January 5, 2018

Re: Oregon and Washington Physicians for Social Responsibility Comments on Draft Health Impact Assessment (DHIA) for Millennium Bulk Terminals Proposed Coal Export Terminal in Longview, WA

To: Health Impact Assessment Steering Committee, Cowlitz County, and Washington Department of Health

On December 20, 2017, Cowlitz County in collaboration with the Washington State Department of Health released a draft Health Impact Assessment [1] of the proposed Millennium Bulk Terminals (MBT) coal export facility in Longview. The comments below are submitted in response to that document.

These comments were prepared in reference to the values and standards outlined in "Minimum Elements and Practice Standards for Health Impact Assessment" [2] and the principles and values outlined in "Health Impact Assessment: A Guide for Practice." [Appendix I] These comments also reference sections of the expert analysis submitted in June 2016 in response to the draft Environmental Impact Statement by Oregon Physicians for Social Responsibility and Washington Physicians for Social Responsibility [Appendix II], the Shoreline Permit Denial issued by Cowlitz County Hearings Officer November 2017 [3] and the final Environmental Impact Statement issued by the State Department of Ecology [4].

Oregon and Washington Physicians for Social Responsibility recognize the considerable time and effort devoted to the analysis of health impacts from the proposed coal terminal. The DHIA does include a detailed profile of baseline health status of the residents of the County including the most vulnerable populations. The DHIA also undertakes an analysis of the positive health impacts of economic growth. We find, however, that the DHIA minimizes some of the risks to health and fails to consider the full range of potential health impacts. It also falls short in its very limited geographic scope. Many organizations and municipalities requested an HIA that extended from the mines to the port, including the railroad corridor and the shipping corridor. Instead we are reviewing a DHIA that considers only a portion of Cowlitz County, WA. **Nonetheless, it is important to acknowledge that there is sufficient evidence in the DHIA to support a recommendation of the HIA Steering Committee that the project not move forward because many significant negative health impacts cannot be mitigated.**

The DHIA frequently fails to adhere to the Precautionary Principle, a critical component of public and environmental health practice. The Precautionary Principle states that "should an activity raise threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relations are not fully established scientifically." (Wingspread Conference, 1998). The DHIA rather tends to dismiss concerns that are not scientifically established beyond refute. The precautionary principle holds that in the event of insufficient evidence that an action may cause harms, the burden of proof falls on those taking the action to demonstrate that it will not be harmful. [5] Furthermore, it is the responsibility of decision-makers to ensure that the estimates of the number of people who might experience adverse health impacts are reasonable and reliable.

In addition, although authors of the DHIA state their intent to seek community input, the timing of the release of the DHIA over the busiest holiday season and the short length of time allowed for comments (December 20, 2017-January 5, 2018) did not permit gathering input from affected communities or those most vulnerable to negative impacts. This is a violation of the value of democracy from the International Association of Impact Assessment [6] emphasizing the right of people to participate in the formulation and decisions of proposals that affect their life, both directly and through elected decision makers.

The stated goal of the HIA is to "provide draft recommendations based on assessment results and/or the SEPA Environmental Impact Statement results; work with interested stakeholders to review and solicit input on recommendations; and approve final set of recommendations for inclusion in the final HIA report." [1] These recommendations have not yet been formulated. PSR strongly encourages that this process be undertaken in a transparent and inclusive manner, in accordance with the principles and values delineated in both "Minimum Elements and Practice Standards for Health Impact Assessment" [2] and "Health Impact Assessment: A Guide for Practice." [6]

The DHIA states that this HIA "… does not play a role in the decision to issue permits for a development project." We disagree. We believe that principles and values included in "Health Impact Assessment: A Guide for Practice" should be followed. This document states "the HIA method should involve and engage the public, and **inform and influence decision-makers."** [See Appendix I] There are many permit decisions that have yet to be decided and we expect that this HIA can and should inform and influence decision-makers.

Recommendations should adhere to the standards outlined in the "Minimum Elements and Practice Standards for Health Impact Assessment" [2]:

> *6. HIA provides recommendations, as needed, on feasible and effective actions to promote the positive health impacts and mitigate the negative health impacts of the decision, identifying, where appropriate, alternatives or modifications to the proposal.*

Note that many negative impacts of this project cannot be mitigated (FEIS [4] and "Findings of Fact, Conclusions of Law and Decision Denying Permit regarding Shorelines Permit Application of MBT [3].) The HIA Steering Committee should

identify denial of the MBT project as an alternative to the proposal.

> *8. HIA proposes indicators, actions, and responsible parties, where indicated, for a plan to monitor the implementation of recommendations, as well as health effects and outcomes of the proposal.*

Monitoring will require significant financial resources and, minimally, a large investment in air quality monitoring, noise monitoring and evaluation. We question the county's ability to meet this commitment given the fact that MBT has not even provided the County with resources adequate to complete the analysis for this DHIA.

Specifically, if the MBT proposal were to be implemented, the City of Longview and Cowlitz County "would need to assure vigilance in monitoring, operation, oversight, and prompt remediation to ensure protection of workers, residents, and the environment. This would require adequate funding and active engagement throughout the duration of the facility's operations. The level of oversight required, given the myriad opportunities for violation of safety and environmental protection, would be very difficult to enforce and is unlikely a reliable strategy." [Appendix V]

SUMMARY FINDINGS

1. HEALTH EFFECTS OF DIESEL PARTICULATE MATTER (DPM) AND COAL DUST: Coal dust and diesel particulate matter (DPM) exposures lead to death, hospitalization from heart and lung disease, asthma attacks, pneumonia, decline in lung function, asthma in children, plus growing evidence of stroke, Type 2 diabetes, neurological and cognitive impairment, cancer and pre-term and low-birth weight babies. In the Appendix, the DHIA acknowledges that in "2008 the Washington Department of Ecology ranked DPM as the highest priority toxic air pollutant based on cancer potency and emission levels."

The DHIA provides data that indicates this project will lead to a higher burden of illness and increased deaths from exposure to DPM and coal dust for the residents of Cowlitz County.

However, the DHIA minimizes the negative health impacts and the fact that those with underlying illnesses are most negatively impacted by poor air quality. It also fails to conclude that the impacts of these air pollutants cannot be mitigated and that these air pollutants most affect vulnerable communities already burdened by significant health inequities.

2. IMPACTS ON VULNERABLE POPULATIONS: The DHIA includes an analysis of the disproportionately negative impact the project would have on vulnerable populations. These impacts are discussed principally in relationship to air and noise pollution and neglect other negative health impacts. However, the DHIA demonstrates that higher noise exposure impacts low income areas in Cowlitz County. Noise is associated with higher rates of high blood pressure, heart attack and heart disease. Cowlitz County and the neighborhoods that would be most impacted by increased noise already experience higher than average rates of these diseases and that increased noise will contribute to further increase in these rates. (page 21)

The analysis reveals that those persons most vulnerable to the negative effects of air pollution are also those who are most exposed to air pollutants, which will have the unfortunate effect of increasing health disparities, particularly in low-income communities. Cowlitz County consistently ranks near the bottom of Washington counties in health indicators. (page 13) The population of Cowlitz County already has a higher burden of illness, specifically higher rates of heart disease, lung disease, diabetes, and cancer, and will therefore be more likely to be harmed by air and noise pollution.

The DHIA fails to consider the many direct and indirect adverse impacts on the health and safety of tribal members and the Treaty-reserved rights and resources of Tribal Nations.

3. AIR QUALITY MONITORING: The DHIA does not address the problem of grossly inadequate air quality monitoring in the affected areas, either for purposes of assessment or ongoing monitoring.

4. ECONOMIC PROSPERITY: The DHIA includes an analysis of the positive impacts of projected economic growth in the County of the proposal. It includes, however, no analysis of the economic impact of negative health outcomes. It fails to include recent information pertaining to the viability of the coal industry. The implication that the coal terminal would have a net positive effect on community prosperity is not supported.

