyses Provide Further Evidence of the Public Health Benefits of More Stringent Ozone Standards.

To extend the health impact research to a broader public health context and indicate the magnitude of adverse effects, the EPA modeled potential exposures to different levels of ozone and assessed the risks associated with those exposures. 73 Fed. Reg. at 16,441. This allowed the EPA to consider the size of population groups at risk, the likelihood that exposures of concern would occur, and estimate the number of people likely to experience effects. *Id.* While there were significant uncertainties associated with these modeling exercises, and EPA repeatedly emphasized this, the EPA also pointed out that the CASAC had expressed the view that the exposure analysis was state-of-the-art and the health risk assessment was well done and balanced. *Id.* Moreover, these analyses did not provide a full picture of exposures and health risks nationally because not all at-risk groups were modeled (e.g., outdoor workers, children under 5), not all health outcomes (such as increased medication use, school absences, and emergency department visits) could be evaluated, and the geographic scope was limited, leading the EPA to state that it recognized "national-scale public health impacts of ambient O_3 exposures would be much larger," although since there was variability in responsiveness to exposure only a subset of at-risk groups were expected to experience adverse effects. *Id.* at 16,447.

Exposure.

The exposure analysis modeling considered the general population, school-age children (ages 5-18) and school-age children with asthma living in twelve U.S. urban areas in different regions of the country where the then-current 8-hour standard was not met. 73 Fed. Reg. at 16,441. The EPA considered exposures likely to occur at three benchmark levels—0.080, 0.070,

[26] Total symptom score was the sum of severity scale ratings for four individual symptoms, throat tickle, cough, shortness of breath, and pain on deep inspiration. Exhibit 14 at 751.

and 0.060 ppm—based on data regarding ozone levels collected during three years (2002-2004; 2002 was a high ozone year and 2004 had lower levels). *Id.* at 16,441, 16,447. Exposures at these three benchmark levels were referred to as "exposures of concern." *Id.* at 16,447. The data presented regarding the exposure analysis in EPA's final rule shows that literally millions of asthmatic and all-school-age children are exposed to ozone levels above the benchmark levels of 0.060 and 0.070 ppm when engaged in elevated exertion, especially when the high ozone year (2002) is considered, or if the city with the highest ozone level is considered. *Id.* at 16,447-448. "About 50 percent of asthmatic [or] all school aged children, representing nearly 1.3 million asthmatic children and about 8.5 million school aged children in the 12 urban areas examined, are estimated to experience exposures at or above the 0.070 ppm benchmark level while at elevated exertion . . . associated with the 2002 O_3 air quality levels." *Id.* at 16,447. Exposures are even greater at the 0.060 ppm benchmark level, ranging up to 70 percent of all or asthmatic school age children when the 2002 ozone levels are considered. *Id.* at 16,448.

The Criteria Document also provided information on exposure. This report focused on susceptible populations, which it identified as older adults, children, individuals with preexisting pulmonary disease, and those with higher exposure levels such as outdoor workers. Criteria Document at 8-70. A table was presented showing the prevalence of respiratory disorders. *Id.* at 8-71 (Table 8-4). In the West, 11.8 percent of the adult population suffers from asthma and 11.2 percent of children suffer from this condition, and nationwide 21.9 million adults and 9.1 million children suffer from asthma. *Id.* "Of most concern here are those individuals with preexisting respiratory conditions, with approximately 11% of U.S. adults and 13% of children having been diagnosed with asthma and 6% of adults having COPD (chronic bronchitis and/or emphysema)." *Id.* at 8-70. An additional table was presented showing the number of respiratory conditions per hundred persons per year in the U.S. in various age groups. *Id.* at 8-72 (Table 8-5). When all ages are considered together, 78.9 persons per 100 persons per year have some form of respiratory condition. Considering the simple risk factor of being young (less than 18) or old (65 or older), the EPA pointed out in the Criteria Document that 26 percent of the U.S. population is under 18 years of age and 12 percent are 65 years of age or older.[27] *Id.* at 8-70. These large numbers caused the EPA to recognize that "even a small percentage reduction in O_3 health impacts on cardiopulmonary diseases would reflect a large number of avoided cases." *Id.* at 8-72.

In the Staff Paper, three tables were presented showing the number of people exposed and person-days of exposure in the twelve metropolitan areas included in the study for the three ozone benchmark levels (0.080, 0.070, and 0.060 ppm), for the three years of recent air quality data (2002, 2003, and 2004), and for the three population groups in the study (the general population, all children 5-18 years old, and asthmatic children 5-18 years old). Staff Paper at 6-25 to 6-27 (Tables 6-1a to 6-1c). Together these tables present a large body of data showing the predicted magnitude of exposure to ozone pollution in this country. We will not attempt to review all of these data here, but instead will focus on the data from 2003 (which the Staff Paper points out was something of an "intermediate" ozone pollution levels year), the recent air quality data for the year, and the number of people exposed at a given benchmark level. If that is done,

[27] In Wyoming, 24 percent of the population is 18 or less and 12.2 percent is 65 or older, based on 2007 estimates. *See* http://eadiv.state.wy.us/pop/ST_AS07.htm.

the following table can be generated from Tables 6-1a and 6-1c, which present data on predicted exposures at the 0.080 and 0.060 ppm benchmark levels:

Table A. Number of persons and the percent of the population in three population groups estimated to be exposed when at moderate exertion to two ozone benchmark levels (0.080 and 0.060 ppm) in 12 urban areas in the U.S based on 2003 air quality data. Table based on estimated 8-hour maximum concentrations at the indicated benchmark level. Table generated from Tables 6-1a and 6-1c in the EPA Staff Paper.

General Population		**All Children**		**Asthmatic Children**	
0.080 ppm --number of persons (% of population)--	0.060 ppm --number of persons (% of population)--	0.080 ppm --number of persons (% of population)--	0.060 ppm --number of persons (% of population)--	0.080 ppm --number of persons (% of population)--	0.060 ppm --number of persons (% of population)--
5,970,000 (7%)	27,660,000 (31%)	2,430,000 (13%)	10,220,000 (56%)	340,000 (13%)	1,490,000 (58%)

We think these data make it clear that when predicted exposures at a 0.060 ppm benchmark level are considered—an exposure level where scientific evidence indicates important health effects can occur—relative to predicted ozone exposures at higher ozone levels more closely approximating the current NAAQS (the 0.080 benchmark level), it is apparent that many, many more people experience an "exposure of concern." Thus, if compliance with a 0.065 ppm standard was the goal and was achieved, far fewer people would be exposed to potentially harmful pollution levels than would occur at a 0.075 ppm standard level.

In addition, the EPA examined the extent to which alternative standard levels below the then-current standard were estimated to reduce exposures of concern at the 0.070 and 0.060 ppm benchmark levels. Two of those alternative standards were a 0.074 ppm 4th daily maximum standard (the "74/4" scenario) and a 0.064 ppm 4th daily maximum standard (the "64/4" scenario). Staff Paper at 6-62. We focus on these two standards (four other standards were considered) because they are closest to the current NAAQS and the WAAQS the Petitioners are asking to be established. For the 74/4 and 64/4 scenarios, the EPA estimated exposures of concern at the two benchmark levels (0.07 and 0.06 ppm) based on air quality in 2003, which was intermediate between the air quality estimates for 2002 and 2004. *Id.* at 6-63. These data were presented in Table 6-8, and they can be more briefly summarized as follows:

Table B. Percent of population in two population categories (all children and asthmatic children) estimated to be exposed to ozone at two different benchmark exposure levels (0.070 and 0.060 ppm) under two different alternative standards aggregated across 12 urban areas based on air quality data for 2003. Table generated from Table 6-8 in the EPA Staff Paper.

Exposure of Concern Benchmark Level	Alternative Standard Level/Form	Percent of All Children 5-18 years old aggregated across 12 cities with the range shown in parentheses (18.3 million children)	Percent of Asthmatic Children 5-18 years old aggregated across 12 cities with the range shown in parentheses (2.6 million children)
≥ 0.07 ppm	74/4	1 (0-2)	1 (0-2)
	64/4	0 (0-0)	0 (0-0)
≥ 0.06 ppm			
	74/4	5 (2-14)	7 (2-14)
	64/4	0 (0-1)	0 (0-1)

It is apparent from these data that setting an ozone standard in the range of 0.064 ppm will lead to greatly reduced exposures to ozone at levels of concern—0.060 or 0.070 ppm—in susceptible population categories when compared against a standard similar to the current NAAQS, 0.074 ppm. Overall, exposures are predicted to be reduced to zero percent as opposed 1-7 percent exposure, which represents tens of thousands of people at a minimum.

