

Sonoma County Board of Supervisors
County of Sonoma Board of Supervisors
575 Administration Drive, Room 100 A
Santa Rosa, CA 95403

December 12, 2010

Re: Comments on the Dutra Asphalt Plant EIR, Revised Project II

Honorable Supervisors,

The Utah Physicians for a Healthy Environment urges the Sonoma County Board of Supervisors to respect the wishes and concerns of the Petaluma residents who are concerned about increased air pollution in their community as result of constructing and operating an asphalt plant on the southern border of Petaluma. There is no disputing that this plant will increase the levels of PM 2.5, PM 10, Nitrogen Oxides, Ozone, and Polycyclic Aromatic Hydrocarbons (PAH) in the community.

The increase in trucking emissions in “Dutra Asphalt Plant EIR, Revised Project II” would result in impacts to the environment and public health that have not been described in the EIR. It is my understanding that the county has offered no discussion of alternatives or ways to mitigate the damages I describe below. The California Environmental Quality Act requires that a new EIR be produced to describe such issues. Because diesel emissions represent such a disproportionate amount of typical traffic pollution – about 100 times the pollution compared to a gasoline engine with a catalytic converter on a per horse power generated basis – this is an unacceptable omission in the permitting process.”

In our view the overwhelming opposition to the proposed asphalt plant by Petaluma residents is a legitimate, scientifically sound position based on the likely public health impacts in their community.

Air Pollution is Never “Safe”

Because state and federal regulatory agencies must make an attempt to protect public health in the context of allowing opportunity for industrial activity, they must establish thresholds for what might be considered acceptable levels of air pollution. As science progresses more information about the hazards of air pollution steadily accumulates but that new information does not become reflected in those thresholds until several years, and some cases decades, after the science has become well established.

Over 2,000 studies published in the last twelve years clearly indicate that there is no such thing as a "safe" level of air pollution and that means that regulation thresholds are essentially arbitrary. Even levels previously thought to be benign we now know are not. There is no threshold below which there is no health effect# and any increase in pollution to your community will have corresponding public health impacts. How regulatory agencies deal with this information is yet to be seen. But even if the Dutra project satisfies current regulations or is approved by the BAAQMD, in no way does that mean it will not have substantial adverse health impacts to the community. The Sonoma County Board of Supervisors has the opportunity and obligation to protect the health of their constituents, in this case

beyond what can be provided by the regulatory framework of the BAAQMD.

Health Impacts of Cigarette Smoking and Air Pollution – A Comparison

Virtually all of the broad based and well known health consequences of first and second hand cigarette smoke are also now known to be the consequence of urban air pollution.

In the same way there is no safe number of cigarettes you can smoke, there is no safe level of air pollution you can breathe. That should be no surprise because most of the chemicals in both types of air pollution are the same. In recent years throughout the country state, local and federal regulations have been implemented to eliminate exposure to second hand smoke. Any new industrial source of air pollution into a community will have the same type of health outcome as exposing the citizens to a new source of second hand cigarette smoke.

Just this week, the Surgeon General of the United States elaborated in detail new revelations on the dangers of second hand cigarette smoke. The comments below are from a news report on the Surgeon General's press conference. These comments are just as applicable to the dangers of community air pollution.

"Thursday's report says there's no doubt that tobacco smoke begins poisoning immediately – as more than 7,000 chemicals in each puff rapidly spread through the body to cause cellular damage in nearly every organ. 'That one puff on that cigarette could be the one that causes your heart attack,' said Surgeon General Regina Benjamin. 'There is no safe level of exposure to cigarette smoke, whether you deliberately inhale it or are a nonsmoker who breathes in other people's fumes.'

"But more recently it's become clear that some of the harms – especially those involving the heart – kick in right away, said Dr. Terry Pechacek of the Centers for Disease Control and Prevention.

"That means social smoking, the occasional cigarette at a party, can be enough to trigger a heart attack in someone whose arteries already are silently clogged, he said.

"When Pueblo, Colo., banned smoking in all public places in 2003, the number of people hospitalized for heart disease plummeted 41 percent in just three years, the report found.

"Why? Cigarette smoke immediately seeps into the bloodstream and changes its chemistry so that it becomes more sticky, allowing clots to form that can squeeze shut already narrowed arteries, the report explains. That's in addition to the more subtle long-term damage to blood vessels themselves, making them more narrow. And no one knows how little it takes to trigger that clotting."