5. GLOBAL CLIMATE CHANGE: The DHIA includes a detailed analysis of the adverse effects of global climate change on the residents of Cowlitz County. It notes that "changes in Washington's climate in the near and midterm future will likely increase hazards to human health and increase health disparities. Without preventative and protective measures, this will worsen a variety of health outcomes." It also states, "What is certain is that if increasing global GHG emissions from human activities continues on a business as usual path, residents in Washington and Cowlitz County will experience far greater harms than if the level of GHG emissions at the global level are dramatically reduced sufficient to arrest the increase in atmospheric GHG concentrations and limit global warming to under 2 degrees Celsius." The assessment, however, declines to acknowledge the negative impact of the proposed coal terminal to global climate change.

6. RAIL CONGESTION AND NOISE POLLUTION: There is higher noise exposure in low-income areas in Cowlitz County. Noise is associated with higher rates of high blood pressure, heart attack and heart disease. Cowlitz County and the neighborhoods that would be most impacted by increased noise already experience higher than average rates of these diseases and that increased noise will contribute to further increase in these rates. (page 23)

The DHIA does not describe the full range of negative health impacts of noise and traffic congestion generated by projected increase in rail traffic, including an increase in the number of train accidents as described in the FEIS.

A single train could delay traffic by 9 minutes at at-grade crossings. There will be 16 train trips each day at full operation. This could decrease accessibility of public services and

increase wait times for emergency vehicles. (page 21) The DHIA does not describe the health implications of delayed response times. These include death and/or disability for cardiac and stroke patients, accident patients, and all patients threatened by emergent life and death situations.

7. FOOD CONTAMINATION: The DHIA concludes that the project represents no risk to food safety, but this conclusion is based on underestimates of coal toxic pollutants including mercury, lead, arsenic, cadmium and DPM emissions. The DHIA ignores the findings of the "Assessment of the Health and Safety Implications of Coal Transport through Oakland" which states, "**Coal dust typically contains toxics such as mercury, lead, arsenic, cadmium, and crystalline silica. These substances are of high health concern if inhaled or ingested and are known to cause cancer, fetal defects and neurological damage, even at very low doses. There are no known safe levels of exposure to these toxics."** (Appendix V)

Tribes have the right to fish and harvest seafood. Tribal members and others eating shellfish could be exposed to potentially toxic and carcinogenic polycyclic aromatic hydrocarbons due to this project. (page 25)

8. WATER QUALITY: The DHIA considers effects of water quality in relationship to PAH contamination of edible fish, but concludes that potential negative impacts are tiny. The DHIA additionally concludes that drinking water in the area will be safe from contamination. Again, this conclusion is based on underestimates of coal emissions and minimizes studies that document already existing toxic contamination of local ground water and aquifers.

9. HEALTH EFFECTS OF TOPPER AGENTS (SURFACTANTS):
The DHIA concludes that these risks are minimal while acknowledging that the science behind this conclusion is limited. Review was limited because some ingredients are proprietary or were not sufficiently identified to be reviewed independently for potential health impacts. (page 26) Therefore the potential risk to the local population and rail communities from the mines to the terminal is unknown.

10. PAHs, HEAVY METALS, AND OTHER TOXINS: The DHIA fails to adequately consider negative health impacts of a number of other toxics associated with coal transport, export and combustion including mercury and other heavy metals plus polycyclic aromatic hydrocarbons (PAHs), many of which are carcinogens. There was no discussion of cumulative impacts of many toxins and air pollutants, which may have additive and synergistic effects that exacerbate negative health impacts.

11. OCCUPATIONAL HEALTH AND SAFETY: The DHIA fails to independently investigate the potential adverse effects on worker health at the coal terminal site. The DHIA does consider impacts of exposure to topper agents at the site of application. Eye, skin, and lung irritation as well as gastrointestinal disturbances are possible. The DHIA fails to consider that workers at the terminal site may be at risk for "coal mine dust lung disease," as are workers at surface coal mines.

12. MARINE ACCIDENTS AND TOXIC SPILLS: The DHIA fails to take into consideration the negative health impacts of potential marine accidents and toxic spills associated with increased shipping in the Columbia River.

13. RAIL ACCIDENTS AND TOXIC SPILLS: The DHIA fails to take into consideration the negative health impacts of potential rail accidents and toxic spills associated with increased rail traffic.

14. CATASTROPHIC EXPLOSION: According to the Oakland Coal Export report, there are inherent hazards in transporting and handling coal, including the risk of catastrophic explosion. "Since coal is inherently combustible, each step in its handling creates hazards for workers and nearby communities." The DHIA does not examine or describe these risks to human health and safety.

15. UP- AND DOWNSTREAM COMMUNITIES: The DHIA fails to take into consideration the negative health impacts on up- and downstream communities, including Native American tribes, from increased marine traffic, rail traffic, and coal transport.

16. STAKEHOLDERS: The DHIA includes no evidence that all stakeholders, including the most vulnerable populations, have yet been involved in the assessment.

17. ACTIVE TRANSPORTATION AND RECREATION: For lack of time, the authors of the DHIA failed to answer this question. This is a key omission because we know that recreational facilities at schools, soccer fields, hiking trails and biking lanes are areas of concern. Youth and active adults engage in intensive exercise that increases breathing rates and increases the total amount of pollution inhaled. Children are at risk even if they are not intensively exercising because they respire more frequently than adults and their body weight is lower. They concentrate significantly more toxins per body weight than adults. The boundary of Woodland Primary School is 125 feet from the railroad. (page 28) This puts children at greater risk for inhalation and ingestion of coal and DPM toxic pollutants.

DISCUSSION

1. HEALTH EFFECTS OF DPM AND COAL DUST

Part A (Air Quality), Section II (Health Evaluation) considers these questions:

> *Question 1. What effects will coal dust, diesel exhaust from trains, ship pollutants, and emissions from vehicles, due to increased congestion, have on the health of Longview residents and sensitive populations (such as asthmatics, elderly, pregnant, smokers, those with respiratory conditions, and youth)?*
>
> *Question 2. What are the short- and long-term effects of diesel exhaust and coal dust exposure?*
>
> *Question 3. What neighborhoods and communities will be at the greatest risk of exposure to air pollution based on proximity, prevailing winds, and other environmental factors?*

Some short-and-long term effects of diesel exhaust and coal dust exposure (PM 2.5 and PM 10) are well-delineated in the HIA. The current health status of the neighborhoods and communities at greatest risk of exposure are also clearly noted and found to be generally worse than that of Washington State as a whole.

Health data shows higher death rates from heart disease, lower respiratory diseases, most notably emphysema in Cowlitz County, particularly in the neighborhoods near the proposed MBT (Highlands and St. Helen's) than in other areas of Washington State. This translates into a greater negative effect of air pollution on the health of the population of Cowlitz County because of the higher burden of existing illness.

The DHIA omits the harmful effects of PM 2.5 on older adults in particular. Recent research has shown that the elderly are disproportionately harmed from this type of air pollution. Even a slight increase in daily PM 2.5 exposure has been shown to directly correlate with increased mortality for adults 65 and older. [Appendix III] As the HIA notes that Cowlitz County's population of adults over 65 is larger than that of Washington overall, this risk is particularly significant.

