BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of: Application No. 2013-01 TESORO SAVAGE, LLC VANCOUVER ENERGY DISTRIBUTION TERMINAL	CASE NO. 15-001 SWORN PRE-FILED TESTIMONY OF ERIC HANSEN

I, Eric Hansen, state as follows:

1. I swear under the penalty of perjury of the laws of Washington and the United States that the following testimony is true and correct.

2. I am over eighteen years of age and am otherwise competent to testify in this case. My testimony is based upon my education, training, experience, professional qualifications, and understanding of the matters herein.
Based on my professional experiences and training, I have developed an expertise in air quality impacts, regulation and permitting.

3. I am a Principal with Ramboll Environ, operating from an office in Lynnwood, Washington. I represent a number of people from the Lynnwood office who contributed to the air quality analyses and permit application for the Vancouver Energy Terminal ("Terminal")

4. I have been an air quality consultant since 1978 and have developed an expertise in the air permitting of new and modified industrial facilities over a period of more than 35 years. Early in my career, my focus was air quality modeling, supporting both permit applications and SEPA and NEPA analyses. In the 1990's, I became more focused on industrial air permitting projects, which included projects under Energy Facility Siting Evaluation Council (EFSEC) jurisdiction. My EFSEC experience includes

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a coal fired power plant proposed in the late 1970s, an oil pipeline, and four somewhat more recent combined cycle power plant projects.

4. My company, Ramboll Environ (Environ) has prepared all air quality studies, data and other materials required for preparation of the Application for Site Certification (ASC) and Notice of Construction (NOC) as well as the air permitting application for the Terminal [currently under review by EFSEC] as required by EFSEC regulation.

I. Air Permit and Site Certification for Stationary Source.

1. *Determining and Controlling Air Emissions Associated with Terminal Operations.*

EFSEC has established a comprehensive regulatory program that addresses the air quality issues related to the siting and permitting of industrial energy projects. Air Emission sources associated with the Terminal itself (i.e., the stationary source) are well documented in Chapter 5 of the ASC because emissions are the bases for both the air permit application and our assessment of the impact of Terminal emissions on ambient air.

Once we characterize the physical and operational characteristics of the Project's emission units, we identify what we believe to be Best Available Control Technology (BACT)[1] for each such unit. Unlike some states, Washington requires application of BACT for both minor sources and major (i.e., industrial) sources of regulated air pollutant emissions, so the Terminal (as a minor source) must apply the same degree of emission control as it would as a major source. Environ examined each stationary emission unit at the Terminal site to determine an emission limitation based on the maximum degree of reduction of each pollutant which, on a case-by-case basis, taking into account feasibility,

[1]BACT is fully discussed in Attachment 1 to Chapter 4.1 of the EFSEC ASC

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energy, environmental and economic impacts and other relevant factors, we believe is achievable for the Terminal. This process is often referred to as the EPA's "Top-Down" process for determining BACT. Ultimately, EFSEC determines what constitutes BACT but our application presents what we believe to be BACT. This process resulted in several changes to the initial design of the Terminal,

For example, the initial proposal was to combust vapors displaced when loading a vessel in a ground level enclosed flare. During our review of control options, Vancouver Energy elected to install the Marine Vapor Combustion Units instead because they had better vapor destruction efficiencies and lower overall emissions than the flare technology. This change significantly reduced project emissions.

2. *Emissions Calculations and Dispersion Modeling.*

Once the appropriate emission controls were identified for Terminal emission units, we considered crude oil throughput, combustion unit firing rates, and other physical constraints to determine the maximum hourly, daily, and annual emissions from each emission unit. In this process, we overestimate emissions because we assume maximum operation of the Terminal, which does not always occur. Furthermore, the emission rates we identified for the Terminal are likely to dictate permit conditions so we took considerable care not to underestimate emissions.

Note that we look at each pollutant individually when we assess compliance with air quality standards. As further discussed below, Washington regulates criteria pollutants by comparing predicted concentrations to National Ambient Air Quality Standards (NAAQS) and toxic air pollutants (TAPs) by comparing a specific compound's emission rate with a small quantity emission rate or the compound's predicted ambient

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concentration with an Acceptable Source Impact Level. This makes sense because each compound has different health consequences. Although it may be tempting to talk about the quantity of criteria or toxic air pollutants in total, this approach does not provide an appropriate means of assessing effects. Nonetheless, I note that approximately 95 percent of the cumulative toxic air pollutants emissions are comprised of NOx, CO, and SO2 – criteria pollutants that are already accounted for in our assessment of NAAQS compliance. In a sense, Washington's permit process evaluates the majority of the toxic air pollutants twice.

