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Dear Mr. Doenges:

In a December 28, 2018 letter to the Port of Kalama and Cowlitz County, the Department of Ecology cited our work on greenhouse gas emissions associated with the proposed Kalama methanol facility. In the paper cited, "Towards a climate test for industry: Assessing a gas-based methanol plant", we described some flaws in the then-current analysis of the greenhouse gas emissions associated with the proposed facility.

Subsequent versions of the SEIS have improved upon some of the issues we identified in our original critique. We described the improvements and remaining flaws in a December 27, 2018 letter to Port of Kalama.

Now, the Department of Ecology has released its own analysis, a draft, second SEIS for the facility. This SEIS again improves on some of the flaws of prior iterations. For example, the new version takes a more nuanced view on what methanol from the proposed facility might displace.

However, the draft second SEIS still makes critical, unsupported assumptions that limit its credibility for characterizing the climate implications of the proposed facility. Most importantly, the SEIS fails to evaluate the proposed facility against a low-carbon baseline consistent with the globally agreed goal to limit warming to "well below 2 degrees C" and the pace of emissions reductions achieving this goal requires, as reflected in Washington State's own legislated greenhouse gas emissions limits.

Further, the draft second SEIS erroneously assumes 1-for-1 displacement of other fossil fuels, and offers contradictory evidence on how the facility could affect coal use in China. This undercuts the argument that the facility would reduce global greenhouse gas emissions. The recent announcement that China will strengthen its 2030 climate target, peak its carbon emissions in the next decade, and hit net zero by 2060 further undercuts this claim, while also casting further doubt on the relevance of baseline assumed for the SEIS. China's commitment leaves little room for the expansion of coal-based methanol, and likely speeds its decline, *regardless* of whether the Kalama methanol proceeds.

The purpose of this letter is to describe these and other observations of the draft, second SEIS.

We are grateful for the opportunity to provide these comments and would be happy to answer any questions about them.

Sincerely,

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SEI comments on Kalama Manufacturing and Marine Export Facility Draft Second SEIS

Peter Erickson and Michael Lazarus, Stockholm Environment Institute (SEI) U.S. Center
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In February of 2018, we published a discussion brief in which we examined the climate implications of the proposed Kalama methanol facility. The brief, entitled "Towards a climate test for industry: Assessing a gas-based methanol plant"[1], presented an approach for assessing whether the construction and operation of the facility would be consistent with internationally-agreed goals of keeping global temperature rise "well below 2 degrees C."[2] Our brief critiqued the facility's 2016 "Final" Environmental Impact Statement (FEIS)[3], finding that it provided an incomplete and deeply flawed analysis of GHG emissions associated with the facility.

Later that year, a new Draft Supplemental EIS (DSEIS) was submitted by the Port of Kalama and Cowlitz County.[4] In December 2018, we sent a letter to the Port of Kalama, in which we found that the DSEIS treatment of fugitive methane losses, though more comprehensive than in the FEIS, was still not credible.[5] We also made further critiques, including related to the misplaced confidence that the DSEIS places in drawing a direct, causal connection between the planned production of the Kalama facility's methanol and the displacement of coal-based methanol in China. The final version of that first SEIS was published in August 2019, and largely retained the same analysis from the DSEIS.

Now, the Department of Ecology has conducted additional analysis, releasing a draft, second SEIS. We have reviewed this second draft SEIS (hereafter, DSSEIS) and make six observations below.

The first observation is the simplest: the DSSEIS does not evaluate how the project against the globally agreed goal to limit warming to "well below 2 degrees C". Relatedly, we find that the DSSEIS uses an incomplete and inconsistent logic as to what the facility's methanol may displace.

Lastly, a final set of observations relate to how this draft, second SEIS treats methane. The current DSSEIS is an improvement over past iterations, but still falls to use up-to-date information.

1 The DSSEIS compares the proposed Kalama facility only to "business-as-usual", ignoring how the project would fare in a low-carbon scenario consistent with the State's – and now, China's – own policy goals

The DSSEIS rightly notes that it is important to "evaluate how emissions from the proposed project would compare relative to a scenario without the project" (pp 49-50). The only such *without-project* scenario the DSEEIS envisions is a business-as-usual scenario in which "global methanol demand increases over the next 40 years" and where methanol is made from coal and gas.

However, nations of the world have committed to the Paris Agreement, which calls for limiting global warming to "well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels"[2]. Pursing emission reductions consistent with limiting warming to 1.5 °C is also the policy of the State of Washington.[6]

The Intergovernmental Panel on Climate Change (IPCC) in its special report, *Global Warming of 1.5 °C*, shows that global carbon dioxide (CO_2) emissions must reach zero by about the year 2050 in order to meet the 1.5 °C with no or "limited" overshoot (exceedance) of the temperature limit. Between 2020 and 2040, global CO_2 emissions from fossil fuel combustion and industry would need to decline by more than 75%.[7] Indeed, this is roughly the pace of required state-wide emission reduction codified into Washington State law this year.[6]