What conclusions are drawn are found buried in the Appendix. In the Appendix, the DHIA notes that in "2008 the Washington Department of Ecology ranked DPM as the highest priority toxic air pollutant based on cancer potency and emission levels." Although the HIA notes significant negative health impacts of both diesel exhaust and coal dust exposure to the residents of Cowlitz County, particularly those closest to the terminal, it does not acknowledge that these effects cannot be mitigated. Because the greatest negative health impacts would occur in vulnerable communities and to those burdened by illness, pregnant women, infants and children, and those over 65 years, this project does not meet the standards of "Equity" from the International Association of Impact Assessment. [Appendix I]

Furthermore, the DHIA does not discuss the adverse effects of exposure to black carbon (BC), a component of diesel particulate matter, smaller than PM 2.5, and more dangerous. There is evidence that previous estimates of the effects of PM 2.5 on health may have been underestimated as new methods of measurement have been developed to evaluate the black carbon content. Of most concern, evidence of neurodevelopmental and neurodegenerative effects of exposure to black carbon and PM2.5 and the toxicants they carry into the blood stream have been left out of the analysis. Thus, important health impacts on children, adults, and the elderly have been left out of the draft HIA.

Asthma rates in Cowlitz County are very high. The DHIA does not analyze the potential for increased asthma rates and exacerbation resulting from exposure to fine particulate matter and ground level ozone. High asthma hospitalization rates are noted in the Table 8 but there is no discussion. Asthma should be added and evaluated as a health impact along with significant increases in hospitalizations for respiratory infections, COPD and bronchiectasis.

The impact to other communities along the rail lines or shipping routes is also minimized or excluded and what information is provided is only found in the Appendix.

The DHIA also does not acknowledge the multiple cumulative and synergistic effects of DPM and coal dust.

For further detail see pages 6-15, Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals Longview [Appendix II]

See also, from the *Journal of the American Medical Association*, a summary of the most current evidence for premature death associated with low level air pollution. (Appendix III)

2. IMPACTS ON VULNERABLE POPULATIONS

Woven into Section II (Health Evaluation) and Appendix I (Air Quality) is a detailed analysis of the baseline health of the local community and projected disproportionate impacts on vulnerable communities, including persons with underlying health conditions, and vulnerabilities associated with low-income, race, and other demographic factors. It includes a discussion of the social determinants of health as they are manifest in the local community.

The document includes some additional analysis on the disproportionate impact of increased rail traffic on vulnerable and low-income communities. Disproportionate impacts of rail and marine accidents, toxic spills, and potential contamination of food and drinking water are not discussed. This is a violation of the principle of "Equity" established by the International Association of Impact Assessment. [Appendix I]

For further detail see pages 40-41, Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals Longview. [Appendix II]

3. AIR QUALITY MONITORING

The discussion of air pollutant effects in Section II (Health Evaluation) and again in Appendix I (Air Quality) are based on baseline monitoring data in Longview from 2013 and 2016. The source of this monitoring data is from a single monitor stationed 1.5 miles from the project site. [4, page 689] This is not only an inadequate assessment of baseline air quality in the area, but is also inadequate to assess any degradation in air quality due to the coal export terminal, should MBT be allowed to proceed. Also lacking in the DHIA is information about wind speed, direction and impacts of inversions on air quality near the terminal and in Cowlitz County.

See page 11 of Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals Longview. [Appendix II]

4. ECONOMIC PROSPERITY

Part B (Economic Health, Prosperity and Resiliency), Section II (Health Evaluation) takes up these questions:

Question 4. How will the project affect the number and types of jobs in Longview in the long-term and how does that affect the health of those employed and the community as a whole? How does that compare to alternative site uses for the MBTL site?

Question 5. How will the other aspects of the local economy be affected? Will the impact on tourism, the service economy, and the river economy increase prosperity?

Question 6. How will this affect local taxes and will that affect health?

Question 7. What economic, social, or environmental accountability does Millennium have to the community if they close or leave the community? Does that accountability remain if there is a bankruptcy?

The analysis focuses on the positive health effects that would result from projected economic growth from the coal terminal. This is an important part of a comprehensive health impact assessment. The analysis here, and in DHIA Appendix I, is detailed, includes wage multipliers, effects on tax base, discussion of alternative uses of the site for the proposed coal terminal and the consequences to the community should the project terminate prematurely.

Missing from the discussion is any analysis of the economic costs of negative health impacts such as loss of work and school days, costs of medical care, and years of potential life lost. Net effects of the project on economic prosperity cannot be predicted without further analysis, as the report itself admits: "A sophisticated economic analysis would be necessary to draw more solid conclusions on the positive health impacts of a project from a perspective of job creation and site use." [1, page 16]

Furthermore, estimates for job creation, direct and indirect (on which estimates of economic growth are predicated) derive solely from the estimates provided by MBT itself with no independent assessment of the accuracy of these estimates.

The DHIA clearly states that closure of the plant would have serious economic consequences for both MBT's employees as well as the community at large. It notes that there are some ways to mitigate this such as The Worker Adjustment and Retraining Notification Act (WARN). There are notable exceptions to requiring employers to comply with this including closure due to unforeseen circumstances. The DHIA notes that another way to mitigate a closure would be to require that MBT comply with the International Finance Corporation Performance Standard of having a "Retrenchment Plan" in place, which includes provisions for managing lay-offs in the event of downsizing or closure. MBT currently has no plan to develop a "Retrenchment Plan" and there is no current requirement for MBT to do this.

If MBT closes its operations, the site would require major environmental cleanup efforts to make it usable for other industrial or non-industrial uses. This would be a significant negative impact on the community not only in loss of jobs but in the cost of making the site usable by other companies. The DHIA notes that the Model Toxics Control Act does not include coal as a toxic substance. It states that that they cannot offer an assessment of whether the MBT site cleanup would trigger the Model Toxics Control Act, but imply that it would be very unlikely.

It is remarkable that the DHIA does not address the issue of the likelihood of closure, given the efforts of most countries, especially China, to significantly reduce the use of coal to improve air quality and limit global warming. The DHIA implies but does not clearly state that Millennium could not and would not be held accountable for the economic, emotional, and physical impacts to their workers or for the broader impact to the community. Further, it implies that there is no accountability for its environmental impact.

Furthermore, recent news from Newcastle, Australia demonstrates the massive decline of coal export markets and financial risks associated with over-reliance on coal by the Port of Newcastle. See "World's biggest coal export port announces shift away from coal" published in the Guardian on January 5, 2018.

5. GLOBAL CLIMATE CHANGE

Part C (Community Health), Section II (Health Evaluation) responds briefly to the following question:

> *Question 8: What are the potential effects of climate change on Cowlitz County residents, their health, and the linkage to increased carbon dioxide (CO2) from this project?*

MBT plans to export 44 million metric tons from Longview each year. 44 million metric tons of coal yields about 90 million metric tons of carbon dioxide once it is burned. This is roughly on par with Washington State's current total annual carbon dioxide emissions. (page 20).

Appendix 2 (Climate Change) in the DHIA includes a more detailed discussion of global warming effects on local weather and environment and the potential adverse effects on Cowlitz County residents including: heat-related illness, respiratory disease, vector-borne illness, water- and food-born disease, and extreme weather events and references the expected disproportional impacts on vulnerable communities.

In Appendix 2, net greenhouse gas (GHG) emissions from the proposed terminal are estimated based on various policy scenarios. The calculation of net increase in GHG emissions assumes that the same coal, if not transported through Longview, would still be extracted and distributed to international markets. This assumption is not supported by evidence.

While the DHIA states, "Today's decisions concerning GHG emissions and reductions in the short term will determine the severity of climate events to come in the second half of the 21st century and beyond" the document then concludes: "While these potential emissions would contribute to GHG concentrations in the atmosphere, it would be difficult to attribute these particular emissions [from MBT] to a future projected degree of global warming, resulting climate effects, and resulting health effects." [1, page 54]

Since the proportional contribution of any particular project to world-wide GHG emissions is never certain, the implication is that *the impact on worldwide GHG emissions of any particular project cannot be taken into consideration.* This represents a failure to apply reasonable and informed judgment in the face of uncertainty. It is a violation of the Precautionary Principle in public health practice. Additionally, it flies in the face of Washington state laws and policies which require reductions in GHG emissions to protect our climate and health.