Based upon the Terminal layout and an emissions inventory, Environ applied an EPA-approved air dispersion model to estimate the off-site concentrations of regulated air pollutants emitted by the Facility and compared predicted concentrations to ambient air quality standards and toxic air pollutant impact criteria. As a rule, how we apply these models is governed by EPA's Guideline on Air Quality Models and our work is checked by Ecology's air quality modeling experts. We applied EPA's AERMOD dispersion model using five years of local meteorological data to calculate pollutant concentrations at each of more than 8,000 receptors for every hour of a five year period. We then compared predicted concentrations with state and national air quality standards.

It is important to understand that this modeling process is not determinative of what *standards* are protective of human health and welfare. Rather, modeling is used to determine if the applicable standards will be achieved. Such standards are established by the U.S. Environmental Protection Agency and the Department of Ecology, and these

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agencies determine pollutant concentration levels that are acceptably protective. The Clean Air Act requires the EPA to set NAAQS for certain criteria pollutants. The NAAQS are health based and the EPA sets two types of standards: primary and secondary. The primary standards are designed to protect the health of what are deemed *sensitive* populations such as asthmatics, children, and the elderly. The secondary standards are concerned with protecting the environment and are intended to address visibility, damage to crops, vegetation, buildings, and animals.

Results provided in the Terminal permit application indicate model-predicted concentrations of all pollutants evaluated comply with primary and secondary standards at all off-site locations.

3. *PSD Permit Application for Air Pollutant Emissions Not Required.*

The air quality approval process for the Terminal would follow federal "Prevention of Significant Deterioration" (PSD) regulations if the Terminal Facility were classified as a *major source*. The Federal Clean Air Act deems "[p]etroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels" to be a major source if annual emissions of certain regulated pollutants exceed 100 tons per year (tpy), not including greenhouse gas emissions (GHGs). Initially, we determined that Terminal emissions would exceed the PSD thresholds. However, after the Applicant's commitment to additional emission controls, which significantly reduced Terminal-related emissions, we concluded that Terminal emissions will be below the PSD threshold of 100 tpy for each regulated pollutant. As a result, the Terminal will be permitted under Washington's

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minor source permit process. Environ is confident that this process is lawfully and technically appropriate for permitting the Terminal.

EFSEC is currently reviewing the air permit application portion of the ASC. EFSEC has requested additional information and data to supplement various issues related to air emissions and controls at the Terminal. The Applicant has provided comprehensive and detailed responses to all such requests. Environ expects the air permit to be issued because the application package satisfies all regulatory criteria in WAC 173-400 and 460 and corresponding EFSEC regulations.

II. Preliminary Draft EIS.

1. *Preparation of PDEIS and DEIS.*

Environ also prepared the air quality sections of the Terminal Preliminary Draft Environmental Impact Statement (PDEIS). Ultimately, EFSEC retained an independent consultant, Cardno Entrix (CE), to prepare the draft EIS. In the process of preparing the draft EIS, however, CE critically reviewed Environ's technical work. CE used Environ's work as a significant foundation for the EIS. In addition, CE performed additional calculations in support of the relevant air studies. CE's judgements and stated conclusions in the draft EIS (DEIS) with respect to the degree of Terminal air quality impacts are entirely attributable to CE.

2. *Consideration of Mobile Source Emissions.*

Environ's air analysis work in support of Facility SEPA review went beyond consideration of the stationary source emission units required to be addressed by

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the Terminal air quality permit process. Although not required as part of the air permitting process, this additional review took into account "*mobile*" emission sources such as marine vessels, tugs supporting those vessels, and trains. Vessel and train emissions were calculated and added to the Terminal "stationary" source emissions that were evaluated for the permit application. Environ again employed the AERMOD model to predict total concentrations of relevant criteria pollutants in ambient air. These criteria pollutants, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter (in this case, $PM_{2.5}$ as a portion of PM_{10}), were modeled at the same 8,000 receptors for the same five year period used in modeling stationary source emissions. The results of this additional modeling analysis indicate that cumulative concentrations (model-predicted concentrations plus estimated existing "background" concentrations) of all criteria pollutants will comply with state and national ambient air quality standards established to protect human health and welfare.

