

Comments on the Noise Impact of the Proposed Tesoro-Savage Oil Terminal  
In Vancouver, 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 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.

I have read the sections concerning the noise impact of the Tesoro Savage Vancouver Energy Distribution Terminal Facility's draft environmental impact statement (DEIS). It is my opinion that during construction and decommissioning of the proposed facility, the noise impact on the nearby community, and especially on the Tidewater office building and the Clark County Jail Work Center (JWC) would be extremely serious. On page 3.9-24 the DEIS states that the noise impacts on the Tidewater office building would be moderate to major, and that the noise impacts at the JWC would be considered moderate. On the contrary, I believe the impact on both facilities would be so severe that they would need to be either closed or moved during these processes. I will explain the reasons for my opinion in the paragraphs to follow.

### Criteria

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). It 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 still commonly used to assess the impact of various noise sources, particularly aircraft noise, it has been widely criticized for several decades because it does not give adequate importance to single or discrete events. 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. Studies have shown that DNL accounts for only a limited amount of the variance between noise sources and the impact on exposed communities. Even the Federal Aviation Administration, 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 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).

One of the long-standing arguments against the sole use of DNL criteria, such as the 60-dB criterion used in the DEIS, is that DNL is based on community surveys showing only the percentage of people describing themselves as "highly annoyed" by noise, as if people who are somewhat annoyed are not to be counted. Perhaps it is because the "highly annoyed" residents are the ones most likely to complain and initiate lawsuits, even though the others are still adversely affected. Another argument is that averaging noise levels fails to take into account the effect of individual events, such as blasting, pile driving impacts, locomotive horns, and train pass-bys. For example, the table on page 3-9-15 gives noise levels from pile driving and jet grouting in DNL (averages) rather than discrete levels. The effects of these events should be assessed by one of the metrics recommended in the paragraph above to better understand the full impact.

The statement on page 3.9-12 that "there would be no noise impacts at the Fruit Valley residential area from construction activities" because the estimated noise levels from construction would be less than the ambient level, is misleading. The DEIS speaks

in averages rather than levels. When the highest combined equipment level at 50 feet is nearly 90 dBA (page 3.9.12), one can be sure that discrete noise events, like blasts and impacts, will be perceived well above the ambient. On page 3-9-18, noise from trains are stated in terms of hourly averages rather than event levels, or even averages for the duration of the pass-by. Although it is convenient to express criteria in terms of averages, people do not experience noise as averages, they experience noise as events.

Most importantly, the 60-dBA DNL used in this draft EIS is too high to address the impact adequately. Although the DEIS states that it is in conformity with the EPA's criteria, the EPA's recommendation has always been a DNL of 55 dBA (EPA, 1974). Likewise, although the DEIS states that it is in conformity with the rules of the State of Washington, the 60-dBA DNL is not in conformity. First, the noise limitations in the State of Washington's Table A-5 are listed in terms of levels not averages. It is a mistake to compare the averages in the DEIS to the noise levels in the Washington Standard. In actuality, the Washington standard is considerably more conservative because it does not use averages. The maximum permissible levels for Class A (residential) are 55 dBA in the daytime and 45 dBA at night. These are not averages. It would be impossible for these construction activities to be in conformity with the Washington standard for the JWC facility, which the DEIS has classified as a Class A, residential. It is equally unlikely that the construction activity would meet either Class B (commercial) or Class C (industrial) standards, considering that the standard is stated in terms of noise levels, not averages.

#### Impact on the JWC Facility

One of the most serious impacts of the proposed construction project is on the Clark County Jail Work Center (JWC). According to the JWC's website, the In-Custody building houses 124 beds and the Work Release program has 100 beds. According to sources in the Clark County Sheriff's Office, there are 200 more beds planned for a future expansion. There are currently 53 staff members working at the facility, where they prepare upwards of 3100 meals per day and provide laundry services for other facilities as well as this one. The JWC facility is located only 400 feet from the proposed

site. It is also very close to several sets of railroad tracks and would therefore be impacted by train noise as well as construction. The DEIS points out that this property resides on land that has been zoned industrial, and implies that it would be permissible to raise the noise levels even though the DEIS considers it to be Class A (residential) because people sleep there. I believe it would be very unwise, as well as inhumane, to use this zoning error as an excuse to raise noise levels for a sensitive population.

Table 3.9-6 shows that the project related noise level at the JWC would rise from the existing ambient DNL of 62 dBA to an average level of 70 dBA, a noise level increase of 9 dBA, which they classify in this case as “severe.” It is indeed severe. This increase is nearly a doubling of the loudness level and a tripling of noise energy. Once again, these are not actual noise levels, but averages, in which discrete events would be considerably louder and more disruptive.

There are many reasons why the proposed noise scenario would have an extremely negative impact on the JWC population. It is well known that noise can disturb sleep, 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. 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 DEIS estimates nighttime average sound levels at the JWC facility as 42-57 dBA, considerably above the WHO recommendations.

A report that I prepared for the U.S. Army several years ago, explored the effects of noise on performance (Suter, 1992). There is an extensive literature on all of the extra-auditory (non-hearing loss) effects of noise, but one of the more relevant ones for this project is the effects on social behavior. It has been shown that noise decreases helpful behavior and increases anti-social behavior, particularly when there is no perceived control over the source of the noise. These studies have been replicated and expanded in more recent years. High levels of noise also increase stress and produce decrements in job performance, which would impact staff as well as inmates. Such high

levels of noise as predicted by the DEIS would lead to severe consequences, so that normal functioning of the JWC would be impossible. The facility would either have to close or relocate during the construction of the Tesoro Savage facility, involving serious economic as well as social consequences.