Use and production of all three major fossil fuels must decline dramatically to meet the 1.5 °C limit. Over the next two decades (through 2040), the IPCC finds that, to attain the 1.5 °C limit with no or limited overshoot, coal use must decline by an average of 8% annually (for a total of 82% between 2020 and 2040), gas use by an average of 3% annually (for a total of 43%), and oil use by an average of 5% annually (for a total of 65%).[7]

Were fulfilment of the Paris Agreement to be considered a reference, it is possible that the Kalama facility would *increase* global greenhouse gas (GHG) emissions relative to a *without-project* scenario. That outcome could arise since the project would lock in increased use natural gas for decades, and lock out lower-GHG pathways for making the end-products envisioned from the project's methanol. For example, vehicle and stationary fuels can be low-GHG electricity instead of methanol[8]; and olefins can be created from bio-based feedstocks[9], from CO_2 captured from the air,[10] from electrolytic hydrogen supplied by renewables[8], or even from lower-GHG fossil pathways.[5,11,12] Low-cost methanol from the Kalama facility could make it more difficult for these lower-carbon technologies to compete, leading to an increase in global GHG emissions compared to a situation without the project.

Assessing whether or not the project would increase or decrease GHG emissions relative to such a low-carbon, 1.5 °C or 2 °C scenario, is beyond the scope of this comment letter. However, to be complete, the DSSEIS assessment of the GHG emissions impacts of the project should consider as its reference with-out project scenario, not just a business-as-usual case, but also a low-carbon case, one that is consistent with the emission reduction goals that the state has adopted. The state's own emission reduction goals, the international Paris Agreement, and China's recent commitment to reach net-zero carbon dioxide emissions by 2060 all provide ample policy context for Ecology to consider a low-carbon, 1.5 °C or 2 °C scenario.

Considering alternative baseline scenarios in this way could also help align the DSSEIS with the Department of Ecology's recent thinking that such analyses should evaluate net GHG emissions "relative to alternative market scenarios".[13] It would also help to resolve the fundamental inconsistency of the DSSEIS with the future scenario – aiming to keep warming to 1.5C -- that underlies the state's own policy framework.

2 The DSSEIS erroneously assumes 1-for-1 displacement of other fossil fuels

As described above, the DSSEIS evaluates global GHG emissions relative to a reference, *without-project* scenario. To characterize emissions in this "reference case", the DSSEIS assumes that each tonne of methanol from the project will perfectly displace another tonne of methanol (or equivalent) made from coal or natural gas somewhere else, 1-for-1, and then compares emissions between the two cases.

However, the underlying 1-for-1 displacement assumption is directly contradicted by other arguments in the DSSEIS.

Specifically, the DSSEIS shows how expanding the supply of methanol leads to an *increase* in the use (combustion) of methanol: when the supply of methanol increases, "the result is that a greater quantity of methanol is used" (Appendix B, page 16; since the Kalama facility is adding new methanol to the world market, it is helping to expand supply as shown in the chart on that page.). In other words, each unit of methanol added to the market would displace *less* than one tonne of other methanol, while also adding some to total world methanol consumption.

Despite this being a basic principle of economics, the SEIS fails to quantify the emissions implication of expanding the supply and use of methanol, stating that such a "question is outside the scope of this analysis."

This question should be *inside* the scope of analysis. Expanding the size of the methanol market could increase GHG emissions, since, as the DSSEIS acknowledges, more methanol would be combusted (releasing CO_2), as well as since other fuels that compete with methanol could well be lower-carbon (e.g. electricity for vehicle fuel or electrolytic hydrogen for chemical production, especially under a low-carbon scenario.[8]) Simplified methods to assess the effect of expanding fuel supply are available, and should be used here, because it is not rational to assume that Kalama's methanol would perfectly substitute for other methanol[14,15].

Furthermore, Governor Inslee's directive 19-18, which called for the Department of Ecology to adopt rules for environmental assessments, indicated that such analyses should include "market effects" and "any induced load or growth in fuel or energy consumption"[16] when quantifying greenhouse gas emissions for industrial projects. Evaluating the emissions effects of the induced, increase in methanol consumption as a result of the project would be one way to do this.

3 The DSSEIS offers contradictory evidence on how the facility could affect coal use in China

One reason the DSSEIS finds that the Kalama facility could reduce global GHG emissions is that the project would displace coal-based methanol in China.

The logic for this assertion is that the Kalama project will be "more cost competitive and win market share by virtue of cost, causing other operations to produce less while the project is in operation" (page 52).

However, the DSSEIS appendix appears to contradict this claim. There, the DSSEIS argues that coal-based methanol will proceed in China *with or without* Kalama. It also argues that China is far from operating a competitive market and that a transition to such a market is "enormous… and will take a long time to accomplish" (Appendix B, p.16). Consequently, it is not clear that assertions of coal displacement due to cost competitiveness are very relevant.