American Heart Association: Heart Disease and PM2.5

The American Heart Association recently published a scientific update on the cardiovascular consequences of air pollution. For each increase in PM2.5 of 10ug/cm³ [10 micrograms per cubic meter] long term average, there is an increase in all causes of community mortality of about 10%. It can be unequivocally stated that some people will die in your community because of the pollution of the proposed asphalt plant, even if the increase in PM2.5 overall is small.

Additional Science on PM2.5

Since the late 1980's more than 150 epidemiological studies report associations between daily changes in particulate air pollution and respiratory and cardiovascular mortality, hospitalizations and other related health endpoints. These adverse effects are seen at low and 'common' concentrations of particulate pollution. A Dutch study demonstrated risks for cardiopulmonary mortality even at what are considered 'background' levels of particulate pollution.#

Not only does PM2.5 result in an increase in death from cardiovascular causes but there is also an

increased risk for non-fatal events.# Women seem to be impacted even more than men. A study in the New Journal of Medicine, the world's most prestigious medical journal, demonstrated that for each 10 mcg/cubic meter increase in PM2.5 there was a 24% increase in risk of a cardiovascular event and a 76% increase in the risk of death. There was also an increased risk of strokes. It should be noted that this rate of increase is very close to the increase demonstrated from a chronic active smoking habit of one pack a day.

As with smoking, particulate matter pollution and ozone cause increased systemic oxidative stress leading to pathologic vascular changes including progression of atherosclerotic plaques to vulnerable forms, prothrombotic states, endothelial dysfunction and altered autonomic nervous system control.#

Within one hour, exposure to traffic pollution is associated with increased rates of heart attacks as much as 300% compared to non-exposed individuals. Other studies show rates of strokes and heart attacks in the community increase within hours after air pollution spikes.#

Quoting from the American Heart Association (AHA)'s updated scientific statement published in May 2010: "The overall evidence from time-series analyses conducted worldwide since publication of the first AHA statement confirms the existence of a small, yet consistent association between increased mortality and short-term elevations in PM10 and PM2.5 approximately equal to a 0.4% to 1.0% increase in daily mortality (and cardiovascular death specifically) due to a 10 ug/m³ elevation in PM2.5 during the preceding 1 to 5 days."

Not only have numerous studies shown that there is no safe level of PM exposure, but a recent landmark study published in the flagship journal of the AHA, using data from over 1 million people, demonstrated that when cardiac mortality, the signature air pollution health outcome, was plotted against PM from air pollution, first and second hand cigarette smoke, all three sources showed a steep curve at low doses. In other words, per unit dose of exposure, low levels of PM actually caused higher rates of mortality.#

Long term exposure to PM air pollution is associated with an average rise in blood pressure for urban populations chronically exposed. Average blood pressure was found to rise 1.7 mmHg for an increase of 2.4ug/m³ in PM2.5. A similar association was found with the coarser PM10. The rise was found in both systolic and diastolic blood pressure.# Chronic exposure to PM has been shown to increase the thickening of arterial walls which is a known end result of higher blood pressure. These findings are especially significant because they demonstrate community wide effects, impairing the health of everyone exposed, not just a susceptible population. The American Heart Association has estimated that residents of most cities in the U.S. lose between one and three years of life expectancy due to air pollution.# The California Air Resources Board concluded in 2008 that Californians exposed to high levels of particulate pollution had their lives shortened an average of ten years, and tripled their previous estimate of the number of California residents who died prematurely due to air pollution to 24,000 annually.

There is a remarkable correlation between rates of deep vein thrombosis and increased levels of PM, beginning at very modest levels.# A likely mechanism of this clinical outcome is revealed by studies that show PM10 causes excessive platelet aggregation in diabetics.#

Oxidative (OS) appears to be the biological genesis of numerous diseases processes and a major contributor to the aging phenomenon. OS is the mechanism behind air pollution's role in central nervous system dysfunction, neuroinflammation, cortisol stress, cognitive impairment and memory loss

in children and neurodegenerative diseases such as Alzheimer's. Numerous studies show such specific clinical outcomes as impaired intellect among children who grow up breathing more air pollution. #, #, #, #, # Even rates of neurobehavioral disorders correlate with community nitrogen oxides and PM10 levels. #