For further assessment on the impact of global climate change see pages 2-6, Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals. [Appendix II]

6. RAIL CONGESTION AND NOISE POLLUTION

Part D (Personal Health), Section I considers these questions:

> *Question 9. What will be the health effects on the community in regards to emergency response times, commute times, and traffic congestion?*
>
> *Question 10. What will be the effect be on recreational and active transportation activities in Cowlitz County, such as walking, biking, and taking the bus?*
>
> *Question 11. What will be the health effects of noise and vibration?*

The FEIS concluded that increased rail traffic would cause a significant increase in area traffic congestion and delays in emergency response time. [4, Section 5.3.8] The FEIS further notes that if all suggested improvements to at-grade crossings are made, the problem of traffic congestion could be adequately mitigated. However, the County has not made these improvements a condition for project approval. [3, page 20] The HIA fails to address and resolve this issue.

As noted earlier, effects on recreation and transportation activities in the area were not investigated. Recreational opportunities and active transportation are important to creation of a healthy and economically thriving community. There is considerable evidence in public health and community planning literature that improved access to walking and bicycling to and from work and school improves the health of the community. If diesel emissions and coal dust foul the air and train noise is annoying or disturbing, it is less likely that adults and children will play outside or engage in walking, biking and recreational activities.

The DHIA described many of the adverse health impacts of noise exposure, but emphasized these health impacts occurred after many years of exposure even while stating that noise can trigger the body's stress response, cause sleep disturbance and increase blood pressure. Work and school performance can be adversely impacted as well. These responses to noise are short-term impacts and can have rapid adverse health impacts especially in children, the elderly, persons already under stress, and persons who are ill. Children develop better concentration skills in a quiet environment, children who are exposed to noise pollution while learning are more likely to experience reading delays, and children who spend time in noisier areas have higher resting blood pressure and higher stress levels.

The DHIA notes that noise is measured in different ways, but did not consider that "averaging noise levels fails to take into account the effect of individual events, with locomotive horns and train pass-bys being perfect examples. …people do not experience noise as averages – they experience noise as events." For further discussion of this point and its relevance to estimating adverse health impacts of noise exposure, see the comments of Dr. Alice Suter on the NEPA DEIS submitted on November 28, 2016. [Appendix IV]

The DHIA acknowledges that "noise health risks exist for anyone in the county or along the rail line elsewhere beyond the corridor studied in the FEIS." The DHIA focuses on heart disease and found agreement with scientific studies that for each 10 dB increase in noise there is a 6% to 8% increase in population risk for adverse heart health outcomes. The DHIA found that risk for high blood pressure, heart attack and heart disease increases in a meaningful way between 52 decibels and 75 decibels, and also referenced the World Health Organization's 50 decibel nighttime threshold for high blood pressure and heart attack impacts.

The draft HIA includes a map of contours of noise estimates from the FEIS that included data from noise monitoring stations and included the 55 Ldn (average day night sound level) rail noise contour that was not included in the FEIS. **But the DHIA did not specifically connect the data on increased health risks with increases in noise levels within this rail noise contour and did not point out that the 55 Ldn contour includes a large residential area adjacent to the proposed MBT site. This is a serious omission.** Nevertheless, looking at 5 years of mortality data, the DHIA found that the Cowlitz County death rate from heart disease is 7% higher than the state, and concluded that Cowlitz County and the neighborhoods that would be most impacted by increased noise are already experiencing higher than average rates of disease and increased noise will increase those rates further.

7. FOOD CONTAMINATION

Part D (Personal Health), Section I considers these questions:

> *Question 12. Will fish in the Columbia River be contaminated and if so, what will be the health impacts on people who eat those fish?*
>
> *Question 15. Will there be any health effects on residents by consuming food grown on local farmland or in residential gardens?*

The DHIA concludes that some accumulation of PAH in shellfish is possible, but the impact of ingestion is minimal because the harvesting of shellfish in the Columbia River is prohibited. This conclusion understates risk to tribal communities.

The combined and cumulative harm that could come to fisheries from coal transport and export along Northwest waterways such as the Columbia River must be more fully considered. We object to any project that causes significant impacts to tribal fishing and treaty rights.

The following words are taken from a prepared statement of the Yakama Nation given November 18, 2013, at an Oregon Physicians for Social Responsibility press

conference: "First and foremost, given the direct and indirect impacts that the coal export proposals would have on the Yakama People and our Treaty-reserved rights and resources, Yakama Nation is fully opposed to all coal export proposals, including the Millennium Bulk Terminal project at the Port of Longview. As such, Yakama Nation continues to ask all permitting agencies, including the U.S. Army Corps of Engineers and other state and local authorities to deny any and all permits related to these proposals. To be clear, Yakama Nation will not negotiate nor agree to so-called mitigation for any violations of its Treaty-reserved rights."

For further detail see page 40, Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals. [Appendix II]

The DHIA further concludes that coal dust contamination, along with its associated toxins and heavy metals, will have minimal effects on local home and commercial food crops. This conclusion is based on modeling of coal dust emissions in the FEIS [4] that significantly underestimates emissions based on actual measured emissions at coal terminals in other communities. The conclusion is therefore not warranted. Furthermore, the potential for coal dust including contaminants for which there is no known safe level of exposure (mercury, arsenic, lead, cadmium) must be more fully considered before discounting impacts on food grown on farms and in home gardens. As previously noted, the "Assessment of Health and Safety Implications of Coal Transport through Oakland" states "**these substances are of high health concern if inhaled or ingested and are known to cause cancer, fetal defects and neurological damage, even at very low doses. There are no known safe levels of exposure to these toxics."** [Appendix V]

For further detail see pages 20 – 27, Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals. [Appendix II]

8. WATER QUALITY

Part D (Personal Health)

Question 14. Will there be health effects related to changes in water quality?

The report concludes that there is no evidence to support substantial contamination of groundwater that is used by the local community for drinking water. This assertion was made with inadequate evidence or analysis to support it. Studies have found gasoline, benzene, arsenic and other contaminants in local ground water and aquifers [Appendix II, pages 38-39]. If these earlier contaminants penetrated shallow and deep aquifers, why would one assume that contaminants related to the construction and operation of the MBT could not penetrate as well? Where is the description of potential health impacts that could occur should the deep aquifer (source of drinking water for residents of Longview and other communities) be contaminated by industrial and toxic pollutants? Furthermore, this conclusion of no contamination is based on coal dust emissions that are underestimated. Oil spills are not considered, as well.

9. HEALTH EFFECTS OF TOPPER AGENTS (SURFACTANTS)

Part D (Personal Health), Section I (Health Evaluation) considers the following question:

Question 13. What are the health impacts of topper agents on workers or residents?

The section notes that "to the extent that topper agents reduce community exposure to coal dust, the use of these toppers will be beneficial for public health." [1, page 26]

However, even with these agents applied, coal dust is lost in transit at high rates. [7] In addition, it is unclear whether these topper agents will be used on the coal pile at the MBT site to keep the coal dust from blowing in the wind. Even if it is not re-applied at the terminal, topper will be in the coal dust, some of which will blow in and around the project site and adjacent neighborhoods.

Investigation did not reveal any potential for significant harm from toppers or surfactants, but the section concludes that "The review performed by DOH was limited. Some ingredients were proprietary or were otherwise not sufficiently identified to be reviewed independently for potential health impacts. In addition, MSDSs and toxicological databases show very little testing data for some of these ingredients." [1, page 26]

The conclusion that these agents present no potential harm, given the weakness of the evidence, is not warranted. The potential toxicity must be elucidated, regardless of proprietary constituents. The Precautionary Principle should be invoked in the event that no further information on constituents is available.