The EPA also presented exposure estimates in its proposed rule. 72 Fed. Reg. at 37,853-855 (Table 1). In presenting these data the EPA noted there was a small error in the data presented in the Staff Paper and it was presenting corrected data in the proposal, which slightly increased the exposure estimates and lung function risk estimates. *Id.* at 37,851. The data presented in Table 1 of the proposal show that at the 74/4 alternative standard many thousands more children and asthmatic children are estimated to be exposed to ozone benchmark levels of concern than under the 64/4 alternative. *Id.* at 37,855 (Table 1). That Table is presented here:

TABLE 1.—NUMBER AND PERCENT OF ALL AND ASTHMATIC SCHOOL AGE CHILDREN IN 12 URBAN AREAS ESTIMATED TO EXPERIENCE 8-HOUR OZONE EXPOSURES ABOVE 0.080, 0.070, AND 0.060 PPM WHILE AT MODERATE OR GREATER EXERTION, ONE OR MORE TIMES PER SEASON AND THE NUMBER OF OCCURRENCES ASSOCIATED WITH JUST MEETING ALTERNATIVE 8-HOUR STANDARDS BASED ON ADJUSTING 2002 AND 2004 AIR QUALITY DATA[1, 2]

Benchmark levels of exposures of concern (ppm)	8-Hour air quality standards[3] (ppm)	All children, ages 5–18 aggregate for 12 urban areas, number of children exposed (% of all) [%reduction from current standard]		Asthmatic children, ages 5–18 Aggregate for 12 urban areas, number of children exposed (% of group) [% reduction from current standard]	
		2002	2004	2002	2004
0.080	0.084	700,000 (4%)	30,000 (0%)	110,000 (4%)	0 (0%)
	0.080	290,000 (2%) [70%]	10,000 (0%) [67%]	50,000 (2%) [54%]	0 (0%)
	0.074	60,000 (0%) [91%]	0 (0%) [100%]	10,000 (0%) [91%]	0 (0%)
	0.070	10,000 (0%) [98%]	0 (0%) [100%]	0 (0%) [100%]	0 (0%)
	0.064	0 (0%) [100%]	0 (0%) [100%]	0 (0%) [100%]	0 (0%)
0.070	0.084	3,340,000 (18%)	260,000 (1%)	520,000 (20%)	40,000 (1%)
	0.080	2,160,000 (12%) [35%]	100,000 (1%) [62%]	330,000 (13%) [36%]	10,000 (0%) [75%]
	0.074	770,000 (4%) [77%]	20,000 (0%) [92%]	120,000 (5%) [77%]	0 (0%) [100%]
	0.070	270,000 (1%) [92%]	0 (0%) [100%]	50,000 (2%) [90%]	0 (0%) [100%]
	0.064	30,000 (0.2%) [99%]	0 (0%) [100%]	10,000 (0.2%) [98%]	0 (0%) [100%]
0.060	0.084	7,970,000 (44%)	1,800,000 (10%)	1,210,000 (47%)	270,000 (11%)
	0.080	6,730,000 (37%) [16%]	1,050,000 (6%) [42%]	1,020,000 (40%) [16%]	150,000 (6%) [44%]
	0.074	4,550,000 (25%) [43%]	350,000 (2%) [80%]	700,000 (27%) [42%]	50,000 (2%) [81%]
	0.070	3,000,000 (16%) [62%]	110,000 (1%) [94%]	460,000 (18%) [62%]	10,000 (1%) [96%]
	0.064	950,000 (5%) [88%]	10,000 (0%) [99%]	150,000 (6%) [88%]	0 (0%) [100%]

[1] Moderate or greater exertion is defined as having an 8-hour average equivalent ventilation rate ≥ 13 l-min/m².
[2] Estimates are the aggregate results based on 12 combined statistical areas (Atlanta, Boston, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Sacramento, St. Louis, and Washington, DC). Estimates are for the ozone season which is all year in Houston, Los Angeles and Sacramento and March or April to September or October for the remaining urban areas.
[3] All standards summarized here have the same form as the current 8-hour standard which is specified as the 3-year average of the annual 4th highest daily maximum 8-hour average concentrations must be at or below the concentration level specified. As described in the Staff Paper (section 4.5.8), recent O_3 air quality distributions have been statistically adjusted to simulate just meeting the current and selected alternative standards. These simulations do not represent predictions of when, whether, or how areas might meet the specified standards.

Again, these results show that meeting a standard of 0.064 ppm will lead to far fewer exposures of concern in at-risk populations than would occur under a 0.074 ppm standard. While EPA noted the variability in these data year-to-year, among urban areas, and among individuals, and uncertainty as to certain model inputs and the model itself, *id.* at 37,854-855, as noted above the CASAC viewed this analysis as state of the art. *Id.* at 37,851. It should also be pointed out that while there may be greater uncertainty associated with the public health consequences of exposures at the 0.060 benchmark level, the EPA recognized "asthmatics are likely to have more serious responses [than the healthy subjects included in the controlled exposure studies at the 0.060 ppm level] and that lung function [which was the "marker" utilized by the EPA in the exposure analysis] is not likely as sensitive a marker of O_3 effects as is lung inflammation." *Id.* at 37,853-854. Thus, while there may have been uncertainty associated with these estimates, especially at lower levels, there was also a possibility asthmatics might have

shown even more serious responses than indicated and that if inflammation had been used as the "marker" more sensitivity would have been reflected in the estimates.

Exposure in Sublette County.

So far as we know there is no similarly detailed analysis of exposure levels to ozone that exists for Wyoming as a whole or for Sublette County. The Petitioners do not have the resources to develop such a study. Nevertheless some Sublette County-specific information can be gleaned.

According to data from the Center for Disease Control and Prevention's Behavioral Risk Factor Surveillance System, in 2007 12.5 percent of adults in Wyoming had been told at some point they have asthma.[28] Based on the U.S Census Bureau estimate of 7,539 people in Sublette County in 2006,[29] this means 942 people in Sublette County could suffer from this condition. Moreover, the Census Bureau estimated that 6.5 percent of the population of Wyoming was under 5 in 2006, 23.6 percent was under 18, and 12.2 percent was 65 and over.[30] So even in sparsely populated Sublette County, several hundred to several thousand people are in likely at-risk groups that could be threatened by exposure to ozone. An article in the Casper Star Tribune reported that the mining sector directly employed 17,146 workers in Wyoming in 2007. Tom Mast, *Report says oil and gas drive state's economy*, CASPER STAR TRIBUNE, Aug. 26, 2008. The oil and gas industry of course has a major presence in Sublette County. Many of these people work outdoors, a group that is recognized as being vulnerable to ozone pollution, and of course these people are working in the gas fields where the ozone precursors are being emitted and the ozone is being formed near ground level. Overall, it seems unlikely that ozone exposure in Sublette County among at-risk groups is significantly less on a proportional basis or significantly different than the national picture developed by the EPA in its recent exposure analysis.

Risk.

EPA's risk assessment estimated the risks of various health endpoints resulting from ozone exposure and provided an assessment of risk reductions and remaining risks that would be associated with meeting alternative 8-hour ozone NAAQS in several urban areas. 73 Fed. Reg. at 16,442. The health endpoints included lung function decrements in all and asthmatic school age children, respiratory symptoms in asthmatic children, respiratory-related hospital admissions, and non-accidental and cardiorespiratory-related mortality. *Id.* Causality between the health endpoints and ozone exposure served as a basis for including the endpoints in the risk assessment. 72 Fed. Reg. at 37,857. These "limited estimates are indicative of much broader array of potential O_3-related health endpoints that [EPA] consider[s] part of a "pyramid of effects" that include various indicators of morbidity that could not be included in the risk assessment (e.g., school absences, increased medication use, emergency department visits) and

[28] *See* http://apps.nccd.cdc.gov/brfss/display.asp?cat=AS&yr=2007&qkey=4417&state=WY and http://apps.nccd.cdc.gov/brfss/display.asp?cat=AS&yr=2007&qkey=4416&state=WY
[29] http://quickfacts.census.gov/qfd/states/56/56035.html.
[30] *See* http://quickfacts.census.gov/qfd/states/56000.html.

which primarily affect members of at-risk groups."[31] 73 Fed. Reg. at 16,449. In general the analysis showed "increasing estimated risk reductions associated with just meeting the lower alternative 8-hour standards considered." *Id.* at 16,443. More specifically, with respect to lung function decrement, the EPA reviewed the substantial reduction in risk associated with being able to meet the then-current standard (0.08 ppm) but then stated, "[t]hus, even when the current standard is met, about 4 to 8 percent of asthmatic school-aged children are estimated to experience one or more occurrences of moderate lung function decrements, resulting in about 1 million occurrences (using the 2002 simulation) and nearly 700,000 occurrences (using the 2004 simulation) in just 5 urban areas" and 6-10 of these occurrences were likely occurring in an ozone season even when the then-current standard was met. *Id.* at 16,448. And large lung function decrements ($FEV_1 > 20$ percent) were predicted to affect tens of thousands of school age children, including asthmatic school age children, even when the then-current standard was met. *Id.* Large lung function decrements would likely interfere with normal activities even in healthy individuals, and therefore even a single occurrence would be considered adverse, and cause for medical concern in some asthmatics. *Id.* at 16,448, 16,451.

The Staff Paper provided a series of tables presenting estimated risk effects occurring when the-then applicable NAAQS (0.080 ppm) was just met. Staff Paper at 6-30 to 6-41. In the interest of space we will not review the results presented in these five tables in detail, but suffice it to say that together they show that even when the old standard was just met many thousands and in several cases hundreds of thousands of people in these at-risk groups would experience significant lung function responses or other respiratory symptoms, or hospital admissions, or even mortality. The risk to many people was substantial even if the old standard was met.

The EPA then went on to assess the percent reduction in risk estimates that would result from meeting the alternative standards mentioned above (including the 64/4 and 74/4 alternatives) relative to just meeting the then-current standard of 0.08 ppm. The EPA again considered risks to school age children in 12 urban areas, risks to asthmatic children in five urban areas, and the risk of non-accidental mortality incidence, considering air quality data from 2002 and 2004. Staff Paper at 6-67 to 6-72 (Figs. 6-1 to 6-6). It also presented two tables showing risks of chest tightness in moderate to severe asthmatic children in Boston and risks of respiratory-related hospital admissions in New York. *Id.* at 6-74 to 6-75 (Tables 6-9 and 6-10).

