Comments on the Noise Impact of the Proposed Millennium Bulk Terminals
Longview, Washington
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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. However, 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 nighttime 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 model in this EIS is 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 by 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. <u>The Human Element</u>

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. <u>Noise Contours</u>

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 con-

tours 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. <u>Health and Psychological Impact</u>

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 an-

noyed, their sleep will be disturbed, and the risk of cardiovascular disease increases. The WHO recommended noise levels are considerably below (quieter than) the levels identified as “moderate” or “severe” 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 et al., 1981; 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 shown cognitive impairments in children due to transportation noise, in-

cluding 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 the percentage of the community predicted to be "highly annoyed" leaves out all of those who experience aversion to the noise but do not express them-

selves 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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