10. PAHs, HEAVY METALS, AND OTHER TOXINS

The DHIA focuses its analysis on the effects of exposure to DPM, apparently because of the greater adverse health impacts of DPM. In narrowing the scope of the assessment to DPM, the health effects of exposure to toxins in coal and coal dust are largely excluded as are the effects of polycyclic aromatic hydrocarbons (PAHs), which are by-products of diesel exhaust. PAHs include formaldehyde, benzene, and 1,3-butadiene, which have documented carcinogenic and other negative health effects. Coal and coal dust contain neurotoxins and carcinogens, including lead, mercury and arsenic. [See Appendix V] The potential health effects of these toxins are not considered in the DHIA.

For further detail on potential for negative health impacts see pages 14-23, Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals Longview. [Appendix II]

11. OCCUPATIONAL HEALTH AND SAFETY

The individuals who will face the most substantial increase in risk from accidents and exposure to DPM, coal dust, and other toxic pollutants will be the workers at the terminal itself. Given the increased likelihood of development of chronic lung disease from this exposure, will Millennium provide protection from coal dust and DPM and other particulate

matter inhalation? Will Millennium monitor workers' lung function at baseline and at recommended intervals?

The DHIA notes this potential impact on health, but dismisses the concern with a single statement: "The DHIA Millennium Bulk Terminals-Longview has stated that the occupational health and safety of workers employed by the proposed project will be managed in accordance with the requirements of WISHA." (Washington Industrial Safety and Health Act) [1, page 14] As in the DEIS, "there is no mention of the effects of noise from the construction project on the workers themselves, who will be exposed to various sources, such as compressors, pneumatic tools, and train sources. Will Millennium have a hearing conservation program? Will that program meet the requirements of Washington's state plan for OSHA? Will the railroad workers and workers at the site be provided with sufficient protection from the extensive durations of high-level noise emitted by the horn?" [Appendix IV]

Due diligence requires at a minimum the examination of the health and safety record of MBT by independent experts.

12. MARINE ACCIDENTS AND TOXIC SPILLS

When fully operational, marine traffic on the Columbia River will increase by 1680 transits of ocean-going vessels per year. The FEIS estimates that this will result in 2.8 additional vessel mishaps per year of variable severity with associated potential for property damage, loss of life, toxic spills and fires. [4, section 5.4] The FEIS further concludes that there is no way to mitigate this risk.

The DHIA does not take into consideration the health impacts of this risk. Furthermore, the potential negative economic impact of marine accidents is not incorporated into the analysis of the project's effects on the region's economic prosperity.

MBT argues that it cannot be held responsible for marine activities conducted by third parties [3, section 9.14]. This, however, does not justify omission of the risks of marine accidents from a comprehensive HIA. This is a violation of the minimum standards for an HIA, which includes the element: "HIA systematically considers the full range of potential impacts of the proposal on health determinants, health status, and health equity." [2, page 5]

13. RAIL ACCIDENTS AND TOXIC SPILLS

When fully operational, rail traffic in Washington and Oregon will increase by 5840 transits of loaded and unloaded trains per year. The FEIS notes that existing rail lines will be operating over capacity and estimates that this traffic will result in at least 11 additional rail mishaps per year of variable severity with associated potential for property damage, loss of life, toxic spills and fires. [4, section 5.2-8] Not all of this additional risk can be mitigated with improvements in existing rail lines.

The DHIA does not take into consideration the health impacts of this risk. Specifically, it fails to describe the health impacts and potential injury from rail accidents, inhalation and contamination from spills, and risks related to fires resulting from the rail mishaps that the FEIS acknowledges will occur.

Again, MBT argues that it cannot be held responsible for rail activities conducted by third parties. This, however, does not justify omission of the risks of rail accidents from a comprehensive HIA, which is a violation of minimum standards for an HIA.

14. UP- AND DOWNSTREAM COMMUNITIES

The geographic scope of the DHIA is limited to portions of Cowlitz County. However, upstream communities in Utah, Colorado, Wyoming, Montana, Idaho, and Oregon will involuntarily assume health and safety risks from the increase in rail traffic and coal transport. Likewise, downstream communities along the Columbia River in Washington and Oregon will involuntarily assume risks associated with increased marine traffic. Furthermore, these communities will assume those risks without accruing any of the compensational benefits of the project.

Multnomah County (Portland) evaluated risks to its community from increased rail transport of coal and concluded that the rail traffic would impose additional health risks on their community and that those who would be most affected already bore a higher burden of disease related, in particular, to DPM exposure. [5]

These additional risks would be the direct result of the MBT coal transport facility in Longview. But many, if not most, of these communities do not have the resources to conduct independent HIAs. It is not known how many of these affected communities are even aware of the potential impacts on their communities from this proposed project. This is a violation of two elements of minimum standards for an HIA:

> *"HIA involves and engages stakeholders affected by the proposal, particularly vulnerable populations."*
>
> *"HIA systematically considers the full range of potential impacts of the proposal on health determinants, health status, and health equity."* [2, page 5]

The disenfranchisement of up- and downstream communities is also a violation of the following principle set forth by the International Association of Impact Assessment [Appendix I]:

> **"***Democracy*—emphasizing the right of people to participate in the formulation and decisions of proposals that affect their lives, both directly and through elected decision-makers. In adhering to this value, the HIA method should involve and engage the public, and inform and influence decision-makers. A distinction should be made between those who take risks voluntarily and those who are exposed to risks involuntarily."

Conclusions

Oregon and Washington PSR conclusions are based on the DHIA, the FEIS, the Decision of the Shorelines Hearing Officer, the Assessment of Health and Safety Implications of Coal Transport through Oakland, hundreds of peer-reviewed journal articles and include:

- Coal pollutants affect all major body organ systems and contribute to *4 of the 5* leading causes of death in America, including heart disease, cancer, stroke, and chronic respiratory disease.
- Transportation of coal by rail through Longview and the transfer of coal through the proposed MBT export terminal will increase exposures to air pollutants with known adverse health effects including deaths.
- There are no proven methods to eliminate or reduce the emission of these pollutants to a safe level.
- There are inherent hazards in transporting and handling coal, including the risk of catastrophic explosion.
- The combustion of coal exported from Longview will contribute to global climate change, resulting in additional adverse health risks to Cowlitz County residents and others.
- Impacts of coal transport and handling, including noise impacts, will be greatest along the railroad and near the terminal in neighborhoods already burdened by significant health inequities.

It is highly likely that there will be increases in adverse health and safety outcomes as a result of the project. We ask the HIA Steering Committee, Cowlitz County, and the WA Department of Health to take action to prevent the many unavoidable, significant, and adverse health impacts associated with the MBT coal export proposal.

The Final HIA should provide the basis for clear recommendations from the HIA Steering Committee to prevent construction of this coal terminal, deny future MBT coal export permits, and seek healthy alternatives to the coal export facility. It can also be a tool to protect the health and safety of Cowlitz County residents from future projects that endanger human health and our climate.

Thank you for this opportunity to comment,

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APPENDIX I

Principles and Values of Health Impact Assessment

From the International Association of Impact Assessment (Quigley 2006)
as reproduced in Bhatia, Rahjiv, Health Impact Assessment: A Guide for Practice, 2011

• ***Democracy***—emphasizing the right of people to participate in the formulation and decisions of proposals that affect their lives, both directly and through elected decision-makers. In adhering to this value, the HIA method should involve and engage the public, and inform and influence decision-makers. A distinction should be made between those who take risks voluntarily and those who are exposed to risks involuntarily.

• ***Equity***—emphasizing the desire to reduce inequity that results from avoidable differences in the health determinants and/or health status within and between different population groups. In adhering to this value, HIA should consider the distribution of health impacts across the population, paying specific attention to vulnerable groups and recommending ways to improve the proposed development for affected groups.

• ***Sustainable development***—emphasizing that development meets the needs of the present generation without compromising the ability of future generations to meet their own needs. In adhering to this value, the HIA method should judge short- and long-term impacts of a proposal and provide those judgments within a time frame to inform decision-makers. Good health is the basis of resilience in the human communities that support development.