#### Impact on the Tidewater Office Building

In a similar manner, construction noise from the proposed facility would have a severe impact on the Tidewater office building, which is only 100 feet from the construction project, such that office work in this building would be impossible. The existing average ambient noise level would rise from a DNL of 60 dBA to a projected DNL of 82 dBA, a 22-dBA increase. This increase reflects a quadrupling of noise loudness and more than a 100-fold increase in sound energy. Working in the Tidewater office building would be like working directly under the flight path of a major airport, and yet airports do not even show their noise contours above 75 dBA anymore - nobody lives or works there.

As stated previously, because the numbers cited in the DEIS are averages and not levels, they do not account for the intrusive effect of discrete noise events, such as blasting, the use of pneumatic tools, and pile driving. The effects of these intermittencies are even more disruptive than the continuous din.

The EPA has identified an indoor background noise level of 45 dBA to allow 100% intelligibility of relaxed conversation (EPA, 1974). Levels ranging from 56 to 66 dBA would be considered "just acceptable" for speech and telephone communication in working areas like shops, garages, and power-plant control rooms (see Suter, 1992). Even assuming a 10-15 dBA attenuation from closed windows, the resulting noise levels would make communication extremely difficult, to say nothing of the stress and adverse impact on task performance. Yet the DEIS escapes this issue by stating that the noise impact criteria do not apply to the Tidewater office building because it is zoned commercial and the Category 1 criteria only apply to land uses where quiet is an essential element, and Category 2 criteria only apply to residences and buildings where people normally sleep.

### Train Sources

In addition to the adverse impact of train activity on the JWC, which is only 100 feet away from several sets of train tracks, the train horn can be expected to have an impact on the residential community. There are residential areas close to the intersection of West 20th St. and Thompson Avenue, where the engineers will be obliged to sound their horns. The closest house is 100 feet away, but others are certainly going to be increasingly impacted. The DEIS predicts an hourly average level of 81 dBA at 100 feet. Once again, because this is an hourly average, the single events will be much louder. In fact, Federal regulations require that the horns sound at levels of 96 to 110 dBA measured at 100 feet for 15 to 20 seconds. If, for example, the horn sounds at 110 dBA measured at a distance of 100 feet, the level would still be more than 96 dBA at the Fruit Valley residential area 3000 feet from the site. This is a very high level for a small community to experience, and the impact will be considerably greater if the community is anxious, fearful, or otherwise averse to the development of this project.

### Not Included in the Analysis

The DEIS makes no mention of the adverse physiological and psychological effects of construction and train noise on exposed communities. These studies are too numerous to mention here, but could be made available upon request.

Neither is there any mention of the effects of this construction project on the workers themselves, who will be exposed to various sources, such as pumps, compressors, blowers, boilers, pneumatic tools, and train sources. The DEIS states that these noise sources will be kept inside as much as possible so as to shield the community, but the process of doing that will increase the exposure of the workers to noise sources that are already beyond the point of hearing damage. Will Tesoro Savage have a hearing conservation program? Will that program meet the requirements of Washington's state plan for OSHA?

Other questions arise as well. Will any of the mitigation measure be actually applied or are they just wishful thinking? The noise from arriving and departing trains appear to be exempt from compliance with state and local noise limits. The DEIS

presumes that they are expected to be less than the worse-case noise levels considered in the model. However, they could contribute to the overall level, particularly the horn. If the DEIS would consider discrete events separately, as it should, they would have a significant impact. Moreover, since the State requirements are given as levels rather than averages, the DEIS should be obligated to give estimates of discrete noise levels to assess compliance with the State requirements.

### Summary

On several counts this Draft Environmental Impact Statement is inadequate to predict the impact of construction and decommissioning noise on the residents of Vancouver. The 60-dBA DNL criterion it uses is much too permissive and, despite the statement's claim, is not consistent with either the EPA's recommendations or the State of Washington's environmental noise standard. Because the DEIS uses only noise averages instead of any measures of discrete noise events, it grossly underestimates the effects.

Even without considering discrete events, the DEIS shows that the average noise levels to which the inmates and workers would be exposed would necessitate moving or closing the Clark County Jail Work Center. The same would be true of the Tidewater office building, where meaningful office work would be impossible. These disruptions would cause adverse economic as well as social consequences. In addition, the mandatory use of the engine's horn will cause repeated disruptions to nearby residents several times during the day. A revised version of the EIS, if prepared properly, would only show these effects to be even more serious.

### References

EPA (1974). Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety. U.S. Environmental Protection Agency, Washington, DC.

FAA (2006). Order 1050.1E, Chg 1. Section 14.5, Supplemental Noise Analysis. U.S. Department of Transportation, Federal Aviation Administration, National Policy. Washington, DC.

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Suter, A. (1992). *Communication and Job Performance in Noise*. *ASHA Monographs No. 28*. American Speech-Language-Hearing Association, Rockville, MD.

WHO (2009). *Night Noise Guidelines for Europe*. World Health Organization, Copenhagen, DK.