Regna Merritt

OREGON PSR PHYSICIANS FOR SOCIAL RESPONSIBILITY

January 13, 2015

Re: Comments on the Proposed Terminal 6 Environmental Overlay Zone Boundary and Code Amendment.

Dear Members of the Planning and Sustainability Commission,

Guided by the values and expertise of medicine and public health, Oregon Physicians for Social Responsibility works to protect human life from the gravest threats to health and survival. The destabilization of Earth's climate is a grave threat to human health. We work for a rapid transition to a highly efficient, low-carbon society.

We are greatly concerned about the proposal by the Port of Portland and Pembina Pipeline Co. to amend the environmental zones to allow a propane terminal to be built and propane to be transported through environmental zones through pipelines to storage tanks, through pipelines to refrigerated tanks, through pipelines to tanker ships.

Our concerns regarding the Pembina proposal include, but are not limited to, the risk of destabilization of our climate. We believe that the significant contribution of GHG associated with this project constitutes an additive threat to a sustainable and healthy future, rather than one that mitigates existing threats from other fossil fuels. This project is inconsistent with and would interfere with a rapid transition to a healthy, low-carbon society. As you know, there are a myriad of long-term health issues associated with a warming climate. These include disproportionate impacts on low income communities and communities of color already exposed to high levels of air and water pollution.

A 2015 State Legislative Priority for the City of Portland is to reduce carbon emissions.

> *"Objective:*
>
> Support policies that limit Oregon's carbon footprint, mitigate climate change and improve air quality.
>
> *Issue:*
>
> The City of Portland is committed to promoting a prosperous, low-carbon economy. A clean environment is crucial to a healthy and resilient community. Increased carbon dioxide is a well-known contributor to

global warming. Limiting our carbon footprint will help increase our resiliency and improve our environment."

This project will clearly interfere with collective efforts to limit our carbon footprint.

We are also concerned about immediate, direct negative public health and safety impacts related to this project. They include the potential for derailments, leaks, tanker car explosions, tank explosions and ship explosions. These can lead to displacement, delayed emergency response times, accident, injury, death as well as chronic adverse health impacts from toxic emissions related to trains, tanks and terminals.

Safety Issues are Significant and Harmful: Risk of Explosion and Fire

We are concerned about the very real danger of fires and explosions. Propane is an extremely flammable hazardous material. (See Testimony of Dr. Tsongas for citations.)

There have been too many incidents where firefighters and community members have lost their lives or been injured by explosions from leaking propane tanks. On average, firefighters respond to propane incidents in the US once per day. In Ghent W. Virginia, a 500 gallon tank leaked into a general store, the gas ignited, the building exploded and was completely destroyed, killing 4 people and injuring 6. In Albert City, Iowa an 18,000 gal tank of propane exploded killing two firefighters and injuring 7. In Kingman AZ, propane was being transferred from a rail car containing 33,000 gallons to a storage tank. A boiling liquid expanding vapor explosion (called a BLEVE) caused the deaths of 11 firefighters. The explosion ripped apart the steel rail car, one three-ton end of which was thrown 1/4 of a mile away, and sending debris and flames 2000 feet away, igniting several buildings. In California, a 29,000 gallon rail car filled with propane was being routinely checked when the propane ignited due to static electricity. One man was burned, the fire was limited to one car, but evacuation of a 1 mile radius was necessary because of the potential for explosions and ignition of the propane in 3 other cars as well as storage tanks nearby.

The proposed terminal will have a daily capacity of 1.6 million gallons of propane per day. Unit trains of 100+ tank cars holding 10-30,000 gallons of propane each will be offloaded to eight 125,000-gallon storage tanks, refrigerated, and transferred to 2 refrigerated storage tanks holding some 33.6 million gallons of propane, stored for +/- 15 days until the propane is transferred to ships for ocean transport. At any point in this transfer process, an explosion or fire could occur that would be catastrophic. At least one rail safety expert has reported that tanker cars used to transport propane are near the end of their lifetime.

Explosions could be human caused, through simple error, including derailment, or through terrorist activity.