• ***Ethical use of evidence***—emphasizing that transparent and rigorous processes are used to synthesize and interpret the evidence, that the best available evidence from different disciplines and methodologies is utilized, that all evidence is valued, and that recommendations are developed impartially. In adhering to this value, the HIA method should use evidence to judge impacts and inform recommendations; it should not set out to support or refute any proposal, and it should be rigorous and transparent.

• ***Comprehensive approach to health***—emphasizing that physical, mental, and social well-being is determined by a broad range of factors from all sectors of society (known as the wider determinants of health). In adhering to this value, the HIA method should be guided by the wider determinants of health.

APPENDIX II

[Oregon and Washington Physicians for Social Responsibility Comments on Draft Environmental Impact Statement for Millennium Bulk Terminals Longview]
Available at: http://www.psr.org/chapters/oregon/assets/pdfs/oregon-and-washington-psr-1.pdf

APPENDIX III

Junfeng Zhang. Low-Level Air Pollution Associated With Death: Policy and Clinical Implications. *JAMA*.2017;318(24):2431–2432. doi:10.1001/jama.2017.18948

Low-Level Air Pollution Associated With Death: Policy and Clinical Implications

Junfeng Zhang, PhD

Globally, an estimated 3.3 million annual premature deaths (5.86% of global mortality) are attributable to outdoor air pollution,[1] although ambient air pollution has been regulated under national laws in many countries. In the United States under the Clean Air Act, the primary National Ambient Air Quality Standards (NAAQS) are intended to protect human health, with an adequate margin of safety, including sensitive populations such as children, older adults, and individuals with respiratory diseases. Under the Clean Air Act, the standards are reveiewed every 5 years to account for new scientific evidence regarding their

Historically, this science-based review process has resulted in continued evolution of the NAAQS. For example, an annual and 24-hour standard for fine particulate matter ($PM_{2.5}$) and an 8-hour standard for ozone were added in 1997. The 24-hour $PM_{2.5}$ standard was lowered from 65 μg/m^3 in 1997 to 50 μg/m^3 in 2006. The 8-hour ozone standard was lowered from 0.08 parts per million (ppm) in 1997 to 0.075 ppm in 2008 and then to 0.070 ppm in 2015. At the next review of NAAQS for $PM_{2.5}$ and ozone, new scientific evidence will be evaluated in recommending whether the current standards should be revised.

In this issue of *JAMA*, Di et al[2] report findings that day-to-day changes in $PM_{2.5}$ and ozone ambient concentrations were significantly associated with higher risk of all-cause mortality at levels well below the current daily NAAQS. Using a case-crossover design and conditional logistic regression analysis in a data set involving 22 million deaths among US Medicare participants during 2000-2012, the authors estimated that a 10-μg/m^3 increase in $PM_{2.5}$ and a 10–parts-per-billion increase in warm-season (ie, between April 1 and September 30) ozone in the 2 days prior to death were, respectively, associated with a 1.05% (95% CI, 0.95%-1.15%) and 0.51% (95% CI, 0.41%-0.61%) increase in daily mortality rate. The authors also identified susceptible subgroups, reporting that nonwhite individuals, Medicaid-eligible indi- viduals, women, and adults 85 years and older had significantly higher mortality risk associated with increased $PM_{2.5}$ levels and that individuals aged from 75 to 84 years and 85 years and older had higher mortality risk associated with increased ozone levels. Importantly, the authors did not find evidence of a threshold in the exposure-response relationship for

either pollutant, suggesting that there is no "absolute" safe level of exposure to $PM_{2.5}$ or ozone.

The Medicare cohort used in this study includes individuals residing in rural areas without nearby air pollution monitors, but the authors were able to estimate exposure to $PM_{2.5}$ and ozone using predictive models of data from remote air monitors, satellite-based measurements, and other data sets.[2] Pollutant concentrations in rural areas are generally lower than in urban areas. The findings from this study add unique evidence, applicable to both rural residents and more vulnerable groups, to raise public awareness concerning health risks associated with low-level $PM_{2.5}$ and ozone pollution. The findings suggest that the current NAAQS for these pollutants should be reevaluated.

The findings from this epidemiological investigation by Di et al[2] are supported by mechanistic insights from recent studies of pathophysiological responses to $PM_{2.5}$ and ozone exposure. It is now well accepted that short-term exposure to $PM_{2.5}$ has cardiorespiratory effects through increased pulmonary and systemic inflammation, increased oxidative stress, enhanced thrombogenesis, and autonomic dysfunction.[3] At relatively high concentrations, ozone impairs lung function and increases the incidence of asthma attacks. As a highly reactive oxidant, ozone has long been considered to mainly affect the respiratory system. However, a recent study showed that at levels below those capable of causing lung function changes, ozone is associated with increases in pulmonary inflammation, blood pressure, and platelet activation (a risk factor for thrombosis).[4] Rodent studies show that ozone compromises immune function against bacterial infection.[5] Not only do these mechanistic studies support the biological plausibility of exposure-mortality associations, such as those found by Di et al,[2] but they also provide insights for potential "therapeutic" interventions. For instance, a limited number of studies suggested that antioxidant supplementation may reduce the effects of $PM_{2.5}$ or ozone.[6] More intervention trials should be conducted to examine the efficacy of using dietary supplementation, medications, or personal protective equipment in alleviating the adverse health effects of air pollution in the general population and particularly in more susceptible populations.

The findings of Di et al[2] may have implications for forecasting and personal monitoring of exposure to $PM_{2.5}$ and ozone, which could allow individuals at increased risk to reduce or mitigate their exposure. The study showed that when $PM_{2.5}$ or ozone concentration was higher on a particular day, more deaths oc- curred 2 days later. Predictions of pollutant concentrations for the next few days, such as weather forecasting, can be made readily available to the public. (For example, this has already been done in China.) Individuals can be advised to minimize their outdoor activities when outdoor pollutant levels are projected to be higher. However, staying indoors may be more helpful in avoiding exposure to ozone than to $PM_{2.5}$ because less than 30% of ambient ozone penetrates indoor spaces when windows and doors are closed, whereas more than 80% of $PM_{2.5}$ enters the indoor space in the absence of an air cleaning device such as central or room filtration.

In the study by Di et al,[2] several subgroups of Medicare recipients, including nonwhite individuals, women, Medicaid- eligible individuals, and older adults (>70 years) were found to have increased susceptibility to $PM_{2.5}$ and ozone. These susceptibility factors should be considered in developing personalized protection strategies, such as staying indoors on heavy pollution days and during exacerbations of underlying respiratory conditions, and wearing personal protective equipment, such as N95 face masks and respirators when outdoors.[7] Individuals at increased risk may also wish to avoid places such as heavily polluted city streets.[8] Furthermore, with rapid technological advancements, it becomes increasingly feasible to use low-cost, light-weight pollutant monitors in residences and workplaces or to be worn by individuals. Such exposure data can be integrated into a mobile health platform as part of an overall health management plan to achieve maximal risk

reductions.

Such individual-level protections, however, are only a complement to the ultimate solution of emission controls. In 2015, 107 million and 23 million people lived in US counties where air quality did not meet the standards for ozone and $PM_{2.5}$, respectively.[9] While efforts are needed to bring these nonabatement counties into compliance with the current NAAQS, regulators should continue to consider emerging sci- entific evidence such as that reported by Di et al[2] and should further lower the standards to minimize health risks. Some may argue that it would be too costly to make further improvements in air quality when pollution levels are relatively low. However, pollution controls required by the Clean Air Act have been associated with preventing an estimated hundreds of thousands of premature deaths and with esti- mated economic benefits exceeding the costs.[10] It can be assumed that even greater health benefits could result from further emission reductions, which can be achieved through cleaner energy production (eg, by renewable, nonpolluting sources such as wind and solar power) and a cleaner transportation fleet (eg, with electric and hybrid vehicles and low-emission mass transportation).