Specifically, the DSSEIS appendix observes that coal is a low-cost source of methanol in China, that "there is likely a preference for expanding domestic production where feasible", and that domestic capacity is under-utilized, arguing that "low-cost coal-based methanol will expand production in China" in the years to come. These observations apply, however, *regardless* of the presence of the Kalama facility. In other words, the Appendix appears to argue *against* there being a strong causal connection between the project and the reduction of coal use in China.

Furthermore, the recent announcement that China intends to peak its carbon dioxide emissions by 2030, reaching carbon dioxide neutrality by 2060[17], further undercuts the claim that there is a causal connection between the Kalama facility and reduced coal use in China. China's commitment, which could see the country reducing coal consumption by 96% between 2025 and 2060[18], leaves little room for the expansion of coal-based methanol, and likely augurs its decline, *regardless* of whether the Kalama methanol proceeds.

The observations above all suggest that China's move away from coal-based methanol will be driven more by policy – including climate policy – than by cost competition with international suppliers. This view is also shared by chemical industry consultant IHS Markit, which wrote last month that, despite the "increasing scrutiny" of coal-based methanol in China, the main reason for China to maintain some coal-based methanol is for national energy security.[19]

Regardless, the SEIS appears to offer a stronger argument that, instead of displacing coal, methanol from the Kalama facility may displace the importing of *gas*-based methanol to China from other sources. For example, in Appendix B, the SEIS argues that Kalama methanol and other gas-based

methanol providers will compete directly with each other: "absent KMMEF, other lower-cost natural gas-based exporters would also supply the growing market in China" (Appendix B, page 19).

This argument, if true, suggests that, instead of coal in China, a better comparison to Kalama would be gas-based methanol produced in other parts of the world. We address that argument next.

4 The DSSEIS assumes, without justification, that the Kalama facility is more efficient than alternative gas-based methanol facilities.

The SEIS describes that "it is likely that in the future, methanol production globally will move towards lower GHG emitting technologies (CR or ULE)" (page 46). However, in contradiction to this claim, the DSSEIS then assumes that other methanol importers to China are less efficient than the Kalama facility. However, it is entirely possible that other sources of methanol in this expanding market – which would also likely be *new* (not existing) facilities, just like Kalama – would be just as efficient as Kalama (or, in the future, even *more* efficient), such that project would offer *no* emissions benefits – and perhaps even an emissions increase – relative to alternative methanol producers.

Indeed, technologies for making methanol with fewer emissions than would the Kalama facility are advancing rapidly, including from methane pyrolysis (currently in test phase), which is expected to be commercial within a decade, and steam cracker electrification[20]. These developments raise questions about whether the Kalama facility can be a lower-GHG methanol producer for most of its full 40-year lifetime (as assumed in the DSSEIS), let alone for the next decade.

5 The second SEIS analysis of methane loss, though improved, is still not up to date

The draft second SEIS analysis of upstream methane loss rate, though improved from the first SEIS, still does not use up-to-date information.

As background, in 2016, the FEIS made the serious error of assuming that the Kalama facility would lead to *no* upstream methane emissions from the production, gathering, processing, and transportation of natural gas. The 2019 sought to remedy this error by including estimates of upstream methane emissions, but still did so in a flawed manner that significantly underestimates these emissions.

Now, the DSSEIS improves the assessment of methane loss, but still uses the latest scientific understanding (i.e., Alvarez et al 2018,[21] as interpreted by GREET modelers) as a "high" case, rather than as the central, best estimate.

The Alvarez analysis is important, because it looks at a decade worth of data collected across the country to reach the best possible estimate, taking into account the overall body of research. The key observation of the study and, indeed, from much of the last decade of research on methane emissions, is that the majority of methane losses from oil and gas operations occur not from "leaks" from individual pieces of equipment, but instead from much larger emissions events that occur during "irregular" situations, for example, where equipment fails to function, or where human error occurs.

Because of this scientific understanding of how and when methane loss occurs, the DSSEIS should use the best up-to-date science – as derived from Alvarez et al. 2018 -- as its central estimate, not as a sensitivity case.

6 The SEIS choice of global warming potential for natural gas still does not reflect recent science

Furthermore, the DSSEIS still uses, like those that came before it, an outdated figure for how methane contributes to global warming as its default values. Specifically, they use a value for methane's "global warming potential" of 25. (The number indicates how much more a given unit of mass of methane contributes to warming over 100 years than does carbon dioxide). That value of 25 is from the Intergovernmental Panel on Climate Change (IPCC)'s 2007 *Fourth Assessment Report*,[22] but the IPCC has since updated the potential to 36 for fossil fuel sources in its 2013 *Fifth Assessment Report*.[23] (The DSSEIS uses a value of 28 as a sensitivity case to represent the *Fifth Assessment Report*, or "AR5" value, but that value is for biogenic, not fossil, methane, and omits climate-carbon feedbacks. Climate-carbon feedbacks are important to include, since warming from CH_4 also leads to other mechanisms, such as more water vapor in the atmosphere, that themselves also lead to warming.)

This use of an outdated GWP would also seem to stand in contrast to the Department of Ecology's latest thinking, which is to use the "most recent" IPCC assessments for the global warming potential (GWP) value.[13]

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