Washington's toxic air pollutant (TAP) small quantity emission rates (SQERs) and acceptable source impact levels (ASILs), which are set forth in WAC 173-460-150, are applied in the context of air permit review of stationary sources, and are not intended to apply to mobile sources. However, CE concluded that diesel particulate matter (DPM) emissions from the combustion of diesel fuel in mobile sources (i.e., trains, vessels, construction equipment) should be assessed as an indicator of Terminal impact. As such, the DEIS applied the stationary source ASIL for DPM to both Facility and mobile source emissions to provide an indicator of impact. Terminal stationary source emissions of DPM

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(to which the ASIL applies) are basically limited to the occasional emergency engine testing and result in offsite concentrations that comply with the ASIL. However, with the addition of DPM emissions from ships and locomotives (to which ASILs are not intended to apply), predicted DPM concentrations exceed the ASIL for this pollutant.

As noted in the discussion in the Preliminary Draft EIS Environ prepared (and not necessarily in the DEIS), the basis of the Washington DPM ASIL (i.e., the unit risk factor adopted by the California EPA Office of Environmental Health Hazard Assessment) may not be based on sound science and has not been accepted by EPA.[2] In addition, as noted in Applicant comments on the DEIS the review of potential adverse impacts from DPM presented in the DEIS did not factor in actual exposure periods – but rather assumes continuous exposure of all human receptors for 70 years.[3]

Significant scientific and analytic problems arise when addressing the complexities of mobile source DPM in relation to the DPM ASIL, which are not encountered in the standard ASIL evaluation performed for permitted DPM emission sources. Exhaust particulate matter from diesel fueled engines is comprised of solid particles emitted directly as part of the exhaust and also particles that form when hot gases condense in and mix with ambient air. The direct particle emissions are considered "filterable" because they can be collected, for example, on filters during stack testing. The "condensable" portion of the exhaust is material that is vapor phase at the same stack conditions, but which condenses and/or reacts upon cooling and dilution in the ambient air to form solid

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[2] PDEIS (EX 0001-PCE), Section 4.2, pp 7-8.

[3] Applicant DEIS Comments, pp.3-30, 3-33, attached hereto as Attachment B, and incorporated herein by reference.

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or liquid particulate matter soon after discharge from the stack. For purposes of making determinations about *permitted* diesel exhaust emission sources, Ecology applies the ASIL for DPM based on only the filterable fraction of the emissions. Ecology permitting staff does not apply the ASIL to mobile sources.

Considering just the filterable fraction of diesel exhaust is feasible for a stationary emission source (e.g., using generator stack test data). However, most studies that involve transportation-related emission sources are based on measurements of diesel exhaust *mixed with air*. Therefore, the measured DPM emissions include the condensable fraction and overstate the emissions that are appropriate for use in Ecology's screening procedure. This results in higher predicted concentrations in ambient air than the outcome if only the filterable component of DPM were considered.

Our experience using air quality dispersion modeling has revealed that analyzing mobile source DPM emissions results in estimates of DPM concentrations far in excess of the stationary source ASIL for most locations near high density transportation sources like freeways, major roads, railroads, and marine vessel travel pathways. Thus, applying the stationary source ASIL review procedure to transportation sources confuses the utility of using the DPM ASIL as a screening threshold for permitting stationary sources. Application of the ASIL in the DEIS to assess DPM from Terminal related mobile sources, is an inappropriate use of this screening tool and not likely to provide a meaningful analysis for any purpose.

It is important to note that although the Project Applicant has no control over emissions from train and vessel engines, existing regulatory programs that include increasingly stringent requirements in future years will bring about continuing reductions in emissions from such sources through the life of the Facility. For example, EPA's

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emission control program for new or rebuilt locomotive engines will reduce future NOx and PM emissions through the Tier 3 and Tier 4 requirements that are now in effect; and, these programs could have more effect on reducing locomotive emissions than were assumed in the Project air quality analysis. Similarly, the increasingly stringent requirements for vessel engine NOx control using Tier 3 engines beginning this year (2016) were not considered in the air quality impact assessment.