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Conflict of Interest Disclosures: The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest.Dr Zhang reported receiving funding from Underwriters Laboratories Inc in the form of a research contract to Duke University to supporta study of the health impact of using air purifiers in the bedrooms of children with asthma in Shanghai, China. From 2012 to 2017, he served as a member of the Oxides of Nitrogen Primary NAAQS Review Panel for the US Environmental Protection Agency. He has also received an honorarium for attending a global advisory board meeting on air pollution from the RB Company in London, England.

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APPENDIX IV

Comments on the Noise Impact of the Proposed Millennium Bulk Terminals

Longview, Washington

Alice H. Suter, Ph.D.

November 28, 2016

My name is Dr. Alice Suter. I am a retired audiologist living at 1106 NE Tillamook St., Portland, Oregon, 97212. My specialty for many years has been the effects of noise on people. I have worked as a Senior Scientist at the U.S. Environmental Protection Agency's (EPA) Office of Noise Abatement and Control, and as Manager of the Noise Standard at the Occupational Safety and Health Administration in the U.S. Department of Labor. Later I was a Visiting Scientist and Research Audiologist at the National Institute for Occupational Safety and Health in the Department of Health and Human Services. I have also worked for many years as an environmental and occupational noise consultant, advising companies, municipalities, and government agencies about their noise problems. My complete resume is available on request.

On June 13, 2016, I submitted comments on the noise section of the previous draft (SEPA) Environmental Impact Statement for the Washington State Department of Ecology. The noise section of the NEPA draft submitted to the U.S. Army Corps of Engineers is essentially the same in nearly all respects, so my previous comments would apply. This time I am including some additional remarks which I would have included before if time had allowed.

I have reviewed Chapter 6, the sections concerning the noise impact of the Draft NEPA Environmental Impact Statement (EIS) for the proposed Millennium Bulk Terminals at Longview, Washington. It is my opinion that the noise impact on the nearby community would be extremely serious, considerably more serious than the draft EIS concludes.

On page 6.5-25, the draft EIS estimates that the noise impacts from trains on some 229 residences would be moderate and on 60 homes would be severe. The method by which the noise impacts are estimated is incomplete and biased away from the public health and welfare impact. On examining the noise map in Figure 6.5-7c and comparing it to the existing noise contours in figure 6.5-5c, it is clear that large portions of the city would be adversely impacted, greatly exceeding the estimates made in the draft EIS. I will explain the reasons for my opinion in the paragraphs to follow.

1. Use of Energy Averages

The criteria to measure the impact of noise on the citizens of the surrounding community has been expressed by the company's consultant as $L_{dn,}$ for which the current terminology is Day-Night Sound Level (abbreviated DNL). The DNL is a cumulative level that averages sound levels over a 24-hour period, using a 10 dB penalty for night-time noise. Its best use is to compare the impact of different noise scenarios and noise reduction methods with one another.

Although the DNL is commonly used to assess the impact of various noise sources, particularly aircraft noise, it has been widely criticized for several decades. A more conservative metric is widely used in Europe - the DENL, which provides an additional penalty for the evening hours between 5:00 and 8:00 pm, a time period that is important for rest and relaxation.

The principle criticism of DNL is that it does not give adequate importance to single or discrete events. Studies have shown that DNL accounts for only a limited amount of the variance between noise sources and their impact on exposed communities. Even the Federal Aviation Administration (FAA), a long-time supporter of DNL, has recommended supplementing the DNL with other metrics to assist the public's understanding of the noise impact (FAA, 2006). Other metrics described in a recent report by the National Academy of Engineering (NAE) include the L_{Amax}, the A-weighted sound exposure level (ASEL), and metrics that give the number of loud events occurring above an average, such as the ASEL (NAE, 2010).

In this draft EIS, averaging noise levels fails to take into account the effect of individual events, with locomotive horns and train pass-bys being perfect examples. The effects of these events should be assessed by one of the metrics recommended by the FAA or NAE in the paragraph above to better understand the full impact. Although it is convenient to express criteria in terms of averages, people do not experience noise as averages — they experience noise as events. This is particularly true of intermittent noise sources like locomotive horns.

2. Use of DNL for Transportation Planning

Anyone making policy decisions on the basis of this kind of EIS must bear in mind that the missions of agencies such as the Federal Transit Administration (FTA) and the Federal Railroad Administration (FRA) are to foster the use and health of the transportation industry, and their impact statements necessarily reflect that bias. These agencies are not public health agencies like the EPA and the Department of Health and Human Services (DHHS). The "community impact" that they measure is not in health but in behavior in terms of community reaction.

The FTA report from which the models in this EIS are derived grades community reaction according to the excess of a new noise level above the pre-exiting noise level. It describes this process as proceeding from "no reaction, although noise is generally noticeable" to "sporadic complaints" at a few decibels above the pre-existing level, through "widespread complaints or single threat of legal action" at 5-10 dB above pre-existing level, to "several threats of legal action or strong appeals to local officials to stop noise" at 10 to 15 dB above the pre-existing level (FTA, 2006, p. 2-14). The report also makes the caveat that although their criteria have been documented in scientific literature, they "do not account for specific attitudinal factors which may exist." These types of community responses are then related to DNL as a function of the percentage of people "highly annoyed" by noise.

2. Noise Impact Criteria

Probably the most important argument against current usage of DNL criteria is that this metric is based on community surveys showing only the percentage of people describing themselves as “highly annoyed” by noise, as in the categories listed on page 6.5-10. This criterion assumes that people who are *somewhat* annoyed are not to be counted, but adverse reactions, including the psychological and physiological effects of noise may occur considerably before the point at which individuals describe themselves as “highly annoyed.” In all probability, the reason why this criterion is often used is because the “highly annoyed” residents are the ones most likely to complain and initiate lawsuits, even though the others are still adversely affected.

In my opinion, the FTA/FRA guidance, shown in Figure 6.5-4 does not adequately describe community response. While it is true that people who are already exposed to high levels of noise in their environment are expected to tolerate smaller increases in noise, in part because of the logarithmic nature of the decibel, it is also true that communities accustomed to a relatively peaceful and quiet environment may be seriously impacted by changes in their environment, which the FTA’s report acknowledges (FTA, 2006, Fig. 2-14). These are communities that vigorously oppose the citing of racetracks or new or expanded airports in their established communities, actions that may have occurred despite community opposition.

In addition, citizens who are either fearful or have a negative impression of the new noise source may be much more disturbed than the planners anticipate, as in the “specific attitudinal factors” cited in the FTA document mentioned above (FTA, 2006). This is quite likely to happen in a community where individuals feel threatened by the health and safety impacts of daily exposure to hazardous materials as miles of uncovered coal cars run through their community.

Figure 6.5-4, which is central to the assessment of noise impact, receives virtually no explanation. One is expected to accept the legitimacy of this graph without knowing about the data on which it is based or how those data were interpreted or incorporated into the graph. The draft EIS gives no formulas,

equations, or any justification except to state that the calculations of noise impact are based on the FTA/FRA guidelines. Further investigation into the FRA's 2006 document reveals that these guidelines were developed by an acoustical consulting firm that also prepares environmental impact analyses for projects such as this. The same graph appears on page 3.3 of the FTA's document, and the document's Appendix B discusses the relevance to this model of data and methods published in Schultz in 1978. The Schultz method has been widely used for transportation planning in the U.S. (Schultz, 1978), although it has been widely criticized over the past several decades in the U.S. and in Europe, where it has been replaced or supplemented by other methods.

3. The Human Element

It has always been clear that there is a great deal of scatter in the data points comprising the "noise annoyance" criteria, decreasing the predictive power of these kinds of impact statements. But also, the reactions of community members to noise should not be viewed merely as data points but as psychological and physiological effects on individual residents. These are humans, not just houses.