It is intuitive that PM and ozone would have adverse impacts on the pulmonary system. Indeed, numerous studies show increased rates of asthma and virtually all other respiratory diseases including lung cancer where air pollution is higher. Ozone is associated with increased rates of respiratory death. # Equally disturbing are less obvious outcomes. Even young healthy people demonstrate rapid decrease in lung function from brief exposure to ozone or PM that persists for several days after the exposure has ended. # , #

Just as chronic exposure to second hand smoke causes a permanent loss of lung function growth in children, so does air pollution. #, # Not only does that permanently impair the exercise capacity of individuals so affected, few physiologic outcomes have more of an ultimate impact on longevity than lung function.

Air Pollution Impacts the Human Embryo

Air pollution, especially PM, may have its largest impact on public health through its affect on the human embryo. A study in laboratory animals demonstrated a change in morphology of the placenta that compromises blood flow to the fetus. # Exposure of pregnant women to air pollution results in intrauterine growth retardation including smaller head size, increased rates of spontaneous abortions, premature births and low birth weight syndrome. Exposure to low concentrations of diesel exhaust are associated with altered levels of activity in the fetus.

Genetic damage and epigenetic changes (chemical attachments to chromosomes) can have virtually identical consequences and both can be passed on to subsequent generations. Newborn babies whose mothers are exposed to more air pollution show increases in both, and the life-long disease burden that results can include higher rates of metabolic disorders, reactive airway disease, cardiovascular disease, cancer, Alzheimer's and all the diseases consequent to immunosuppression. Multiple studies have demonstrated a decrease in intellectual capacity in the off spring of pregnant mothers who breathed more air pollution during pregnancy.

Increased exposure to benzene, the most well known of PAHs has been shown to increase the rate of birth defects like neural tube malformations.

Epigenetic changes can be seen within as little as two hours after exposure to particulate air pollution, especially ultrafine particles, smaller than PM 2.5. While some of this may be reversible other studies demonstrate that some of the epigenetic changes persist for years.

That all these outcomes can be the result of pregnant women smoking is easy for physicians and the lay public alike to comprehend and the sight of a pregnant woman smoking is now repulsive to society at large. It is a new thought process, but equally scientifically based, to think that the same thing happens when a pregnant woman has to breathe air pollution. Again, regarding impact on the human embryo there appears to be no safe threshold of exposure.

Cancer, Multiple Chronic Diseases and Air Pollution

Various forms of cancer show increased rates with higher concentrations of community air pollution. Especially troubling are the numerous studies that show increases in childhood leukemia among more

exposed populations.## Just recently breast cancer rates have been shown to be significantly higher among women exposed to more air pollution.

Multiple other chronic debilitating diseases have been shown to be increased due to air pollution, including type II diabetes, juvenile arthritis, lupus and the increasingly common sleep disorders known as sleep apnea.

That so many chronic diseases and adverse health outcomes are caused or exacerbated by air pollution is a relatively new concept. But the common pathways appear to be oxidative stress, a low grade inflammatory response triggered in the arterial system, and the ability of many of these toxic compounds to penetrate cell membranes, and disrupt subcellular structures like mitochondria and DNA.

The Financial Burden of PM2.5

All of these health consequences also carry with them economic consequences. Every ton of PM 2.5 has been estimated to result in anywhere from \$100,000 to \$300,000 dollars per year in increased health care costs. This undoubtedly is a significant underestimation because many of the associations with multiple chronic diseases had not been established when these estimates were made and the impacts on child and fetal development are substantial but impossible to quantify.

About the Signator Organization

The Utah Physicians for a Healthy Environment (UPHE) has over 200 members, most of whom are physicians or other health professionals. The remainder are individuals educated in and practicing toxicology, chemical engineering, air quality modeling and permitting, biology, earth sciences and other related disciplines. We provide education to the public and policy makers regarding the public health consequences of environmental degradation.

Although the focus of our activities is in Utah, we provide consultation services to citizens groups in several other states. We have been asked by the Petaluma Moms for Clean Air to provide a scientific basis for their concerns about adding air pollution related to an asphalt plant in their community. UPHE is not receiving any financial compensation for our involvement nor do we have any financial conflict of interest regarding this issue.

Sincerely,

Dr. Brian Moench
President, Utah Physicians for a Healthy Environment

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