With respect to lung function decrements, the modeling showed that the 64/4 alternative provided greater reduction in moderate lung function decrements ($\geq$ 15% reduction in FEV_1) in all school age children compared to the 74/4 scenario relative to the then-current standard (65 to 80% reduction versus 40 to 50%), and this was "appreciably greater" than just meeting the then-current standard. Staff Paper at 6-66. In other words, a reduction in the ozone standard to 0.064 ppm was predicted to decrease moderate lung impairment in children by 65 to 80 percent compared to a decrease of only 40 to 50 percent if the standard were set at 0.074 ppm, relative to

[31] EPA defined what constituted "at risk groups" in its proposed rule. At risk groups are composed of people who are *susceptible* to effects when they are exposed to ozone and people who are *vulnerable* to ozone-related effects. 72 Fed. Reg. at 37,845-846. Susceptible people have innate or acquired conditions making them more at risk (e.g., genetic or developmental conditions, personal risk factors like smoking, age). Vulnerable people have an increased likelihood of exposure due to things like exercising or working outdoors.

the old 0.08 ppm standard. The degree of reduction depended on the year (2002 versus 2004) used to adjust estimates. *Id.* For asthmatic school age children, relative to the then-current standard, moderate lung function decrements (≥ 10% reduction in FEV_1) were reduced by 55 to 65 percent under the 64/4 scenario versus only 30 to 45 percent under the 74/4 scenario, and one area had a 75 percent reduction. *Id.*

Just meeting the 64/4 scenario provided estimates of reduced non-accidental mortality compared to the then-current standard of 40 percent in most areas and 60-70 percent in two areas, while the74/4 scenario resulted in only a 15 to nearly 40 percent reduction relative to the then-current standard. Staff Paper at 6-73. Again, the degree of reduction depended on whether 2002 or 2004 air quality data were adjusted. *Id.* Respiratory symptoms of chest tightness in children with moderate to severe asthma in Boston were reduced by about a thousand or more incidences when the 64/4 scenario was compared to the 74/4 scenario, and risks of hospital admission for respiratory illness in New York were predicted to be reduced by 63 to 74 incidences when the 64/4 scenario is compared to the 74/4 scenario. *Id.* at 6-74 to 6-75 (Tables 6-9 and 6-10). *See also id.* at 6-73 (discussing these results).

The EPA also presented its slightly (72 Fed. Reg. at 37,851) revised risk assessment in its proposed rule. 72 Fed. Reg. at 37,860 (Table 2). That Table is reproduced here:

TABLE 2.—NUMBER AND PERCENT OF ALL AND ASTHMATIC SCHOOL AGE CHILDREN IN SEVERAL URBAN AREAS ESTIMATED TO EXPERIENCE MODERATE OR GREATER LUNG FUNCTION RESPONSES 1 OR MORE TIMES PER SEASON ASSOCIATED WITH 8-HOUR OZONE EXPOSURES ASSOCIATED WITH JUST MEETING ALTERNATIVE 8-HOUR STANDARDS BASED ON ADJUSTING 2002 AND 2004 AIR QUALITY DATA [1, 2]

8-Hour air quality standards [3]	All children, ages 5–18, FEV_1 ≥15 percent, aggregate for 12 urban areas, number of children affected (% of all) [% reduction from current standard]		Asthmatic children, ages 5–18, FEV_1 ≥10 percent, aggregate for 5 urban areas, number of children affected (% of group) [% reduction from current standard]	
	2002	2004	2002	2004]
0.084 ppm (Current standard).	610,000 (3.3%)	230,000 (1.2%)	130,000 (7.8%)	70,000 (4.2%).
0.080 ppm	490,000 (2.7%) [20% reduction].	180,000 (1.0%) [22% reduction].	NA [4]	NA.
0.074 ppm	340,000 (1.9%) [44% reduction].	130,000 (0.7%) [43% reduction].	90,000 (5.0%) [31 % reduction].	40,000 (2.7%) [43% reduction].
0.070 ppm	260,000 (1.5%) [57% reduction].	100,000 (0.5%) [57% reduction].	NA	NA.
0.064 ppm	180,000 (1.0%) [70% reduction].	70,000 (0.4%) [70% reduction].	50,000 (3.0%) [62% reduction].	20,000 (1.5%) [71% reduction].

[1] Associated with exposures while engaged in moderate or greater exertion which is defined as having an 8-hour average equivalent ventilation rate ≥13 l-min/m^2.
[2] Estimates are the aggregate central tendency results based on either 12 urban areas (Atlanta, Boston, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Sacramento, St. Louis, and Washington, DC) or 5 urban areas (Atlanta, Chicago, Houston, Los Angeles, New York). Estimates are for the O_3 season which is all year in Houston, Los Angeles and Sacramento and March or April to September or October for the remaining urban areas.
[3] All standards summarized here have the same form as the current 8-hour standard which is specified as the 3-year average of the annual 4th highest daily maximum 8-hour average concentrations must be at or below the stated concentration level. As described in the Staff Paper (section 4.5.8), recent O_3 air quality distributions have been statistically adjusted to simulate just meeting the current and selected alternative standards. These simulations do not represent predictions of when, whether, or how areas might meet the specified standards
[4] NA (not available) indicates that EPA did not develop risk estimates for these scenarios for the asthmatic school age children population.

:

As can be seen, regardless of whether 2002 data (a high ozone year) or 2004 data (a low ozone year) are considered, all children and asthmatic children are estimated to experience thousands fewer moderate or greater lung function decrement responses one or more times per ozone season under the 64/4 alternative standard than they would under the 74/4 scenario, and the 64/4 alternative demonstrated a much greater percentage reduction in risk compared to the-then current standard. While as with the exposure estimates there was again significant variability and uncertainty regarding the risk assessment, we also note again that overall the analysis was considered in a peer reviewed letter sent by CASAC to the Administrator to be "well done, balanced, and reasonably communicated." 72 Fed. Reg. at 37,856.

The EPA has also developed an Air Quality Index program that attempts to portray air pollution risks in a more easily understood and accessible way. *See* http://airnow.gov/index.cfm?action=aqibroch.aqi#aqioz (presenting the air quality index). *See also* 40 C.F.R. § 58.50. In the most recent rulemaking, the EPA revised the air quality index for ozone setting the index value of 100 to equal the new NAAQS of 0.075 ppm. 73 Fed. Reg. at 16,485, 16,513-514. When air quality reaches an index level of 100 it means that there are moderate risks and unusually sensitive people should consider reducing prolonged or heavy exertion outdoors. The EPA also adjusted several other index values, setting 50 to equal 0.059 ppm, 150 to equal 0.095 ppm, and 200 to equal 0.115 ppm (it did not adjust higher index levels). *Id.* An index level of 50 is viewed as "good," 150 is unhealthy for sensitive groups, and 200 is unhealthy for all. Based on the data presented in Tables C and D below and the discussion in that section, it is apparent that Sublette County would have index values in the vicinity of 150 to 200 when ozone levels are high, levels that clearly present public health threats.

EPA's Rationale for Adopting the New NAAQS is Not Persuasive and is Contrary to the Evidence—the New NAAQS Does Not Protect the Public Health with an Adequate Margin of Safety.

The EPA revised the ozone NAAQS from 0.08 ppm to 0.075 ppm in its most recent rulemaking completed in March, 2008. We feel the decision to lower the standard by only 6.25 percent is not well justified or supported in EPA's record, or by the underlying science. It is insufficient to protect the public health, with an adequate margin of safety, and thus should not be adhered to by this Council or the State of Wyoming.

In its proposed rule, the EPA said it would consider revising the NAAQS to a level between 0.070 and 0.075 ppm. 72 Fed. Reg. at 37,818. This level of course only barely includes the range unanimously recommended by the CASAC, which was 0.060 to 0.070 ppm. And in the Staff Paper EPA's professional staff recommended that the NAAQS should be set at somewhat below 0.080 to 0.060 ppm. In the end the EPA selected a level for the new NAAQS that was not only outside of the range recommended by the CASAC but also on the upper end of the level it itself had said was needed for the protection of the public health, 0.075 ppm.

The EPA stated the following reasons for making this decision. It claimed that it was choosing to make a policy judgment that differed from CASAC's views based on what it considered to be the weight that should be given to the Adams studies and the exposure and risk assessments. 73 Fed. Reg. at 16,483. The EPA Administrator claimed that even the CASAC did not view the Adams studies as mandating a level set at 0.060 ppm and that "uncertainty" in the exposure and risk studies warranted not making them a "primary basis" for setting the NAAQS at or below 0.070 ppm. *Id.* He went on to claim that levels set below 0.075 ppm would only result in significant public health benefits if there was a continuum of risks in areas with ozone levels well below the concentrations in "key" controlled human exposure studies and if the epidemiological studies showing impacts on human health at levels well below 0.075 ppm were "causally related" to the ozone at those lower levels. *Id.* He then again invoked "uncertainties" regarding the controlled human exposure studies and epidemiological studies "at very low levels" and claimed that the likelihood of benefits to public health if the level was set below

0.075 ppm would decrease while the likelihood would increase that the standard would go beyond what is needed to protect the public health. *Id.*

We view this rationale as unpersuasive and not well supported. For one, the EPA stated that there was support (provided by the controlled human exposure and epidemiological studies) for the view in the Staff Paper that morbidity effects extended to ozone levels "well below" the current standard, 73 Fed. Reg. at 16,444; that it recognized that the CASAC had said the standard needed to be "substantially reduced," *id.* at 16,452; and it unequivocally stated there was a "strong basis" for setting a revised standard "appreciably below" 0.080 ppm, *id.* at 16,480. We do not feel that lowering the standard by only 6.25 percent can be viewed as a revision that is "well below" the old standard, is "substantially reduced," or is "appreciably below" the old standard. Thus, the above rationales presented by EPA to support a 0.075 standard fail to meet the needs it itself had stated and recognized. In contrast, a 0.065 ppm level would represent an 18.75 percent decrease from the old standard, which we feel meets the stated need for a standard that is "appreciably below" the old standard.

In addition, many of the points we have made above reinforce the lack of persuasiveness of the EPA's rationale for not putting in place a standard adequate to protect the public health, a standard below 0.075 ppm. These points include but are not limited to the following:

- The CASAC, a body of preeminent scientists and doctors and its equally impressive supporting subject matter expert panel, unanimously recommended that the NAAQS should be set at 0.060 to 0.070 ppm based on their review of the Criteria Document, Staff Paper, and Exposure and Risk Assessments. *See supra* pp. 16-17, 18-19.

- Following adoption of the 0.075 ppm NAAQS the CASAC made it clear that its consensus, professional, scientific opinion was that the new standard "fails to satisfy the explicit stipulations of the Clean Air Act that you ensure an adequate margin of safety for all individuals, including sensitive populations," and thus the members of the CASAC panel "do not endorse the new primary ozone standard as being sufficiently protective of public health." *See supra* p. 19.

- Numerous other scientific and medical professionals also recommended establishing a standard in the range of 0.060 to 0.070 ppm, with many recommending 0.060 ppm or even less. *See supra* pp. 20-21.