3. *Atmospheric Formation of Formaldehyde from Crude Oil Vapor*

It has been suggested that the air quality analysis for the Terminal should have addressed the formation of formaldehyde resulting from an atmospheric conversion of volatile organic compounds (VOCs). Environ did not address formaldehyde because it does not consider atmospheric formaldehyde formation a significant issue. My explanation here is based on work by Finlayson-Pitts and Pitts, 1999. [4] The atmosphere naturally destroys VOCs through a process of oxidation resulting in the formation of decomposition products. However, the oxygen in the atmosphere (O_2) does not by itself destroy VOC. Sunlight creates trace amounts of hydroxyl radical (OH) that are mainly responsible for destroying VOC emissions in the atmosphere.

VOC emissions from crude oil evaporation are comprised mainly of light alkanes such as propane, butanes and pentanes. We acknowledge that when light alkanes are destroyed in the atmosphere by reacting with OH, formaldehyde is one of the decomposition products that can be formed. However, destruction of light alkanes by OH occurs over time, and the amount of time can be characterized by half-life (the time required for half of the emitted material to be destroyed). Half-lives for destruction of

[4] Finlayson-Pitts, Barbara J., and James N. Pitts Jr. Chemistry of the upper and lower atmosphere: theory, experiments, and applications, Academic press, 1999.

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light-alkanes are several days. Therefore, the reactions that create formaldehyde are slow enough that any formaldehyde formed from destruction of crude oil vapors will be dispersed by prevailing winds over a wide area and formaldehyde concentrations will be low.

Our analyses did address direct emissions of formaldehyde from combustion sources, and we recently adjusted calculated formaldehyde emissions from the Facility as a result of a question from EFSEC regarding the AP-42 emission factor for formaldehyde. We recognized that initial application of the AP-42 formaldehyde emission factor was incorrect. When this modeling factor was corrected, Facility-wide formaldehyde emissions exceeded the SQER for this TAP in WAC 173-460-150. As a result, we modeled the Facility-wide formaldehyde emissions, including the predicted increase in ambient concentrations of formaldehyde emissions using the correct emissions factor, and determined that the predicted annual average formaldehyde concentration was less than the applicable ASIL. This updated information was provided to EFSEC in correspondence dated May 6, 2016[5].

4. *Capture and Control of Vapor Displaced when Loading Vessels*

It has also been suggested that the DEIS overestimates the quantity of displaced vapors that will be captured/treated by the Terminal's proposed Marine Vapor Combustion Units (MVCUs), suggesting without justification, that up to five percent of displaced vapors would escape to the atmosphere. It has also been asserted that the assumed MVCU vapor destruction efficiency factor (99.8%) is not reasonably achievable.

[5] May 6, 2016 letter from Kelly Flint, Vancouver Energy, to Steven Posner, EFSEC manager, attached hereto as Attachment C.

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Environ assumed 100 percent of the ship vapor was combusted in the MVCUs when estimating MVCU emissions because this maximizes MVCU emissions (if only 95% is captured, less is combusted in the MVCUs and therefore the MVCU emissions are 5% lower). As a conservative assumption, however, we also assumed there was some leakage in the ducting when we calculated component emissions (i.e., leaks from pipe connections, flanges, valves, etc.); consequently, we overstate Facility-wide VOC emissions.

Moreover, the vendor for the MVCUs guarantees 99.9 percent control efficiency and we obtained test data confirming that guarantee; Vancouver Energy provided these data with a letter to EFSEC dated May 6, 2016.[6] Environ based its calculations on 99.8 percent control efficiency, which effectively doubles the VOC emissions compared with emissions under the guarantee. In general, Environ's calculations tend to overstate emissions because the Applicant may be bound by a legally enforceable combustion efficiency condition in the Facility air permit.

5. *Storage Tank Emissions.*

The DEIS has been criticized for failing to adequately address emissions from storage tanks. Environ disagrees. Emissions from the tanks (both in terms of "working losses" and fugitive emissions) were reduced during the design process. Terminal storage tank design requires several elements, including a fixed roof as well as an internal floating-roof (which floats at all times on the surface of tank contents) with primary and secondary seals. Fugitive emissions from the storage tanks were calculated in accordance

[6] May 6, 2016 letter from Kelly Flint, Vancouver Energy, to Steven Posner, EFSEC manager, attached hereto as Exhibit C.

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with EPA's AP-42 Chapter 7.1 and TANKS 4.0.9d program (TANKS). These fugitive emissions were included in the Facility emissions inventory and dispersion modeling.

