Tesoro-Savage DEIS
Preliminary Comments on Air Toxics
Elinor Fanning, Ph.D.
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BACKGROUND

I am an independent consultant engaged in the assessment and analysis of health effects of toxic chemicals, including air pollutants that are regulated under the Clean Air Act. I have over 16 years of experience in the fields of environmental health, toxicology and health risk assessment, with a particular focus in air toxics. I possess a B.A. in biology from Oberlin College, Ohio (1986) and a doctorate in Environmental Health Science from the University of California at Berkeley (1998). I have worked as an associate toxicologist for the Office of Environmental Health Hazard Assessment in the State of California and as a research associate and assistant director in the UCLA Center for Occupational and Environmental Health. In the course of this work, I analyzed health risks associated with gasoline formulation and particulate matter air pollution exposure and toxicology in relation to the Clean Air Act.

I have been asked to review the draft Environmental Impact Statement (DEIS) for the proposed Tesoro-Savage Oil Terminal to be located in Vancouver, Washington (the "Project" or "Facility"). I have reviewed relevant portions of the DEIS and supporting documents as well as comments made during the scoping process from a number of public agencies and the public. Comments from the Washington State Department of Ecology, Washington State Department of Health, and the Board of Clark County Commissioners specifically addressed public health effects of Project-derived air pollutants. Written and oral comments from the public made clear that this is an area of public concern and anxiety, and that the final EIS must present a clear and complete analysis of potential health effects.

Using the framework provided by the scoping comments, I evaluated the elements of the DEIS that address air quality and environmental health effects of air pollution for accuracy and completeness. I have assumed for the purposes of these comments that the methods used to compute emissions of air pollutants from the facility and its associated activities are correctly presented and that any inaccurate emissions calculations will be covered in other comments. I note that I believe that there may be incomplete or inaccurate assumptions regarding emissions. Similarly, I have not reviewed the dispersion modeling methods used by the consultant in any detail and lack of comment regarding the dispersion modeling methods should not be considered endorsement by me of the methods employed. I find the following areas require further analysis or improved clarity of presentation in the final EIS:

1. **<u>The impact of mobile sources associated with the facility requires more complete analysis and presentation.</u>**

Section 3.2 of the DEIS presents new analysis that includes emissions from some on- and near-site mobile sources, to supplement the analysis of stationary

sources submitted by the applicant in their permit application. Emissions from mobile sources, including vessels, locomotives, and vehicles, are relevant to the overall impacts of the proposed Facility for SEPA purposes. SEPA must include analysis that extends beyond what may be required in stationary source permitting as SEPA's intent and purpose is to disclose and assess all air pollutant emissions attributable to the Project. Regardless of whether the mobile source emissions from the facility enter into the legalities of permitting, the combined effects of all pollutant emissions from the facility must be examined in a thorough manner in the EIS. Specific areas that require improvement are discussed in comments A-C below.

A. Hazardous/Toxic Air Pollutants (HAPs/TAPs) emissions data from mobile sources is incomplete.

Emissions of HAPs/TAPs associated with the proposed Project are incompletely detailed in the DEIS. In the August 2014 permit application, the predicted emissions of eight TAPs were found to exceed Washington Small Quantity Emission Rates (SQERs). That earlier analysis by the applicant considered only stationary sources. Total Facility emissions of HAP/TAPs will be much higher when mobile sources are taken into account as well as the stationary sources considered previously. The DEIS discusses calculations performed by a consultant, intended to explore the effects of the facility-related mobile sources, but the only results tabulated are for formaldehyde. The final EIS should present, at a minimum, screening level emissions estimates of all HAP/TAPs from the full spectrum of facility sources and recalculations (to include all associated sources) of the 8 HAP/TAPs previously identified as exceeding SQERs for stationary sources. While not required for permitting, comparison to Washington SQERs would be a reasonable way to screen total associated Facility emissions. A table analogous to Table 5.1-12 of the 2014 Revised Air Permit Application should be used.

B. Dispersion modeling of HAPs/TAPs is incomplete and not well documented.

As described above in comment A for emissions, data on dispersion modeling is quite limited in the DEIS. Appendix F summarizes the updated dispersion modeling that accounts for the mobile source impacts. However, only criteria pollutants are shown in Tables 3.2-8 (same data as Table 9 from Appendix F). No modeling for HAP/TAPs is described in either Appendix F or section 3.2.