Explosions could result from natural disasters from earthquake, tidal surge and/or liquefaction event.

What is the blast zone is for one exploding rail car carrying propane? We know that it was 1/4 to 1/3 mile for one rail car explosion in Arizona.

What is the blast zone for one unit train with 100 propane-filled tanker cars?

What is the blast zone for proposed storage tanks collectively holding 33.6 million gallons of propane?

Is the proposed facility to be located within or near the 100-year flood plain?

Was this information provided to you and to the public?

While Pembina will likely take all reasonable steps to prevent accidental release of propane, the potential for an accident with catastrophic impacts remains.

Both Portland and Multnomah County have a policy for decision making that is based on the precautionary principle [6], whereby in the event of insufficient evidence that an action may cause harm, the burden of proof falls upon those taking the action to demonstrate that it will not be harmful; the burden of proof falls on the Port of Portland and Pembina to demonstrate that a fire or explosion cannot happen.

For this reason and others, we urge you to reject any code changes that would facilitate the construction and operation of this facility.

Public Health Issues Are Significant and Harmful

The public health issues raised by this project include, but are not limited to diesel pollution, ozone pollution, increased noise, and increased risk to those who fish and eat salmon from the waters of the transportation corridor and at the proposed site.

The City of Portland's 2015 State Legislative priorities include "Diesel Emissions and a need to improve air quality."

The issue, as defined in the City's document:

> "Emissions from diesel equipment are toxic to humans. The emissions, also known as particulate matter or "PM," are so small they can cross through our lungs directly into our bloodstream causing cancer, asthma, strokes, heart attacks and premature death. According to the Oregon Department of Environmental Quality, each ton of diesel PM emissions released in Portland results in almost $400,000 in environmental and public health costs. ***North Portland has the highest level of diesel PM in the state, nearly 20 times the health standard."(Oregon PSR emphasis)***

Please see the attached Oregon PSR Fact Sheet on Diesel Particulate Matter to further understand the associated risks.

The staff analysis provided to you is inadequate. It should at least consider air pollution impacts that address the direct, indirect and cumulative impacts of the following:

1) Each trip of a fully loaded and/or unloaded propane ships in transit through the lower Columbia River which will use diesel and/or bunker fuel;

1) Emissions of the ships "idling" at the dock. While Pembina has stated that it could hook ships up to on-shore sources of power, it is not compelled to do so;

2) Diesel-powered trains idling at the terminal and constantly spewing toxic emissions;

3) Diesel-powered equipment and vehicles which will emit toxic PM during the construction of the facility and during its continued operation;

4) Increased risk of ozone production with the intentional and/or accidental release of propane;

5) Increase in lung, cardiac, reproductive and neurological disease from diesel particulates and other emissions;

6) Increase in medical costs and lost productivity from all the above and

7) Disproportionate impacts on low income communities and communities of color already exposed to high levels of air and water pollution.

Prevention is the most effective means to reduce risk.

Both Portland and Multnomah County have a policy for decision making that is based on the precautionary principle, whereby in the event of insufficient evidence that an action may cause harm, the burden of proof falls upon those taking the action to demonstrate that it will not be harmful. The burden of proof falls on the Port of Portland and Pembina to demonstrate that a fire or explosion or harmful toxic emissions cannot jeopardize the health and safety of our community.

We ask that you do not support a code amendment and that you do support a clean and healthy energy future.

Sincerely,

Regna Merritt, PA Oregon Physicians for Social Responsibility

Regna@oregonpsr.org 971.235.764

OREGON PHYSICIANS FOR SOCIAL RESPONSIBILITY

AIRBORNE PARTICULATE MATTER AND PUBLIC HEALTH

BACKGROUND

Outdoor air quality is an increasing concern globally with expanding industrial and transportation emissions. The World Health Organization (WHO) has declared that Particulate Matter (PM) in ambient outdoor air affects more people than any other pollutant. Chronic exposure to particles contributes to the risk of developing or dying from serious disease. (WHO 1) The effects of PM on health occur at levels of exposure currently being experienced by most urban and rural populations in both developed and developing countries. Burning fuel results in two phases of emissions. In addition to the "particulate phase," there is a "gas phase" containing air pollutants such as benzene, formaldehyde, polycyclic aromatic hydrocarbons (PAHs), and other chemicals, which also contribute to disease. (EPA 1, EPA 2) The combustion of fossil fuel for electricity and transportation, especially coal and diesel, are major contributors to outdoor air pollution.