6. *Crude Oil Characteristics and Impacts on Operation Emissions.*

The Environ air analysis adequately addressed the physical and chemical properties of the crude oil likely to be handled at the Facility. In fact, in determining Facility-related emissions, we considered ten crude oils of varying composition that reflect the range of crude oils that will potentially be received at the Facility. For example, we considered all physical and chemical properties of the range of crude oils when estimating emissions associated with the combustion of vapors displaced from the ship tanks as well as fugitive emissions from the storage tanks and components. We assumed a weighted annual mix of crudes: 80% of the worst-case Bakken crude and 20% of the worst-case non-Bakken crude. Worst-case was determined for each TAP. Physical properties of the crude oil as a mixture, and of the individual components of the oil that are considered TAPs, were used with AP-42 Section 7.1 and the TANKS program to calculate fugitive emissions from the tanks.

7. *Crude Oil Throughput.*

Following submittal of the revised NOC Application to EFSEC in August 2014, the Applicant developed a preliminary design for the crude oil storage tanks,[7] and recalculated the number of tank turnovers using the updated tank design information. Based on the updated information, each tank will have a working volume of 341,847 barrels (bbl), and the Facility annual throughput will be 131,400,000 bbl/year. This is equivalent to approximately 64.06 tank turnovers a year.

[7] Letter to Stephen Posner, EFSEC, from Irina Makarow, BergerABAM, Response to EFSEC Draft EIS Data Request 6 – Seismic Ground Improvement Design, April 20, 2015, EX 0021-JCE.

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As a result of these changes, VOC and TAP emissions from the tanks decreased. The primary reason for the decreased emission rates is the use of fewer roof support columns, which reduces the wetted surface area from which compounds can evaporate. Prior to the changes described above, benzene was the only TAP associated with the tanks that exceeded its SQER and required modeling. Following the changes, benzene emissions still exceeded the SQER. Benzene emissions were remodeled using the updated emission rate and predicted concentrations comply with the benzene ASIL. All other TAPs associated with the tanks remained less than their respective SQER, and no modeling was necessary. So, although emission rates and predicted concentrations have changed as a result of the recalculated tank emissions, none of the conclusions associated with the Applicant's demonstration of compliance with pollutant ambient standards or impact levels has changed.

8. *DEIS Defined Impact Criteria.*

The air quality dispersion modeling we conducted for both the permitting review and the PDEIS impact assessment considered a 10 km x 10 km modeling "domain" centered on the Terminal site. This modeling was based on EPA guidance and estimated pollutant concentrations at all locations within the modeling domain, including the Fruit Valley area and the JWC. Environ calculated pollutant concentrations at more than 8,000 locations in this modeling domain to ensure complete coverage of the area. The analysis compared Terminal-related air pollutant concentrations to ambient air quality standards intended to protect human health and welfare with a margin of safety regardless of land use, including residential areas. These ambient standards applied in this analysis are much more stringent than occupational permissible exposure levels that typically apply to industrial facilities. The DEIS analysis indicated ambient concentrations attributable to air emissions from the Terminal and associated mobile sources, plus existing measured

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concentrations, would not be injurious to human health or welfare based on EPA air quality standards.[8]

9. *Unexpected Events*

Based on analysis by other experts, the likelihood of a catastrophic event is very small. Our air quality analyses for air quality permits rarely evaluate such process upsets or unanticipated events because such analysis requires specific information about spill volume, crude characteristics, duration, location and meteorological conditions. Without such information assessing air quality impacts is at best speculative.

The DEIS suggested that evaporation of volatile components of spilled crude oil would contribute to ozone formation. Ozone formation is a complicated process that depends on meteorological conditions and atmospheric chemistry. For a crude oil spill to result in ozone formation, the spill would have to result in the proper ratio of atmospheric NOx and VOC concentrations and would require sunlight. Even if those conditions were present, the incremental ozone formation attributable to crude oil VOCs would likely occur at a considerable distance from the spill and would be short-term and difficult to discern.

With regard to fire or explosion, it is speculative to suggest that a large crude oil fire or explosion would be responsible for a violation of one or more particulate matter (PM) NAAQS. Any such conclusion must account for burn rates, plume rise, and meteorological conditions over a 24-hour period. PM emissions from a fire will vary with time and such emissions are unlikely to last for 24 hours. Finally 24-hour PM10 and PM2.5 NAAQS are based on statistical measures and measured or predicted values are

[8] Table 3.2-8, Draft EIS, November 2015, EX 0051-JCE.