- The research showing statistically significant decrements in lung function at 0.060 ppm in healthy adults indicates it is even more likely there will be adverse responses in people with asthma and other respiratory diseases at these levels. *See supra* pp. 22, 23, 25-27, 27-29.

- "[I]f a population level threshold level does exist, it would likely be well below the level of the current O_3 standard and possibly within the range of background levels." *See supra* p. 23.

- The hundreds of studies reviewed in the Criteria Document on which the CASAC relied "have undergone intensive scrutiny through multiple layers of peer review, with extended opportunities for review and comment by [the] CASAC Panel and the public." It was very "robust." *See supra* pp. 23, 39.

- There can be no doubt that the CASAC was preeminently qualified to assess what levels the NAAQS should be set at in order to protect the public health. *See supra* p. 16.

- The controlled human exposure studies such as the Adams studies "provide the clearest and most compelling evidence of human health effects directly attributable to acute exposures to [ozone] per se." *See supra* pp. 25, 27-28.

- The Adams controlled human exposure studies as interpreted by the EPA show that 7 percent of the subjects experienced "notable" FEV_1 decrements greater than or equal to 10 percent at 0.06 ppm of ozone, and "potentially adverse lung function decrements have been demonstrated in controlled human exposure studies of healthy individuals at 0.060 ± 0.003 ppm O_3." The lower end of the range of 0.060 to 0.080 ppm "reflects the lowest-observed-effects level for potentially adverse lung function decrements and respiratory symptoms in some healthy adults, 0.060 ppm, which is also a level likely to cause these adverse effects in sensitive groups, and is above the level where there is some indication of possible effects thresholds in epidemiological studies." *See supra* pp. 25, 26-27, 27-29.

- EPA's reanalysis of the Adams studies confirmed that exposure to 0.060 ppm ozone caused a small but statistically significant group mean decrease in FEV_1 responses, but EPA stated this small change "is important" because some people experience "distinctly larger effects" and larger FEV_1 decrements "might be expected in more susceptible populations." It went on to conclude that "based on the current body of literature, it is reasonable to expect susceptible populations, such as age-matched asthmatics, to experience at least equivalent or greater decrements in FEV_1" and even a moderate response in asthmatics at the 0.06 ppm level "would limit their activity and increase their frequency of medication usage." *See supra* pp. 27-29.

- The CASAC's view was that the exposure analysis was state of the art and the health risk assessment was well done and balanced. And moreover, despite some uncertainties, this analysis did not provide a completely full picture of all exposures and health risks, and so was conservative in its estimate of exposures. *See supra* pp. 29, 32, 35.

- The exposure analysis made it clear that many, many more people will be exposed to potentially unhealthy levels of ozone at a 0.075 ppm level than at a 0.065 ppm level. *See supra* pp. 29-32.

- The risk analysis clearly showed greater reductions in lung function decrement responses under the 64/4 alternative compared to the 74/4 alternative for all school age children and asthmatic school aged children. *See supra* pp. 33-35.

We feel these points, many made by the EPA itself, rebut most if not all of the reasons put forth by the Administrator for not setting a lower standard. They show that even if there is some "uncertainty" the great weight of clearly well-done and strong scientific and medical research supports setting the standard well below 0.075 ppm. Benefits to public health clearly continue to accrue at levels below 0.075 ppm given that there is no established threshold at which ozone effects end. Given this, it is apparent there is little risk of making the standard more stringent than is necessary to protect the public health at the level we have requested, 0.065 ppm, which is in the midrange of the CASAC's recommendation, and within the range that EPA's professional staff recommended in the Staff Paper.

The EPA Administrator "agree[d] with the CASAC Panel and the majority of public commenters" that the old NAAQS "is not requisite to protect public health with an adequate margin of safety . . . ." 73 Fed. Reg. at 16,471, 16,472. He also agreed that the evidence needed to be considered "holistically" in setting a new standard. *Id.* at 16,476. He accepted the weight of the evidence approach used in the Criteria Document, "and believes this body of scientific evidence across all types of studies is very robust" and that they "provide consistent and coherent evidence of an array of O_3-related" adverse health effects. *Id.* at 16,479. The Administrator stated that he was "[p]lacing great weight on the views of CASAC," *id.* at 16,482, and that he was "in general agreement with CASAC's views concerning the interpretation of the scientific evidence," *id.* But he nevertheless rejected those views and CASAC's interpretation of the science offering as one reason a logically implausible assertion that since the CASAC had recommended a *range* of 0.060 to 0.070 ppm it did not *really* believe the Adams studies indicated the level should be set at *exactly* the 0.060 ppm level (which the CASAC had never even recommended), and also claiming that uncertainties associated with the risk assessment justified rejecting the CASAC's view that "beneficial effects in terms of reduction in adverse health effects were calculated to occur at the lowest concentration considered (i.e., 0.064 ppm)." *Id.* at 16,478-479, 16,483. Then, despite having earlier recognized that exposure should be considered in a continuum and that no threshold level is known at this time, *id.* at 16,444, 16,446, 16,471, 16,481, the Administrator seemed to question whether there was a continuum of health risks that could be protected against when ozone levels were below 0.080 ppm (we assume the "key" studies referred to are those at exposure levels of 0.080 ppm or above), *see id.* at 16,483. He also viewed the epidemiological studies as not providing a causal link to ozone exposure despite having earlier stated that they provided statistically significant evidence of a number of respiratory morbidity outcomes at levels well below the old standard, with controlled human exposure and animal toxicological studies providing support for the biological plausibility of these results. *Id.* at 16,471, 16,476, 16,483. He viewed these matters as "uncertainties" when low levels of ozone exposure were considered and used this to claim that the benefits of a standard set below 0.075 ppm might decrease while the likelihood of setting too strict a standard would increase. Again, these arguments are unpersuasive and not supported by the science and law.

Most importantly, under the Clean Air Act a primary standard is to be set at a level "requisite to protect the public health" with "an adequate margin of safety." Thus, in exercising discretion to determine the level of a standard, the EPA (and we would argue the EQC and DEQ)

must err on the side of caution. As is evident from the above rationales, the EPA did not exercise this legally mandated cautious approach in the recent rulemaking, and thus its decisions are not persuasive. In adopting the 1977 amendments to the Clean Air Act the House of Representatives explained that the amendments were designed among other things to "emphasize the preventative or precautionary nature of the act, i.e., to assure that regulatory action can effectively prevent harm before it occurs." H.Rep. 294, 95th Cong., 1st Sess. 49-51 (1977). A "margin" means an amount beyond what is needed, which further emphasizes the conservative nature of a NAAQS. Allowing for an adequate margin of safety is intended to protect against uncertainties in the science, to protect against as-yet unidentified hazards, and to protect sensitive subpopulations, such as asthmatics, the elderly and those who are active outdoors. Setting a NAAQS is intended to guard against uncertainty, not allow the use of uncertainty as a sword to reject more protective standards, and we feel the same view applies to setting a WAAQS. In setting a WAAQS, the Council must "prevent, reduce and eliminate pollution" and air pollution is defined in the Wyoming Environmental Quality Act to mean the presence of air contaminants "which may be injurious to human health or welfare . . . ." Thus, the ozone WAAQS must be set at a level that prevents, reduces, and eliminates the adverse human health or welfare impacts resulting from the ozone air contaminant, and we believe the science clearly shows that level is well below 0.075 ppm.

NAAQS are to be based on the "criteria" specified by the Clean Air Act, which are to reflect "the latest scientific knowledge," meaning that judgment in setting a NAAQS is not unbridled, it must be based on the latest scientific knowledge considering only the issue of "public health" with "an adequate margin of safety." 42 U.S.C. §§ 7408(a)(2), 7409(b)(1). Calling the chosen level a "policy judgment" as EPA did was really little more than an excuse to disregard or disparage the science. Moreover, if uncertainty in the science was really an issue, as EPA claimed, this would argue for setting a *more* stringent standard not a less stringent standard in order to ensure the required "adequate margin of safety" was provided for.

Finally, it is probably worth noting that litigation challenging the EPA's new ozone NAAQS has been filed in the United States Court of Appeals for the District of Columbia Circuit. The American Lung Association joined by conservation groups challenged the EPA for arbitrarily and illegally failing to promulgate a NAAQS that would be protective of the public health and also for refusing to adopt a separate and more protective secondary ozone NAAQS. *American Lung Ass'n et al. v. U.S. Envtl. Protection Agency*, No. 08-1203 (D.C. Cir., June 30, 2008). This case has since been consolidated with several others that were filed and is now captioned *Mississippi v. U.S. Envtl. Protection Agency*, No. 08-1200 (D.C. Cir. 2008). Moreover, according to recent news reports, the Obama administration has requested an extension of the briefing schedule in this case so that it can make a determination whether the new ozone NAAQS should be maintained, modified, or otherwise reconsidered. Robin Bravander, *EPA seeks review of Bush smog standards*, E&E News, Greenwire (E&E Publ. Serv., Washington, D.C.), March 11, 2009. So we think it is clear the new NAAQS may well not stand for long and may well be strengthened in the not too distant future.

To summarize, it is apparent to us the new NAAQS was established by EPA at a level that fails to protect the public health, with an adequate margin of safety. This is shown by the

views of its own expert advisory panel and many of the documents EPA itself prepared, as well as the views of many other experts. It is due to this failure to base the ozone NAAQS on the best available scientific and medical information that we request the EQC to set the level of the WAAQS at 0.065 ppm. This will ensure the public health is adequately protected, with an adequate margin of safety.

Ozone Levels and Problems in Sublette County.