WHAT IS PARTICULATE MATTER?

Particulate Matter (PM), is composed of very small, solid particles, formed from the incomplete burning of fossil fuels, such as coal, diesel, gasoline, and biomass. PM2.5 measure 2.5 microns or less; PM10 are particles 10 microns or smaller. PM consists of a complex mixture of soot, black carbon, absorbed water, aerosolized sulfuric acid droplets, other acids, nitrogen, sulfur, metals, and other toxic substances, especially PAHs (Perera), which are absorbed by the sponge-like particles and carried by them deeply into the smallest compartments of the lung (alveoli) where they gain direct access to the bloodstream and may then contribute to various diseases in organs distant from the lungs, including the fetal placenta.

The World Health Organization (WHO) reports that there is not a threshold below which no damage to human health is observed. Their guidelines for maximizing health within the constraints of a modern world are that PM2.5 should not exceed an average of 25 micrograms per cubic meter of air (25mcg/m3) in a 24-hour period, and not exceed an average annual exposure of 10mcg/m3. (WHO 1) To put this into perspective, the PM2.5 for Portland, Oregon in January, 2014 ranged from 30-76, while, during same month, the PM 2.5 in Beijing, China was over 600. In Harbin, China in October of 2013 (the start of the heating season), the PM2.5 was over 1000mcg/m3 (Guardian). The major contributors to this astronomically high PM2.5 in China are burning coal and vehicle exhaust.

HOW DOES PARTICULATE MATTER AFFECT PEOPLE?

The fine particles less than 2.5 microns (PM2.5) are particularly important in triggering disease because they penetrate deeply into the alveoli of the lungs. Diesel particulates, submicronic in size, have particularly damaging potential. Some inhaled particles are taken up by macrophages, resulting in lung inflammation. The final common pathway of the pathologic effects of exposure to particulate matter, as well as gas phase pollutants such as benzene and polycyclic aromatic hydrocarbons, appears to be inflammation. (Avogbe, Bellavia, Dominici, Mustafic, Peters 2011, Pieters). The effects of inflammation on various body organ systems are complex, but increased levels of particulate matter are associated with a number of ill health effects including: increased cancer rates, especially lung and breast (Beeson, Crouse, Demetriou, Dockery, Pope, Wei), congenital lung, heart and immune system anomalies in children (Gauderman, Picciotto Vrijheid,) increased rates of asthma, worsening of preexisting asthma and chronic obstructive pulmonary disease (COPD) (Carlsten, Gowers, Delamater, HEI Panel, Trasande, WHO 2), higher rates of heart attacks and strokes (Chen, Dominici, Lie, Mustafic, Qian, Wellenius, Shaw), and higher rates in children (exposed prenatally) of neurodevelopmental disorders such as autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), lowered IQ, and adverse behaviors. (Becera, Chiu, Newman, Perera 2013, Perera 2009, Roberts, Volk 2013, Volk 2011) Not surprisingly, the

most vulnerable populations are pregnant women, children, people that already have pulmonary diseases like COPD or asthma, and the elderly.

KEY AMERICAN MEDICAL SOCIETIES AND THE WORLD HEALTH ORGANIZATION HAVE ISSUED POSITIONS ON PARTICULATE MATTER AND HEALTH:

The *American Heart Association* (AHA) in 2010 updated and summarized its 2004 Scientific statement position: "The overall evidence is consistent with a causal relationship between PM2.5 exposure and cardiovascular morbidity and mortality. This body of evidence has grown and has been strengthened substantially since publication of the first AHA scientific statement and, ... because the evidence reviewed supports that there is no safe threshold, it appears that public health benefits would accrue from lowering PM2.5 concentrations even below present-day (EPA standards), if feasible, to optimally protect the most susceptible populations." (Brook)