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averaged over a three-year period to determine compliance; it is very unlikely that a single event would cause a NAAQS violation.

Concerns about acid rain resulting from a crude oil fire or explosion have also been overstated. It is not technically sound to conclude that a single incident of oil combustion will produce acid rain resulting in even minor air quality impacts.

III. Impacts at Offsite Distant Locations.

1. *Increased Rail Traffic in Other Regions.*

The air quality analysis performed in support of the DEIS considered potential impacts at locations in the vicinity of the Terminal site, where the most intensive and persistent project-related train activities would be expected to occur. The analysis considered train activities on and near the Terminal site, including both low-speed train movement and locomotive idling during unloading. As discussed in Applicant comments on the DEIS [9] to provide conservative results, this analysis intentionally ignored the fact that locomotives will be equipped with systems to shut them off after periods of about 10 minutes of idling Train activities at all other locations, e.g., Tri-Cities, the Columbia River Gorge, Spokane, and even Montana, would either be much less intense or would have been subject to separate Facility-siting environmental reviews (e.g., for rail yards).

Emissions from a passing train traveling through an area along the rail route would be short-term and the emissions more widely dispersed compared with those on and near the Terminal site that reflect train movements and locomotive idling over the course of frequent unloading activities. Consequently, the air quality analysis presented in the DEIS

[9] Applicant DEIS Comments, pp. 3-32-3-33, attached hereto as Attachment B, and incorporated herein by reference.

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addressed the area with the greatest potential for impacts – and no significant air quality impacts were found. Mobile source impacts at significant distances from the Terminal would be less than those evaluated and documented in the DEIS.

It has also been suggested there could be 450 tons of evaporative losses from railcars as they transit long distances. We investigated this claim, and found related documents, but they were based on component leaks at terminals. Informal blogs suggested the possibility of one percent losses, but these were not substantiated. The assertion of 450 tons of evaporative losses assumes all three percent of the volatiles are lost, which is an unreasonable assumption.

It has been suggested that Missoula, Montana is an area where passing trains might trigger violations of the $PM_{2.5}$ NAAQSs. This assertion appears to be based on a letter from the Missoula Air Quality Advisory Council commenting on the DEIS for the proposed Tongue River Railroad expansion for coal transport.[10] This letter indicated that there are potential issues with continuing to comply with the PM_{10} and $PM_{2.5}$ NAAQSs in Missoula, and implied coal trains could endanger compliance. This comment letter on the Tongue River Railroad DEIS, however, failed to mention that the three-year period during which the $PM_{2.5}$ design value just complied with the NAAQS was 2005-2007, and that data from 2008-2010 indicate the design value was more than 10 $\mu g/m^3$ less than the NAAQS. [11] In addition, the Missoula Advisory Council letter did not acknowledge that the $PM_{2.5}$ issue in Missoula is due primarily to wood smoke, and that diesel locomotive emissions are not even mentioned in the latest evaluations of air pollution trends in

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[10] Letter from Jan Hoem, Chair, Missoula City County Air Quality Advisory Council to Surface Transportation Board, July 2, 2015. ,

[11] *Missoula County Year 2013 Air Pollution Trends Report*, May 12, 2014, http://www.missoulacounty.us/government/health-department/home-environment/air-quality/outdoor-air-quality/history-trends-and-studies

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Missoula.[11] The comments regarding potential air quality problems in Missoula resulting from project-related trains are, at best, misleading.

2. *Traffic Emissions at Railroad Crossings.*

. The PDEIS prepared by Environ evaluated vehicles idling at rail crossings by examining the railroad crossing with the highest traffic volumes (Kent, Washington).[12] Environ looked at the volumes and levels of service at this location and compared it with air quality analyses conducted for a similar (but more congested intersection). Because even the more congested intersection complied with the carbon monoxide NAAQS (the typical evaluation criterion), the potential for adverse air quality effects at all other less affected locations was appropriately dismissed.

IV. Greenhouse Gasses

1. *The DEIS overstates GHG Emissions.*

As detailed in the following table, the DEIS *overstates* directly emitted GHG emissions by about 34 percent because CE apparently failed to use the most recent information.