It is widely known there were very high levels of ozone in Sublette County during the winter 2008, particularly in the Boulder area south of Pinedale. Ozone levels reached as high as 122 ppb at the Boulder monitoring station, far in excess of any applicable NAAQS or WAAQS, and clearly a level that can threaten public health. These levels exceed levels that have been seen recently in such ozone "hot spots" as Denver, Houston, and Los Angeles. Due to these high ozone levels the DEQ was forced to issue its first-ever public health advisories during the winter of 2008 warning people of the threats of high ozone levels in the Pinedale area. A total of five advisories were issued, on February 26, March 9, March 10, March 22 and March 23, 2008. On February 3, 2009 the DEQ issued another advisory. *See* http://deq.state.wy.us/out/outreachpressrelease.htm (presenting the DEQ's press releases). While the highest levels were recorded at the Boulder monitoring station near the town of Boulder, high levels were also detected at the Jonah and Daniel monitoring stations. Information on these three monitoring sites, including current ozone levels, can be seen at http://www.wyvisnet.com/.

As will be shown below, it is clear the Sublette County area would not meet an ozone WAAQS of 0.065 ppm. In fact, it is very likely the area is already in nonattainment with the current NAAQS of 0.075 ppm, as will be discussed below. Recognizing this, DEQ in its presentations in Sublette County in 2008 repeatedly stated that, "[a]s of today, data indicates a non-attainment situation." http://deq.state.wy.us/Sublettecountyozone.htm. Under the EPA's newly promulgated ozone rule and the Clean Air Act, the State was required to present its recommendations as to the attainment status for the ozone NAAQS by March 12, 2009, and then the EPA will make a determination regarding whether the area is in attainment or nonattainment with the NAAQS.[32] As will be discussed below, the State made its recommendations and has recommended that Sublette County and portions of Sweetwater and Lincoln Counties be designated in nonattainment with the current NAAQS.

Sublette County has seen high ozone levels in at least three recent years, 2005, 2006, and 2008.[33] In the year 2007 the area experienced lower ozone levels. Data reported on the U.S. EPA Air Quality System ("AQS") database at http://www.epa.gov/air/data/ for the Sublette County monitors are reproduced in Table C. Based on the 3-year average of the 4th-highest

[32] Because of the likely nonattainment situation in Sublette County, local citizens submitted a petition to the EPA on June 14, 2008 asking the EPA to designate Sublette County nonattainment for the ozone NAAQS. That petition is included here as Exhibit 17.

[33] Much of the discussion in the remainder of this section was originally prepared by Dr. Jana Milford, an Associate Professor in Mechanical Engineering and the Center for Combustion and Environmental Research, and director of the Environmental Engineering Program at the University of Colorado at Boulder.

daily maximum values for the years 2006, 2007, and 2008, the Boulder monitor would violate the new ozone NAAQS of 0.075 ppm.

Table C. Daily Maximum Monitored 8-hour Ozone Concentrations (ppm) in Sublette County for 2005, 2006, 2007, and 2008.[34]

Monitor	Rank	2005	2006	2007	2008
Jonah	1	0.097	0.092	0.07	0.102
	2	0.088	0.08	0.069	0.098
	3	0.077	0.071	0.068	0.084
	4	0.075	0.069	0.068	0.082
Boulder	1	0.088	0.08	0.071	0.122
	2	0.081	0.079	0.068	0.104
	3	0.08	0.075	0.068	0.102
	4	0.079	0.072	0.067	0.101
Daniel	1	0.07	0.082	0.067	0.075
	2	0.066	0.075	0.067	0.075
	3	0.066	0.074	0.066	0.074
	4	0.066	0.074	0.066	0.074

As shown in Table C, the highest reported daily maximum eight-hour average value monitored in Sublette County for the first quarter of 2008 was 0.122 ppm (122 ppb) at the Boulder monitor, which is well in excess of the federal standard of 0.075 ppm. The 4th-highest daily maximum value reported for the Boulder monitor for the first quarter of 2008 is 0.101 ppm, which is more than 30 percent above the level of the standard. The ozone levels reported at the Boulder monitor in the winter 2008 are remarkable, and unfortunately are not limited to that monitor. On February 21, when the 1st high value was recorded at Boulder, a daily maximum eight-hour average concentration of 0.084 ppm was recorded at the Jonah monitor. One day later, the maximum eight-hour average concentration at the Jonah monitor was 0.102 ppm. Additionally, on March 11, 2008, the maximum eight-hour average concentration at Boulder was 0.102 ppm and at the Jonah Field was 0.098 ppm. Time-series plots of hourly ozone concentrations at the three Sublette County monitors are shown in Figures 1 and 2 for the dates of February 21-22 and March 10-11, 2008, illustrating the concurrence of elevated ozone concentrations across multiple monitoring sites on these dates. The diurnal trend of mid-afternoon peaks and nighttime lows seen in these data is typical of photochemical production of ground-level ozone. Note that while some hourly data are missing for the Boulder monitor on February 22, the data that were reported indicate that very high ozone concentrations occurred that afternoon, consistent with high values reported for the Jonah monitor.

[34] Data developed by the DEQ submitted with its NAAQS compliance recommendations to the EPA on March 12, 2009 indicate that statewide, excluding the Sublette County monitors, ozone levels in other parts of the State average roughly 0.066 ppm. Exhibit 18 (Attachment 3).

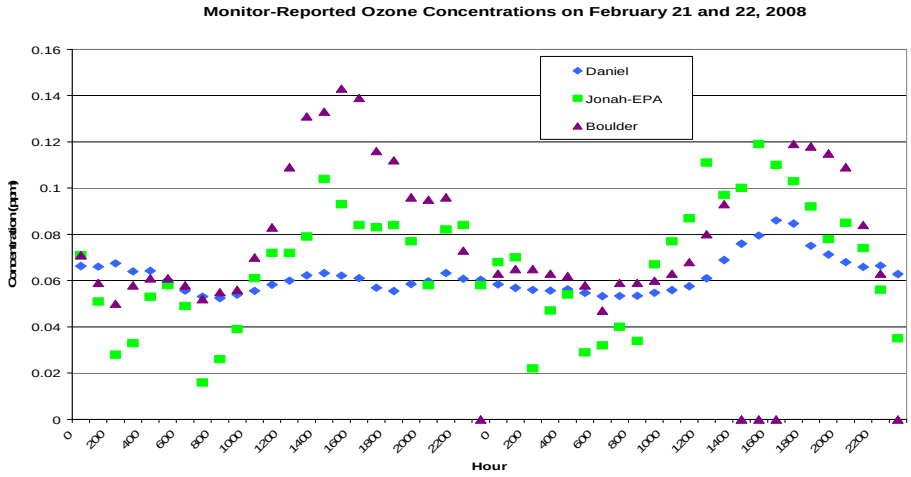

Figure 1. Time series of hourly ozone concentrations reported for Sublette County monitors for February 21 and 22, 2008. Markers along the x-axis indicate missing values for the Boulder Station.

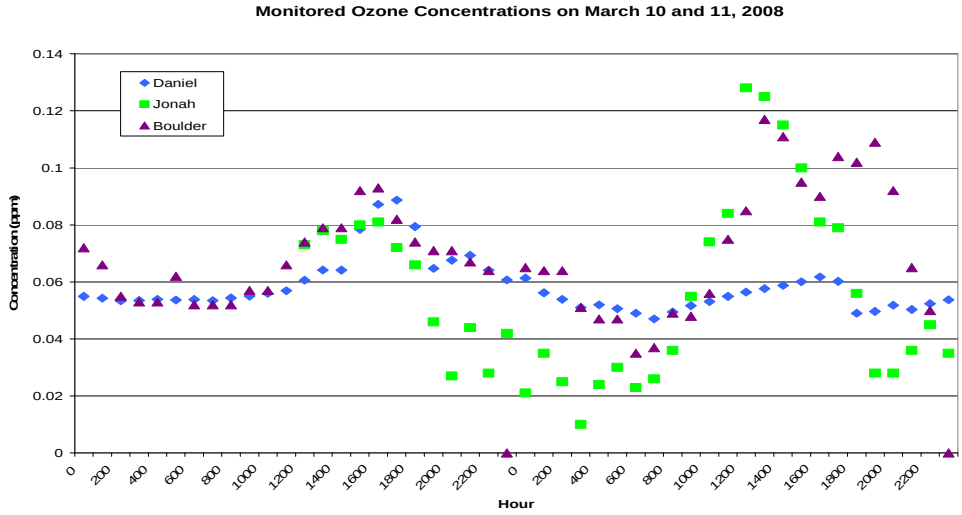

Figure 2. Time series of hourly ozone concentrations reported for Sublette County monitors for March 10 and 11, 2008. Markers along the x-axis indicate missing values for the Boulder Station.

In order to assess compliance with the NAAQS, EPA regulations require averaging the 4th maximum values for the most recent three years for which data are available. Averaging the 4th maximum values for the years 2006 – 2008 for the Boulder monitor gives a value of 0.080 ppm, as shown in Table D, which would represent a violation of the ozone standard. The 2006 – 2008 three-year average of the 4th-highest daily maximum values for the Jonah monitor is 0.074 ppm, which is more than 98 percent of the standard. Even the Daniel monitor has three-year average values that are 96 percent of the current national standard.

Table D. Three-year average of the 4th Highest Daily Maximum Values in Sublette County Based on Monitoring Data Reported for 2006, 2007, and 2008. Source: Data presented by the State of Wyoming with its ozone standard attainment recommendations to the EPA on March 12, 2009. Exhibit 18 (Attachment 3).

Monitor	Concentration (ppm)
Jonah Field	0.074
Boulder	0.080*
Daniel	0.072

*Value violates the National Ambient Air Quality Standard for ozone.

The Sublette County "design value" (3-year average of the 4th highest daily maximum) of 0.080 ppm is comparable to ozone design values in many densely developed urban locations across the country. According to EPA, based on data for 2004 – 2006, three-year average 4th highest eight-hour ozone concentrations were in the range 0.076 - 0.079 ppm in the following counties (among others): Marion County, Indiana (Indianapolis); Saint Louis County, Missouri; Passaic County, New Jersey; Queens County, New York; Cuyahoga County, Ohio; El Paso County, Texas; and Prince William County, Virginia.[35] These counties are expected to be designated nonattainment with respect to the ozone standard unless their air quality conditions improved for the 2006 – 2008 period. Similarly, the Sublette County area has been recommended as nonattainment by the State, Exhibit 18, and it is likely the EPA will formally designate the area as being in nonattainment within one year. This will likely occur regardless of whether the WAAQS is lowered.[36]

Ozone levels in Sublette County have clearly reached levels of great concern, creating increasing threats to the public health.[37] It is for this reason we submit this petition requesting the EQC to establish an ozone WAAQS that is more stringent than the national standard in Sublette County.[38] As noted on page 18 above, the Wyoming Environmental Quality Act allows for ambient air quality standards to "vary from area to area," so setting the lower standard just for Sublette County is permissible.