The American College of Obstetricians and Gynecologists (ACOG) together with the American Society of Reproductive Medicine (ASRM) in October 2013 issued a statement, "The evidence that links exposure to toxic environmental agents and adverse reproductive and developmental health outcomes is sufficiently robust, ... individuals alone can do little about exposure to toxic environmental agents, such as from air and water pollution, ... calling for timely action to identify and reduce exposure." (ACOG)

The *American Academy of Pediatrics* (AAP) issued a policy statement linking ambient air pollution to adverse health outcomes in children and recommended the National Ambient Air Quality Standards (NAAQS) be promptly reviewed and revised to protect children. (AAP, 2004, reaffirmed 2009)

In October 2013, *WHO's International Agency for Research on Cancer (IARC),* classified both outdoor air pollution, as a whole, and particulate matter, on its own, as carcinogenic. Therefore, it is vital to implement efficient policies to reduce exposure to pollution worldwide. (World Health Organization (WHO 2) and American Cancer Society).

SPECIFIC DISEASES ASSOCIATED WITH EXPOSURE TO HIGHER LEVELS OF PARTICULATE MATTER IN AIR POLLUTION

Pulmonary—Studies have demonstrated the effects of particulate matter on the lungs:

- decreased lung function (WHO 3)
- inhibited lung development in children (Gauderman)
- causes and makes asthma worse, resulting in increased hospitalization (Delameter, Gowers, HEI Panel, Pandya)

Cardiovascular—Studies have linked increased particulate matter with increased cardiac disease:

- increased cardiovascular disease mortality and morbidity in both short term and long term exposures to PM 2.5 (Brook)
- increased hospital admissions for serious cardiac arrhythmias (Peters 2000)
- increased probability of admission for acute myocardial infarction (Mustafic, Peters 2001)
- increased ischemic heart disease, arrhythmias, congestive heart failure (Dominici) and bio markers (HRV) associated with increased cardiac morbidity and mortality (Pieters)
- increased hospital admissions and death from heart failure (Shaw)
- increased risk of congenital cardiac anomalies in children (Vrijheid)

Cerebrovascular – Studies have shown links between particulate matter and strokes:

- increased hospital admissions for strokes(Dominici, Lue, Wellenius 2005)

- significant increase in stroke mortality associated with increase in PM (Chen, Qian)
- increased risk of stroke associated with increased exposure to small PM, black carbon, and nitrous dioxide (Wellenius 2012)
- increased risk of stroke and death from stroke for post menopausal women (Miller)

Cancer—Studies relating cancer risk and particulate matter:

- exposure to ozone and PM correlated with development of and mortality from lung cancer (Beeson, Dockery, Pope)
- increased biological markers associated with risk of lung cancer (Demetriou)
- increased oxidative DNA damage predictive of cancer risk (Avogbe)
- increased rates of breast cancer (Crouse, Wei)

Neurodevelopmental—Studies associating in-utero exposure to particulate matter and:

- increased incidence of autism spectrum disorder (ASD)—(Becerra, Roberts, Volk 2013, Volk 2011)
- increased incidence of behaviors associated with attention deficit hyperactivity disorder (ADHD) (Chiu, Newman)
- lowered IQ (Perera 2009)
- increased behavioral symptoms of anxiety, depression, social problems, rule breaking, and aggression (Perera 2013)
- neurobehavioral development in children benefited from the shutdown of a coal-burning plant (Perera 2008)

General:

- increased mortality from cardiac, respiratory and kidney disease in all members of communities with coal exposure (15,16,17,18 Hendryx 2007, Hendryx 2010, Hendryx 2008, Hendryx 2009)
- long term exposure linked to decreased life expectancy from cardiopulmonary mortality (Krishnan, WHO 4)
- prenatal exposures linked to altered immune system development (Hertz-Picciotto)

RESOURCES THAT INFORMED THIS FACTSHEET

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EPA 2— http://www.epa.gov/teach/chem_summ/BENZ_summary.pdf

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