Throughout this draft EIS, the human element is played down. On page 6.5-10, the draft EIS defines **no impact** as a "change in noise level that would result in an insignificant increase in the number of instances where people are highly annoyed by new noise." Here again this criterion ignores all the people who are disturbed, but not categorized as "highly annoyed." The definition of **moderate impact** as a change in the noise level that would be noticeable to most people "but may not be enough to cause strong adverse community reactions" provides a window into the motivation of those who commission these kinds of impact statements. In other words, you can cause distress to a community up to a point, but "adverse community reactions" (i.e. lawsuits) should be avoided. **Severe impact**, causing a significant percentage of the people to be highly annoyed by noise, is acknowledged to produce adverse community reaction. By admitting that the residents of at least 60 homes would experience a severe impact, the draft EIS is

opening the door to concerted community reaction. Too often this reaction is directed toward local officials rather than the original noise source, since the noise source has already been approved.

However, the estimates of 60 severely-impacted or 229 moderately-impacted homes reflect the tip of the iceberg because both of these noise impacts have been grossly underestimated.

4. Noise Contours

Despite its reliance on the FTA's projected noise impact guidelines in Fig. 6.5-4, Millennium's consultant has also drawn noise contours reflecting the "before" and "after" scenarios resulting from the increase of 16 coal trains per day. These contours include DNLs from 55 dB to 75 dB in 5-dB increments. Interestingly, Figure 6.5-8, which shows the areas severely and moderately impacted by noise have omitted these contours. However, by comparing Figures 6.5-5c and 6.5-7c, it is obvious that all of these contours have shifted significantly in the proposed noise conditions. The importance of this shift cannot be overstated. The 55 DNL contour, which currently includes only a small section in the southern part of the City, is proposed to include a large swath of residential area extending along 32nd Avenue and Alabama St., up to and north of Beech St., nearly as far as Tennant Way. The draft EIS makes no mention of the number of houses included in this contour, but there must be several hundred or more, with residents numbering into the thousands.

A DNL of 55 dB has been identified by the U.S. Environmental Protection Agency as the level requisite to protect the public health and welfare from the harmful effects of noise (EPA, 1974). This is the noise level that *should* be used to assess the impact of noise on communities. Every resident south of this contour as far as the area of the tracks would be living in a noise level exceeding the EPA's identified safe level.

As the noise contours proceed toward the source from DNLs of 55 to 60 and 65 dB, the effects of noise will be increasingly serious. It appears that the area

categorized in the draft EIS as severely impacted will be subject to DNLs of 70 dB or greater, as if they were living under the flight path of an airport.

The FTA/FRA method of analysis clearly ignores the whole concept of public health and welfare, basing its method instead on the likelihood of citizens being angry enough to sue.

4. Health and Psychological Impact

People living in areas above the 55 dB DNL will be interrupted in their enjoyment of conversation and TV, they will be awakened at night, and their stress levels will be increased.

It is well known that noise can disturb sleep patterns even without awakening, and sleep quality is important to one's mental and physical health. The World Health Organization has put forward recommendations for nighttime noise levels outside sleeping quarters, in other words before the attenuation of windows is considered (WHO, 2009). Average levels less than 30 dBA should prevent any effects. Between 30-40 dBA some disturbances will occur, between 40-55 dBA adverse effects will occur with many individuals, and above 55 dBA, a sizable proportion of the population will be highly annoyed, their sleep will be disturbed, and the risk of cardiovascular disease increases. The WHO recommended noise levels are considerably below the levels identified as "moderate" or "sever" in the draft EIS, either by its FTA method or simply using the noise contours.

There is an extensive literature on the various extra-auditory (non-hearing loss) effects of noise on individuals and communities, including sleep disruption, communication and activity interference, and the psychological, physiological, and performance effects. A brief summary is presented below:

As a biological stressor, noise can influence the entire physiological system. Noise acts in the same way that other stressors do, causing the body to respond in ways that may be harmful with chronic exposure and lead to disorders known as the stress diseases. When facing danger in primitive times, the body would go through a series of biological changes preparing either to fight or to run away, (the classic "fight

or flight" response). These changes tend to persist with exposure to loud noise even though a person may feel "adjusted" to the noise.

At first these effects appear to be transitory, but with continued exposure adverse effects have been shown to be chronic. This has been demonstrated both in laboratory research animals and in field studies of noise exposed communities (Babisch, 2006; Ising and Braun, 2000; Passchier-Vermeer and Passchier, 2000; Peterson; Peterson et al., 1983). The evidence is probably strongest for the cardiovascular effects such as increased blood pressure, changes in blood chemistry, and an increased incidence of ischemic heart disease (Babisch, 2008; van Kempen et al., 2002). A significant set of laboratory studies on animals showed chronic elevated blood pressure levels resulting from exposure to noise of moderate levels which did not return to baseline after cessation of the exposure (Peterson et al., 1981). Studies of blood chemistry have shown increased levels of the catecholamines epinephrine and norepinephrine due to noise exposure (Rehm, 1983), and a series of experiments found a connection between noise exposure and magnesium metabolism in humans and animals (Ising and Kruppa, 1993), all of which increase the risk of cardiovascular disease.

The adverse effects of noise also apply to children's learning abilities. Several studies have also shown cognitive impairments in children due to transportation noise, including railroad noise (e.g. Bronzaft and McCarthy, 1975; Lercher et al., 2003). A study of noise and school test scores in the U.K. found that the maximum, rather than the average noise level had the most significant effect, which would mean that the current analysis would not predict the extent of the effect of recurring locomotive horn noise on children's learning (Shield and Dockrell, 2002).

5. Not Included in the Analysis

The draft NEPA analysis includes no discussion of potential mitigation, as the SEPA draft did, so it is safe to assume that there would be none.

The draft EIS makes no mention of the adverse physiological and psychological effects of noise on the exposed community, even for those residents

considered severely or moderately impacted. It is impossible to accurately assess the community impact without the prediction of these effects.

There is no mention of the effects of noise from the construction project on the workers themselves, who will be exposed to various sources, such as compressors, pneumatic tools, and train sources. Will Millennium have a hearing conservation program? Will that program meet the requirements of Washington's state plan for OSHA? Will the railroad workers be provided with sufficient protection from the extensive durations of high-level noise emitted by the horn?

Summary

On several counts this draft Environmental Impact Statement is inadequate to predict the impact of noise on the citizens of Longview should the Millennium Bulk Terminals project be approved. The FTA/FRA method of analysis is much too permissive and is not consistent with the true impact on the health and welfare of the citizens of Longview. This analysis clearly shows that the concerns of the FTA and the FRA are to foster the health of the transportation industry rather than the health of the public. The practice of using noise averages without supplementing them with some kind of single event descriptor confuses the public and underestimates the impact. Stating the impact only in terms of percentage of the community predicted to be "highly annoyed" leaves out all of those who experience aversion to the noise but do not express themselves by vigorous community reaction or lawsuits. By failing to apply the noise contours to the analysis, particularly the contour of the EPA's identified DNL of 55 dB, the draft EIS leaves out a large swath of the city and its residents who are expected to be impacted. The analysis makes no mention of the most important noise impacts, which are those causing psychological and physiological effects. Finally, questions around noise mitigation are unresolved. In the end, it is the City of Longview and its citizens that would bear the health and financial burdens, and most likely the complaints and lawsuits resulting from this extremely noisy proposal.

A revised version of the EIS, if prepared properly, would show these adverse effects to be considerably more serious.

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APPENDIX V

An Assessment of the Health and Safety Implications of Coal Transport through Oakland

Available at:

http://www.humanimpact.org/wp-content/uploads/Assessment_Health_Safety_Coal_Oakland.pdf