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[35] Counties with monitors violating the revised 8-hour ozone standard of 0.075 parts per million based on 2004-2006 air quality data, www.epa.gov/oar/ozonepollution/actions.html#mar07s, last accessed July 20, 2008.

[36] The EPA's determination of Wyoming's attainment status relative to the ozone NAAQS, which will be based partly on the State's recommendations in its March 12, 2009 letter, Exhibit 18, will proceed independently of decisions by the EQC or the Governor regarding the WAAQS. EPA will not make its attainment/nonattainment designations based on a WAAQS of 0.065 ppm; it will be concerned with compliance with the 0.075 ppm NAAQS.

[37] Ozone levels in Sublette County did not reached the high levels in the winter of 2009 that they did in 2008. This is likely due to weather conditions being unfavorable for ozone formation (perhaps these should be called favorable weather conditions), the reduction in drilling activity that has occurred due to economic conditions, and perhaps due to the efforts to reduce emissions in the area. But we do not believe this temporary improvement necessarily means air quality has improved greatly on a permanent basis—2007 was also a low ozone year after high levels in 2005 and 2006 but levels peaked again in 2008—and thus we feel action is still needed to establish an ozone standard that will adequately protect the public health.

[38] We recognize that in the Governor's recommendation to EPA he recommended nonattainment status for not only Sublette County but also small portions of Lincoln and Sweetwater Counties. Exhibit 18 at Attachments 1and 2. The Petitioners would not object if the WAAQS designation they have requested was expanded to encompass this larger area, and that would have the advantage of ensuring consistency between the WAAQS and EPA's likely nonattainment designation relative to the NAAQS.

We acknowledge that the DEQ is taking a number of steps to address the ozone problems in this area. For example, the DEQ has recently instituted an interim permitting policy that requires offsets of the two primary ozone precursors, volatile organic compounds (VOC) and nitrogen oxides (NO_X) (1.5:1 for VOC and 1.1:1 for NO_X). It has stated that it will revise the oil and gas development best available control technology ("BACT") guidance that is applicable to minor sources of NO_X and VOCs. It has also stated that it is instituting a voluntary permitting program with industry to regulate emissions from drill rigs. These efforts have been reviewed in the five DEQ public presentations in Sublette County during 2008 that are available at http://deq.state.wy.us/Sublettecountyozone.htm. And the Record of Decision for the Pinedale Anticline Project contains a number of provisions that call for State action to regulate air pollutants. *See* http://www.blm.gov/wy/st/en/info/NEPA/pfodocs/anticline/seis.html. Many of these actions are also reviewed in the State's March 12, 2009 nonattainment recommendation letter to the EPA. Exhibit 18 at 2. So the ozone problems in Sublette County are being taken seriously by the State. Nevertheless, we feel the EQC should establish a lower WAAQS for ozone in Sublette County because a stricter standard is necessary if the public health is to be protected "with an adequate margin of safety." As documented extensively in this petition, the current NAAQS simply does not ensure this is the case, so achieving the national standard should not be the goal in Sublette County where there are clearly high ozone levels, achieving a lower standard that adequately protects the public health, with an adequate margin of safety, should be the goal.

Implications of a More Stringent WAAQS.

If the EQC were to adopt the stricter ozone standard for Sublette County the Petitioners have requested we do not believe it would visit hardship on the State. This is especially true since the area is likely in nonattainment with the existing NAAQS in any event, meaning substantial compliance efforts are almost certain to be required even if Wyoming does not set a lower standard. *See* Exhibit 18 (State's recommendation to the EPA that the Sublette County area and portions of Lincoln and Sweetwater Counties be designated in nonattainment with the ozone NAAQS). And as pointed out, the DEQ is already engaged in a number of significant actions to address the high ozone levels in Sublette County regardless of the formal attainment status.

The DEQ has provided an assessment regarding what compliance with a stricter ozone standard (0.075 ppm) would mean for the State, assuming the Sublette County area may be designated in nonattainment with the NAAQS due to the high ozone levels that have been monitored. *See* http://deq.state.wy.us/Sublettecountyozone.htm (October 29, 2008 DEQ Pinedale presentation, slides 11-17). If an area is in nonattainment it must inventory all NO_X and VOC sources, model existing conditions, develop control strategies for NO_X and VOC emissions, model attainment, promulgate rules as needed to achieve attainment, and make these plans available for public review.[39] Compliance with a stricter WAAQS would not likely require

[39] We do not believe the State needs to submit a state standard that is stricter than a national standard to EPA for EPA approval. We believe the decision to establish a State standard that is stricter than the national standard is purely a question of State law and policy. *See* 42 U.S.C. § 7416 (stating that with some limitations relative to mobile sources, "nothing in this chapter shall preclude or deny the right of any State . . . to adopt or enforce (1) any

much different. The DEQ outlined in its October 29, 2008 presentation in Pinedale what the implications of nonattainment with the NAAQS would and would not be:

What Nonattainment Would Require	**What Nonattainment Will Not Require**
A plan to achieve compliance with the standard.	Instant compliance with the standard will not be achieved and is not required.
Careful review of the energy industry—natural gas production facilities for purposes of Sublette County.	This review will not be limited to the energy industry—all sources, inside and outside of the state, natural and manmade, that may contribute to ozone nonattainment will be inventoried.
A commitment to permanent, measurable, and enforceable control measures on manmade sources within the state that contribute to nonattainment.[40]	But industrial facilities—natural gas facilities—will not be required to shut down.
Lowest achievable emission rates ("LAER") and reasonably available control technology ("RACT") for major stationary sources.	But these levels of control will not be required on minor sources.
A projection of future impacts and efforts to prevent nonattainment in the future.	But a nonattainment status cannot guarantee that there will be no violations of the standard in the future.

We note that these needs were predicted relative to compliance with the ozone NAAQS. We have assumed here that the State would seek to achieve compliance with the WAAQS through measures that are similar to those specified in the Clean Air Act for assuring compliance with a NAAQS. But all that is probably certain is that the DEQ would have to seek to achieve and enforce the new WAAQS. *See* W.S. § 35-11-109(a)(i) (the director of the DEQ is to "[p]erform any and all acts necessary to promulgate, administer, and enforce the provisions of this act and any rules, regulations, orders, limitations, standards, requirements, or permits adopted, established or issued thereunder, and to exercise all incidental powers as necessary to carry out the purposes of this act."); § 35-11-110(a) (the administrator of the air quality division "shall enforce and administer this act and the rules, regulations and standards promulgated thereunder."). As indicated, the DEQ is already taking a number of steps to reduce ozone pollution in Sublette County. If the WAAQS were lowered to 0.065 ppm those, and perhaps other, efforts would continue but they would be aimed at achieving a standard that adequately protects the public health rather than one that does not, and this would a benefit to setting a lower WAAQS in this high ozone area.

Furthermore, the Wyoming Environmental Quality Act makes it clear that there is flexibility in achieving a WAAQS. The Air Quality Division Administrator can "grant such time as he shall find to be reasonable and necessary for owners and operators of air contaminant sources to comply with applicable standards or requirements." W.S. § 35-11-202(b)(ii). And the specific regulations needed to ensure that sources of pollution will not prevent attainment or maintenance of a state or national air quality standard are to be recommended by the Administrator to the Director of DEQ after consultation with the Air Quality Advisory Board.

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standard or limitation respecting emissions of air pollutants or (2) any requirement respecting control or abatement of air pollution . . ." except that States "may not adopt or enforce any emission standard or limitation which is less stringent" than national standards.

[40] In the presentations made in Pinedale and Marbleton in 2008, the DEQ stated, "[w]hen capability exists, [the Air Quality Division] will establish emission control strategies for NO_X and VOC which are sufficient, with an adequate margin of safety, to prevent unhealthy ozone levels." http://deq.state.wy.us/Sublettecountyozone.htm.

Id. § 35-11-202(b)(iii). So again, there will be flexibility and input on how the requested WAAQS is achieved, meaning that setting a WAAQS for ozone that is stricter than the NAAQS will not be draconian. But it would lead to the State seeking to meet a standard that adequately protects the public health instead of one that is set at too high a level to meet this need.

In our view these responsibilities and likely needed courses of action do not present barriers that should prevent adoption of a WAAQS for ozone set at a level of 0.065 ppm. These changes in the way we currently do business are relatively modest in our view, and we would emphasize again two overarching points. First, the science is very clear: it is necessary to set an air quality standard for ozone that is stricter than the current NAAQS in order to protect the public health, with an "adequate margin of safety." Second, as recognized by the Supreme Court in *Whitman v. American Trucking Ass'ns, Inc.*, 531 U.S. 457 (2001), which will be discussed in more detail below, costs are **not** to be a factor in setting a NAAQS (and we would argue a WAAQS) because the *sole* purpose is to set a standard that protects the public health. Costs can be considered later at the implementation stage. Given these two overarching considerations, we do not feel that setting a stricter WAAQS should be inhibited by possible future regulatory implementation challenges. And again, given that the area is already probably out of compliance with the NAAQS in any event, many of these actions will likely need to be taken even if the WAAQS is not changed. They just may not need to achieve as much improvement in air quality (and consequent protection of public health) if a less protective standard governs.