C. Estimated cancer risks associated with HAPs/TAPs require further analysis and clear disclosure.

Carcinogenesis is considered a non-threshold phenomenon for regulatory purposes. Any exposure to carcinogens can cause in incremental increased risk of developing cancer. Because of this, the added risks of to all cancer-causing substances from the Facility and associated activities should

be estimated and presented in the EIS. Diesel particulate matter (DPM) exposure levels are given on page 3.2-18 of the DEIS, for the Clark County prison facility and the Fruit Valley Residential Area. The exposure levels in the residential neighborhood, if experienced for a lifetime, are associated with an increased cancer risk of 15-45 per million. During scoping, the Clark County Board of Commissioners identified exposures in the Fruit Valley Residential Area as of particular concern. The elevated cancer risk to the community would be both significant and unavoidable, yet this finding is not mentioned/discussed in section 3.2.7 on Significant Unavoidable Adverse Impacts. This is an oversight that must be corrected in the EIS. The final EIS must present a more fully developed assessment of all expected ambient air concentrations that will result in health-relevant exposure to adjacent residents, including cancer risks. A cumulative assessment of additional cancer risk should be made that accounts for the increased exposure to all project-related carcinogens (e.g. benzene) not just DPM. These data should then be displayed in a contour map of cancer risk similar to the contour map in Figure 3.2-5 of the DEIS, which shows contours of diesel particulate matter concentrations derived from dispersion modeling.

2. <u>Atmospheric formation of pollutants is not accounted for.</u>

The emissions disclosures and assessment in the DEIS do not completely or adequately describe the proposed Facility's contribution to downwind pollutant concentrations in ambient air. Perhaps most important in this regard is the potential atmospheric formation of particulate matter from other emitted pollutants. VOCs, nitrogen oxides and sulfur dioxide all participate in atmospheric reactions that can produce particulates, although this varies greatly with location and climate. Because emitted PM2.5 is estimated to raise ambient concentration levels of PM2.5 close to the 24 hour and annual National Ambient Air Quality Standards, the addition of secondarily formed particulate could be important in order to fully assess health effects.

Formaldehyde is also produced in the atmospheric reactions from emitted volatile organic compounds (VOCs), and this secondary formation can be important to ambient concentrations. Recent studies in the Houston area concluded that substantial percentages of ambient formaldehyde derive from atmospheric reactions of industrial VOC emissions[1]. Despite formaldehyde emissions meeting permitting requirements, the DEIS should consider and discuss ambient formaldehyde concentrations at key receptor locations in order to accurately and completely understand the impact of the Facility on downwind pollutant concentrations.

[1] Zhang, H., J. Li, Q. Ying, B. B. Guven, and E. P. Olaguer (2013), *Source apportionment of formaldehyde during TexAQS 2006 using a source-oriented chemical transport model*, J. Geophys. Res. Atmos., 118, 1525–1535, doi:10.1002/jgrd.50197

Similarly, there is limited discussion of potential ozone formation in the Vancouver area, an ozone maintenance area. Appendix F considers whether the construction phase could have an impact but I did not find a discussion of possible effects on ozone formation of air pollution during operations. Footnote 4, page 3.2-17 suggests that because VOC emissions are reported at this time to be below Prevention of Significant Deterioration levels, ozone is not a concern. However, in light of emissions of ozone precursor compounds from the proposed facility a more detailed discussion of this matter is necessary if the public are to be convinced that the Facility will pose no risk to ozone maintenance. Again, permitting thresholds are not the proper thresholds for pollutant disclosure and analysis in a SEPA context.

3. **Disclosure and discussion of dispersion modeling of NO^2 for estimation of one-hour concentrations must include actual results.**

On page 3.2-4, the DEIS discusses the dispersion modeling of Nitrogen Dioxide (NO^2). Using a screening level dispersion modeling approach, a consultant found that NO^2 levels would exceed the 1 hour National Ambient Air Quality Standards (NAAQS) of 100 parts per billion, but the actual results from this screening modeling were not disclosed. These results must be included in the final EIS as part of the current Table 3.2-8. The U.S. Environmental Protection Agency (USEPA) has recognized difficulties with the 1 hour NO^2 standard and intermittent sources[2], notably, that the standard becomes artificially stringent when a modeled source is highly intermittent. However, it is not clear that NO^2 from most sources at this Facility would be so intermittent as to require the modifications to modeling that were undertaken; these modifications are more commonly proposed to allow for emissions of rarely-operated emergency equipment. Further assessment of the locomotive and vessel source emissions patterns should be included in the final EIS if the post-processing simulation approach is to be maintained for the 1hr NO^2 concentrations. If maintained, detailed results of post-processing Monte Carlo simulation should be accompanied by a clear explanation of how this approach yields a result that is comparable to the 98th percentile of daily 1 hour maxima on which the NAAQS is based. The text on p. 3.2-4 of the DEIS says that the process computed "the median hourly NO^2 concentrations". The appropriate metric would be the median of the distribution of 98th percentile values that resulted from the simulations. This must be clarified. Overall, the discussion of NO^2 ambient air concentrations due must be enhanced in order for the public and the Commissions to have a full understanding and to judge conclusions drawn from the modeling results by the Project proponent.