	GHG Emissions, CO_2e (tons/year)								
Document	Area 300 Boilers	Area 600 Boilers	MVCU	Comp. Leaks	Tanks	Fire pump	Total	Metric ton/yr	20-yr
Feb 2014 ASC	6,420	63,300	80,200	11.9	261	13.5	150,000	136,080	2,721,600
Aug 2014 ASC		44,170	50,530	12	261	14	94,980	86,166	1,723,317
DEIS Tabulation - Reported as metric tons/year									
DEIS		63,131	51,913	138	236	12	115,430		2,308,600
Amount too high:									34%

[12] PDEIS, section 5.4.2, pp 5-77 and 5-78, EX 0004-JCE.

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In addition, as discussed in Applicant comments on the DEIS,[13] the analysis presented in the DEIS erroneously over-estimated GHGs related to purchased power by a factor of 7.[14]

2. *Greenhouse Gas Emission Reduction.*

As indicated in Applicant comments on the DEIS,[15] the overall reduction of direct GHG emissions from the Facility resulting from the design modifications amounted to 39 percent. This reduction in direct emissions greatly exceeds Ecology's 11 percent target for GHG reduction resulting from voluntary Terminal changes. Based on Ecology guidance, this reduction alone suggests the Terminal would not result in a significant impact based on GHG emissions. Emissions reduction accomplished through Facility redesign should be factored into EFSEC's consideration of the significance of the Terminal GHG emissions.

3. *Out of State Greenhouse Gas Emissions.*

The GHG analysis presented in the Applicant's PDEIS addressed project-related GHG emissions in a manner consistent with Ecology guidance for GHG review under SEPA. It focused on direct emissions in conjunction with emissions from project-related rail and vessel transport within Washington State, and considered GHG emission reductions encompassed within the proposed project in relation to the goal suggested in Ecology guidance. The expanded GHG analysis provided in the Applicant's comments on

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[13] Applicant DEIS Comments, pp. 3-34-3-37, attached hereto as Attachment B, and incorporated herein by reference.

[14] Computation of GHGs related to purchased electricity reported in the DEIS incorrectly applied emission rates taken from the US EPA eGrid2010 database. The calculations for N_2O and CH_4 mistakenly applied emission factors expressed in pounds/**giga**watt hour as emission factors based on pounds/**mega**watt hour. Correctly applying these factors, and using data available from eGrid2012 reduces the estimated GHGs from purchased power by 87%.

[15] Applicant DEIS Comments, pp. 3-34-3-37, attached hereto as Attachment B, and incorporated herein by reference.

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the DEIS[16] further clarified this issue and confirmed that the proposed project would be consistent with Ecology's GHG emission reduction guidelines.

V. Conclusion

The ASC and DEIS air analyses identify maximum short term and annual emissions of air pollutants, including both criteria and toxic air pollutants, and correctly conclude the proposed project would meet all federal and state emissions standards established for these pollutants – including a requirement to employ Best Available Control Technology and federal New Source Performance Standards. Total projected Facility emissions reflect *maximum* emission rate cases and overstate what will be actually emitted. Annual emission totals actually will be less than maximum hourly rates multiplied by 8,760 hours per year because the emissions are not generated at the maximum hourly rate all the time.

Extensive computer air dispersion modeling of the proposed maximum emissions rates has shown that predicted concentrations of criteria pollutants comply with the NAAQS at all locations and that stationary source emissions of toxic air pollutants comply with Acceptable Source Impact Levels established by Ecology.

[16] Applicant DEIS Comments, pp. 3-34-3-37, attached hereto as Attachment B, and incorporated herein by reference.

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DATED this 12 th day of May, 2016.

Eric Hansen, Declarant

STATE OF Washington)
)
COUNTY OF Snohomish)

Eric Hansen, being duly sworn upon oath, deposes and says: The foregoing testimony is true, correct and complete to the best of my knowledge, information and belief and is given subject to the laws of perjury in the State of Washington.

GIVEN under my hand and official seal this 12th day of May, 2016.

Notary Public
State of Washington
CYNTHIA A WAGENER
My Appointment Expires Feb 12, 2017

NOTARY PUBLIC in and for the State of:
Washington
Residing at: 21203 58th Ave. W. Mountlake Terrace, WA 98043
My Commission Expires: 2/12/2017
Printed Name of Notary:
Cynthia A Wagener

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