Dr. Hess's presentation at the IENR ozone information forum in Pinedale provided a helpful review of what compliance with a NAAQS, especially in a nonattainment situation, can entail. http:// uwyo.edu/ENR/IENR/ (presentation of Dr. Peter Hess). Dr Hess concluded that there were four keys to successfully attaining compliance with a NAAQS: (1) Use sound science to develop the plan; (2) Adopt the best regulations from other successful attainment plans; (3) Make intelligent decisions; and (4) Include all stakeholders in the planning process. *Id.* (slide 21). And we think Dr. Henderson made an equally relevant point in her presentation at the IENR forum as to how a NAAQS can be implemented without causing undue difficulty, quoting Mr. Paul Gilman: "Our best insurance that the science, the scientific judgment and policy-making are as good as they can be is that the process is transparent, participatory, peer reviewed and followed with informed oversight." We think that if these principles are followed and adhered to Wyoming can adopt an ozone WAAQS for Sublette County that is stricter than the NAAQS without causing economic or social disruption, yet better assure protection of the public health.

It might also be worth pointing out that EPA has already begun the next review for revisions of the ozone NAAQS. On September 29, 2008, only six months after finalizing the latest revision, it asked for public input on the Integrated Science Assessment which will update the scientific assessment presented in the Criteria Document and also announced a workshop to highlight new and emerging ozone research. 73 Fed. Reg. 56,581 (Sept. 29, 2008). We think it is highly likely that in the next revision the EPA will again revise the ozone NAAQS, probably to a level similar to what we are calling for here given the strong views that have been expressed by the CASAC and the likely greater receptiveness to this under the new administration. As was noted above, in the litigation challenging the new NAAQS that has been filed in the Washington

D.C. Circuit Court, the Obama administration just filed briefing with the court indicating it may well modify or reconsider the current NAAQS.

Thus, even if Wyoming does not establish a WAAQS that is stricter than the current NAAQS, we think it is likely it will have to comply with a stricter NAAQS within a few years. But we do not view that as reason to not take action or to delay taking action, but rather as a signal the State should seize control of this issue and adopt its own standard, as it has done on so many air quality issues in the past. For example, the sulfur dioxide standards that will be discussed below and the Air Quality Division's oil and gas permitting guidance establishing BACT requirements for oil and gas minor emissions sources, which at one time was almost unique in the nation, are examples of the State of Wyoming taking bold steps relative to air quality that go beyond minimum national requirements. And in the State's recommendation letter to the EPA, Governor Freudenthal repeatedly stressed the State's desire to 'go the extra mile' in dealing with ozone problems in Sublette County. *See* Exhibit 18 (making reference to "not waiting for the nonattainment process to unfold," the State's "aggressive program," and "Wyoming's stringent air pollution permitting requirements").

Costs and Benefits of a Stricter Rule—Regulatory Impact Analysis.

In this section we will review some of the costs and benefits potentially associated with adopting a WAAQS of 0.065 ppm as compared to the current NAAQS of 0.075 ppm. But before addressing these economic benefits it is important to emphasize that economic considerations are **NOT** to be a component of setting primary and secondary NAAQS. This issue was considered by the Supreme Court in *Whitman v. American Trucking Ass'ns, Inc.*, 531 U.S. 457, 121 S.Ct. 903 (2001). In its decision the Court considered whether the EPA Administrator was allowed to consider the costs of implementing a NAAQS when she revised the NAAQS for particulate matter and ozone in 1997. Rejecting this contention, the Court *unanimously* held, "[t]he text of § 109(b), interpreted in its statutory and historical context and with appreciation for its importance to the CAA as a whole, unambiguously bars cost considerations from the NAAQS setting process, and thus ends the matter for us as well as the EPA." *Whitman v. American Trucking Ass'ns, Inc.*, 531 U.S. 457, 471 (2001). Earlier in reviewing the provisions in sections 108 and 109 the Court stated that based on these provisions the EPA,

> is to identify the maximum airborne concentration of a pollutant that the public health can tolerate, decrease the concentration to provide an "adequate" margin of safety, and set the standard at that level. Nowhere are the costs of achieving such a standard made part of that initial calculation.

531 U.S. at 465. Costs can be considered when implementation strategies are considered, but not at the NAAQS/WAAQS setting stage.

Now as discussed above, we recognize that the Wyoming Environmental Quality Act allows for consideration by the *Air Quality Division Administrator* when he makes *recommendations* as to the level of an ambient air standard *to the DEQ Director* for the "social and economic values of the source of pollution" and the "economic reasonableness of reducing

or eliminating the pollution" to be considered. W.S. §§ 35-11-202(b)(i)((B) and (D). But as also noted above, the overarching requirement in setting an ambient air quality standard is to promulgate rules and regulations necessary to prevent, reduce and eliminate pollution, not consideration of these economic factors. *Tri-State Generation & Transmission Ass'n v. Environmental Quality Council*, 590 P.2d 1324, 1332 (Wyo. 1979). And "air pollution" is defined in a way that makes it clear that public health and welfare issues are what is meant by preventing, reducing and eliminating pollution, just as is true of a NAAQS. *See* W.S. § 35-11-103(b)(ii) (defining "air pollution").

It is our view that economic considerations can play an appropriate role when it comes to *implementing* or achieving a WAAQS but not in *setting* the WAAQS. Section 35-11-202 applies also to setting "emission control requirements," not just ambient air quality standards, and we believe that economic considerations are more appropriately made at this level of decision-making (i.e., in establishing *permitting* requirements under Sections 2, 3, and 4 of Chapter 6 of the WAQSR). At this stage specific further emissions controls, if needed, can be determined, and as pointed out above the DEQ has already instituted several of these permitting level or implementation level decisions, such as the offsets policy. But these kinds of considerations should not drive the *standard* setting process. And again, the Air Quality Division Administrator can "[g]rant such time as he shall find to be reasonable and necessary" to comply with any requirements. W.S. § 35-11-202(b)(ii). Consequently, the Petitioners urge the Council to set the requested ozone WAAQS solely on the basis of what is needed to protect public health from the adverse effects of ozone, with an adequate margin of safety, and to not make this decision based on economic considerations. And as discussed above, it is unlikely that achievement or implementation of the requested ozone WAAQS will severely disrupt the economy of this State.[41]

But turning to the EPA costs and benefits analysis. The EPA provided a detailed analysis of the costs and benefits of adopting a new ozone NAAQS in its recent rulemaking. This analysis was presented in the "Final Ozone NAAQS Regulatory Impact Analysis" ("RIA"). This document is available at http://www.epa.gov/ttn/ecas/ria.html#ria2007. Some of the results from this analysis will be discussed below. While it would be desirable to have a Wyoming-specific analysis of costs and benefits of a WAAQS that is stricter than the NAAQS, as with the exposure analysis conducting such an analysis is well beyond the means of the Petitioners.

In the RIA, the EPA presented the estimated costs and benefits of achieving four potential ozone standards, 0.065, 0.070, 0.075, and 0.079 ppm. The estimates were based on achieving the standard by 2020. Five different scenarios were presented based on four studies done under different assumptions regarding ozone premature mortality relationships and one analysis that assumed no causal relationship between ozone and mortality. The analysis of

[41] Further evidence supporting this view is provided by the massive development that has occurred in the Pinedale Anticline and Jonah natural gas fields in the Upper Green River Valley. In 2006 the BLM approved 3,100 additional wells in the Jonah field and in 2008 it approved nearly 4,400 additional wells in the Pinedale Anticline field. It is very unlikely that the natural gas industry in Sublette County will be greatly reduced even if it does have to meet additional air pollution control requirements.

benefits included the co-benefits of reductions in fine particulate matter ("PM") associated with NO_X controls that would likely be needed to meet the ozone standard.

The estimates of benefits associated with meeting a 0.075 ppm standard ranged from $ 1.8 billion in 2006 dollars to $ 17 billion in 2006 dollars, using a 7 percent discount rate, and the benefits of meeting a 0.065 ppm standard ranged from $ 5.1 billion 2006 dollars to $ 54 billion 2006 dollars at a 7 percent discount rate.[42] RIA at ES-3, ES-5, 7-3, 7-4. The estimated costs associated with meeting a 0.075 ppm standard ranged from $ 7.6 billion in 2006 dollars to $ 8.8 billion in 2006 dollars, using a 7 percent discount rate, and the costs of meeting a 0.065 ppm standard ranged from $ 32 billion 2006 dollars to $ 44 billion 2006 dollars at a 7 percent discount rate. *Id.* Thus the costs of meeting a 0.065 ppm standard are likely to be substantially greater than meeting a 0.075 ppm standard; however, under either standard it is possible that benefits will exceed costs, and it is possible that benefits of meeting a 0.065 ppm standard will *greatly* exceed costs, which is less likely under the 0.075 scenario. These data, drawn from RIA Tables ES.1, ES.4, 7.1a, and 7.1d are reproduced here:

0.075 ppm Standard		**0.065 ppm Standard**	
Range of Estimated Total Benefits at a 7% Discount Rate—Billions of 2006 Dollars	Range of Estimated Total Costs at a 7% Discount Rate—Billions of 2006 Dollars	Range of Estimated Total Benefits at a 7% Discount Rate—Billions of 2006 Dollars	Range of Estimated Total Costs at a 7% Discount Rate—Billions of 2006 Dollars
1.8--17	7.6—8.8	5.1--54	32--44

The EPA viewed the data in these tables as somewhat limited (they are "truncated summary tables," RIA at 7-4), and thus presented a series of figures that provided a "richer presentation," RIA at ES-6, of the range of costs and benefits of alternative standards as a means to supplement the data in the tables. These figures are presented on pages ES-7 and 7-6 of the RIA. In these figures the EPA displayed all possible combinations of *net* benefits resulting from its various function and cost estimate methods, which resulted in "140 bars in each graph [that] represents an independent and equally probabl[e] point estimate of net benefits under a certain combination of cost and benefit estimation methods. Thus it is not possible to infer the likelihood of any single net benefit estimate." *Id.* at ES-6.