4. **General discussion of health impacts, including differences between acute vs. chronic health effects must be included in the EIS.**

[2] http://www.epa.gov/ttn/scram/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01- 2011.pdf

Little to no mention of the health effects of air pollution is given in the document. Even if emissions rates are estimated to be below air permitting threshold values, and some modeling results within NAAQS, the health effects of increased air pollution are still pertinent to the discussion of Project impacts. The EIS needs to be clear about potential health effects, the differences between acute and chronic health impacts, and the exposures that cause them. For neighbors living in close proximity to the facility, long-term exposure to diesel exhaust and other carcinogens translates to increased risk of developing cancer in their lifetimes. Given the disproportionate fraction of children in this neighborhood population as compared to the state of Washington as a whole, the lifetime cancer impacts are especially important (see comment 1.C above).

The DEIS must also be clear on the fact that exposure to a number of Facility pollutants, especially those that act as respiratory irritants, poses increased risk of acute health effects, i.e., health effects that derive from shorter exposure scenarios. Acute health effects were clearly identified as a concern during the scoping process, yet the analysis of acute health effects is limited to one table that demonstrates ambient air pollution concentrations are estimated to be near or below NAAQS. As mentioned above, this was based on potentially inadequate data for PM2.5, and omitted data on HAPs/TAPs. Respiratory irritants including, but not limited to, NO^2, SO^2, ozone, DPM, acetaldehyde, formaldehyde, naphthalene and other irritating gases present in diesel exhaust, and acrolein produced via atmospheric chemistry are variously associated with respiratory signs and symptoms including cough, asthma episodes, chest tightening, and wheeze. Exposure is particularly of concern in those with asthma or chronic obstructive pulmonary disease. Given that the facility is within one mile of Fruit Valley elementary school, and two miles of Hough elementary school, both public schools within the Vancouver public school district, the community must be assured that children attending these public schools will not be put at increased risk of health effects from the combined impact of a number of toxic substances. A more comprehensive modeling exercise needs to be presented to address this issue.

Concentration increases that could provoke acute health effects in exposed residents of receptor locations in other selected neighborhoods for example along the rail line or near where trains may be stacked up waiting, should also be modeled and presented.

It is critical to look at possible health risks that would be borne by the inmate and worker population at the adjacent Clark County prison facility. The incarcerated are an involuntarily exposed population, and should the proposed crude oil transfer Facility be built, they would be breathing the highest concentrations of facility-derived pollutants of those persons exposed over full 24 hour days. For inmates who suffer from asthma or other respiratory illness, Facility-derived short term exposure to acute respiratory toxicants could be a serious health issue. The final EIS must present a more fully developed

assessment of all expected ambient air concentrations that could result in health-relevant exposure to affected workers and inmates, including acute exposures.

5. <u>Environmental justice impacts and concerns are omitted from the DEIS.</u>

Neither the permit application nor DEIS assesses whether there are environmental justice concerns associated with the introduction of a large source of chemical pollution at the proposed location. Many nearby neighborhoods already suffer from air polluted by freeway and railway traffic as well as port activities. A screen of the demographic characteristics of the most highly affected neighborhoods should be made. The residential neighborhood to the west of Fruit valley Road is the residential area in closest proximity to the facility. A quick look at data compiled by the USEPA[3] indicates that this neighborhood is characterized by a high proportion of children and low-income residents as compared to the demographics of Washington State. The proximity of the Clark County prison facility and the consequent involuntary exposures to inmates also presents a significant environmental justice issue that must be fully disclosed and assessed.

6. <u>Off-site impacts to public health are improperly omitted from the DEIS.</u>

The DEIS wholly omits any discussion or analysis of potential air quality effects and impacts on public health of increased train traffic in the Tri-Cities or Spokane areas. Both loaded and return trains will pass through these areas of the State. If the trains stop at the Pasco yard for refueling and maintenance further emissions will result. Spokane will see cumulatively increased traffic as a hub through which many lines pass. Increased pollutant emissions from rail yard or line-sources and dispersion of criteria pollutants and air toxics to receptors in the Tri-cities and Spokane areas nearest the train tracks and yards should be analyzed. Potential health impacts of modeled concentrations should be discussed. The final EIS should additionally assess whether the addition to background of VOC and NO^2 emissions could potentially put either area at risk for ground level ozone formation.

[3] Environmental Justice Tracking Tool, http://www.epa.gov/ejscreen