If the figures for the 0.075 ppm alternative are compared to the figures for the 0.065 ppm alternative, it is apparent that under approximately half of the 140 point estimates the 0.075 ppm standard is predicted to result in benefits that exceed costs, while this is true of only approximately a quarter of the 140 estimates for the 0.065 ppm standard. RIA at ES-7, 7-6 (Figures ES-1 and 7.1). However, even under the 0.065 standard net benefits were predicted to be positive in a number of instances, and the potential that benefits will *greatly* exceed costs is more frequently indicated under the 0.065 ppm scenario. The potential for greater benefits under

[42] The estimates of benefits under the scenario that assumed no casual relationship between ozone exposure and mortality were greatly less than the benefits estimated under the other four scenarios, and represent the lowest end of the ranges presented, this because reductions in premature mortality "dominate the benefits estimates." RIA at ES-2. We feel the assumption that there is no causal relationship between ozone exposure and mortality is increasingly untenable, as indicated by the just-published study in the New England Journal of Medicine, discussed on page 24, *supra*.

the 0.065 ppm scenario was further emphasized by two additional figures presented by the EPA, one showing the valuation of ozone morbidity and mortality benefits and the other showing co-benefits due to coincident PM control. *Id.* at 6-31 (Fig. 6.1) and 6-32 (Fig. 6.2). In both cases, as these figures show, the predicted benefits accruing from a 0.065 ppm standard greatly exceed the benefits from a 0.075 ppm standard.

It must be borne in mind that these estimates are accompanied by considerable uncertainty and a number of caveats. "Of critical importance to understanding these estimates of future costs and benefits is that they are not intended to be forecasts of the actual costs of implementing revised standards." RIA at ES-9. "Our estimates are intended to provide information on the general magnitude of the costs and benefits of alternative standards, rather than precise predictions of control measures, costs, or benefits." *Id.* at 7-12. EPA presented a list of twelve uncertainties that accompanied these cost-benefit estimates. *Id.* at ES-9 to ES-11. *See also id.* at 6-86 to 6-88, 7-13 to 7-16. And EPA made this important statement: "Studies indicate that it is not uncommon for pre-regulatory cost estimates to be higher than later estimates, in part because of inability to predict technological advances." *Id.* at 7-12.

In addition to estimated costs and benefits expressed in dollars, the RIA also presented extensive data regarding estimated mortality and morbidity effects predicted to be avoided by 2020 under the five scenarios considered. Averaging the upper and lower range estimates for the four scenarios (studies) that assumed ozone levels and mortality are associated and taking the midpoint of the resulting average ranges, it was estimated that 1,312 moralities would be avoided under the 0.075 ppm standard whereas the 0.065 ppm standard would avoid 6,240 deaths.[43] *See* RIA at ES-6, 6-89, 7-9 (Tables ES.5, 6.51, and 7.2).[44] With respect to morbidity effects, many thousands of upper and lower respiratory symptoms, acute bronchitis occurrences, work days lost, hospital and emergency room visits, and several other morbidity measures are estimated to be avoided under the 0.065 ppm standard compared to the 0.075 ppm standard. *Id.* at ES-6, 6-89, 7-9 (Tables ES.5, 6.51, and 7.2).[45] These additional avoided deaths result in billions of dollars in estimated benefits. *See id.* at 6-2 (comparing NMMAPS study estimates at the 0.075 ppm and 0.065 ppm standard levels).[46]

In summary, we feel there is little basis to claim that the dollar costs associated with a WAAQS that is more stringent than the NAAQS will clearly and certainly outweigh the benefits expressed in dollars; it is possible the benefits of a stricter standard will in fact outweigh the costs; and given the flexibility in the Wyoming Environmental Quality Act to tailor regulatory implementation in a way that considers social and economic costs, economic reasonableness, and

[43] If the scenario that assumed no causal relationship between ozone levels and mortality were included these estimated mortality levels would be reduced but estimates of avoided mortalities would still be considerably greater under the 0.065 ppm standard than the 0.075 ppm standard.

[44] *See also* RIA at 6-38, 6-40, 6-46, 6-48, 6-90 (presenting additional Tables and Figures of mortality data for the 0.065 ppm and 0.075 ppm standards).

[45] *See also* RIA at 6-39, 6-41, 6-47, 6-49, 6-91 (presenting additional Tables and Figures of morbidity data for the 0.065 ppm and 0.075 ppm standards).

[46] *See also* RIA at 6-54, 6-55, 6-56, 6-57, 6-62, 6-63, 6-64, 6-65, 6-70, 6-72, 6-74, 6-75, 6-78, 6-79, 6-82, 6-83, 6-84, 6-85, 6-92, 6-93, 6-94, and 6-95 (presenting additional Tables and Figures of economic benefits due to avoided mortalities and morbidity effects for the 0.065 ppm and 0.075 ppm standards).

to allow for a reasonable time to comply with applicable standards, W.S. § 35-11-202(b), there is little danger that the costs of this requested action will be out of proportion to its benefits. And under *Whitman*, the costs of implementing a NAAQS are not a permissible consideration in setting a NAAQS, and we believe the same is true of a WAAQS. And while the costs associated with meeting a WAAQS are somewhat uncertain, there seems to be considerably less uncertainty associated with the greater public health benefits that will result from a 0.065 ppm standard compared to a 0.075 ppm standard. Many fewer deaths and morbidity occurrences will result under the stricter standard, and thus in our view it is clear the WAAQS should be set at a level of 0.065 ppm in order to protect the public health, with an adequate margin of safety.

Standards Stricter than National Standards Are Already in Place.

The Sulfur Dioxide WAAQS are Lower than the NAAQS.

The State of Wyoming has in place WAAQS for sulfur dioxide (SO_2) that are stricter than the national standard. The sulfur dioxide WAAQS on an annual basis is 0.02 ppm while the annual primary NAAQS is set at 0.030 ppm. WAQSR Ch. 2, § 3(a)(i); 40 C.F.R § 50.4(a). The 24-hour sulfur WAAQS is 0.10 ppm while the corresponding NAAQS is 0.14 ppm WAQSR Ch. 2 § 3(a)(ii); 40 C.F.R. § 50.4(b). The 3-hour WAAQS and NAAQS are set at equivalent levels of 0.50 ppm. WAQSR Ch. 2 § 4(a)(iii); 40 C.F.R. § 50.5(a). . Given that these stricter State levels have been in place for years, we feel it is apparent that establishing WAAQS that are more stringent than the corresponding NAAQS will not necessarily visit hardship on the State.

Canada Has an Ozone Standard Set at 0.065 ppm and California's State Standard is 0.070 ppm.

Canada has a national ozone standard set at 0.065 ppm. In June, 2000 the Canada-wide standard for ozone was set by the Canadian Council of Ministers of the Environment at 65 ppb based on an 8-hour averaging time measured as the 4th highest annual value averaged over three years, to be achieved by 2010. http://www.ccme.ca/assets/ pdf/pmozone_standard_e.pdf. Canada like Wyoming has a very robust energy industry, particularly in Alberta, where there are thriving natural gas and tar sands developments. We feel this indicates that a WAAQS stricter than the NAAQS can be set without necessarily impairing our energy industry.

In April 2005, the California Air Resources Board ("CARB") responded to the new science concerning the health effects of ozone at levels below or close to the former federal standard (0.08 ppm), particularly on children's health, by adopting a more protective State ozone standard. California's state ozone standard is set at 0.070 ppm (137 µg/m^3) for an eight-hour averaging period, not to be exceeded. http://www.arb.ca.gov/research/aaqs/caaqs/ozone/ozone.htm.

Conclusion.

For the foregoing reasons the Petitioners request that the Wyoming Environmental Quality Council set the primary and secondary WAAQS for ozone at a level of 0.065 ppm, daily maximum eight-hour average, in Sublette County, Wyoming. As discussed in depth, there is

overwhelming scientific and medical support for setting the WAAQS at a level that is lower than the current NAAQS (0.075 ppm), particularly as evidenced by the views of EPA's scientifically and medically preeminent Clean Air Scientific Advisory Committee. Setting the WAAQS at this lower level is necessary to protect the public health, with "an adequate margin of safety," as has been so clearly articulated by the CASAC and many other health and science professionals.

Setting the WAAQS at 0.065 ppm is necessary to meet the EQC's legal obligation to "promulgate rules and regulations necessary to prevent, reduce and eliminate pollution," as articulated by the Wyoming Supreme Court. *Tri-State Generation*, 590 P.2d at 1332. *See also* W.S. § 35-11-102 (same). And even if this Council views the factors specified at W.S. §§ 35-11-202(b)(i)(A)-(E) as advantageous to refer to, factors which there is "no express statutory requirement that the Council conform its decision-making to," 590 P.2d at 1332, the Petitioners feel a more stringent WAAQS is advisable under those factors. As shown in this petition, ozone levels in excess of 0.065 ppm threaten the health and well being of people and the social welfare and aesthetic values. W.S. §§ 35-11-202(b)(i)(A) and (E). Moreover, the social and economic values of the natural gas production and facilities creating the ozone pollution problems in Sublette County, the need to locate them in that area, and the practicality and economic reasonableness of controlling this pollution are no so clearly greater or more difficult of resolution relative to the economic and other benefits resulting from better protecting the public health under a more stringent WAAQS that these pollution levels should be accepted or allowed to persist. *Id.* §§ 35-11-202(b)(i)(B), (C), and (D). This is especially true since the Air Quality Division Administrator shall "[g]rant such time as he shall find to be reasonable and necessary . . . to comply with applicable standards or requirements." *Id.* § 35-11-202(b)(ii). Thus, an ozone WAAQS of 0.065 ppm should be adopted for the benefit of Sublette County citizens.

Consequently, the Petitioners respectfully request that the Environmental Quality Council set this Petition for Rulemaking for a hearing as expeditiously as possible, receive comments on it, and adopt the requested rule. Thank you for your consideration of this Petition.

_____	_____
Bruce Pendery	Dan Heilig
Attorney at Law	Attorney at Law
On behalf of the Petitioners	On Behalf of the Petitioners
_____	_____
Dated	Dated

With Carbon Copies Sent To:
Governor Dave Freudenthal
DEQ Director John Corra
Air Quality Division Administrator Dave Finley
Wyoming Air Quality Advisory Board
EPA Region 8 Acting Administrator Carol Rushin