Diane Dick

Re: Comments on Draft Second Supplemental Environmental Impact Statement for

Kalama Methanol Refinery and Export Terminal

Dear Director Watson:

Greenhouse gas emissions are not fully accounted for in the draft second supplemental environmental impact statement (SSEIS) and the data contains errors and omissions. Please consider my comments below in revising the final EIS.

Please deny Kalama Manufacturing and Marine Export Facility (KMMEF) a shoreline substantial development and a conditional use permit. The environmental impacts from the project are significant and cannot be mitigated.

1. Include GHG emissions from construction and operation of Kalama Lateral Gas Pipeline.

In 3.4.2 Upstream emissions it is stated, "GHG emissions from the local natural gas distribution system are not attributable to the project because KMMEF will have its own dedicated high-pressure connection. As described in the First SEIS, natural gas will be supplied to KMMEF from the existing interstate transmission pipeline via a new 24-inch 3.1-mile lateral interconnection pipeline. Northwest Pipeline LLC is proposing to construct and operate this interconnection pipeline, which is known as the Kalama Lateral Project."

Presently there is no high-pressure gas connection to the KMMEF site in existence. In the no build alternative to KMMEF there will be no Kalama Lateral pipeline. The Kalama Lateral is integral to the operation of the NWIW methanol refinery. Greenhouse gas emissions from the construction and operation of the Kalama Lateral Project should be included in KMMEF upstream and construction emissions.

2. Upstream emission estimates are based on speculative, incorrect information and omissions.

To begin, over 99% of the natural gas feedstock source for upstream emissions is assumed to come from British Columbia, specifically the Montney Formation (FSEIS Appendix A, p. 41).

Fort St. John, BC, centered in the formation, is located 964 miles north of Kalama, WA.

The gas transmission pipelines map, Figure 3.4-1, labels the pipeline distance to the BC gas source as 629 miles. Clearly this is incorrect. The distance to a Wyoming gas source is likely similar or shorter.

The assumption the feedstock gas will be sourced in British Columbia is unqualified and speculative. The KMMEF SEPA Final Environmental Statement 7.3.2 states, "At this time, NWIW has not entered into contracts for the supply of natural gas to the proposed project." There has been no report this has changed.

The cascade of errors in upstream emissions continues by using the GHGenius modeling tool for life cycle analysis with questionable results.

As noted on SSEIS p. 40, "In the First SEIS, the GHGenius model was used to estimate upstream emissions for natural gas from BC (S&T Squared 2013). The GREET model was used to provide estimates for the U.S. Rocky Mountain natural gas source (ANL 2017)."

The GHGenius model used in the first GHG analysis is outdated (highly revised edition 5.0 released in April 2018) and apparently does not provide the same output data for transmission emissions as the GREET model. This is apparent in comparing the transmission emissions for the BC gas source and the WY source.

Table A-2 Low Emissions Scenario in Appendix A compares the emissions data from the GHGenius model for BC gas with the GREET data for North American gas. It uses GHGenius data from the first GHG analysis. While the data is like that presented in the first analysis, some categories have been combined which blurs the source of some of the emissions, particularly those from pipeline transmission. Transmission emissions, fugitive and storage, appear to be almost three times the value given for BC transmission emissions.

The KMMEF SEPA Final Environmental Impact statement provided a description of factors in determining upstream emissions. "Natural gas extraction involves the operation of compressors and separation equipment at the wellhead and gas processing facilities. Figure 3-8 shows the upstream emissions pathways for natural gas. GHG emissions are calculated based on the energy inputs from aggregate data, which are inputs to the GHGenius and GREET models. The models calculate the life-cycle emissions, including the upstream emissions, to produce fuels for gas extraction and processing. The GREET model also calculates energy inputs and emissions from compressors used for natural gas transport and includes provisions for fugitive methane emissions at all stages of the extraction and

transportation processes. These models do not include emissions associated with the preproduction

phases of the upstream emissions (natural gas well development) and emissions from this phase are not included in the calculations as no well development is attributable to the proposed project." FSEIS 3-17 [emphasis added]

By omission, this statement implies the GHGenius model may not include all the emission factors included in the GREET model, which could explain the greater emission rate yielded by the GREET model for North American gas.

Emissions from pipeline transmission in the GHGenius model for BC gas are insufficiently calculated, producing an inaccurate emission rate for upstream emissions. As previously noted, the pipeline transmission distance from Kalama to the BC gas source is incorrect. Pipeline distance matters in determining emissions. As stated in Appendix A of the SEIS, KMMEF Supplemental

GHG Analysis, 2018, p. 29, Natural Gas Transport- "Natural gas fueled compressor engines compress and move gas along the pipeline network…Natural gas flows through a pipeline at constant pressure and the pressure drops as gas is removed from the pipeline and due to pipe friction. As more gas is moved through the pipeline, additional compression energy would be required to move the gas, which is part of the upstream analysis." [emphasis added] Additional compressors needed on longer pipeline routes require more energy and increase fugitive emissions.

I will emphasize this point by quoting the late William Brake, a retired chemical engineer and registered professional engineer with a 35-year career in the natural gas business.

"The Chapter 4 Air Quality and GHG discuss at length the reasons why GHG emissions are not included for the natural gas transmission of the feedstock to the Kalama Methanol Refinery. The reasons and thought processes are flawed and the flow of natural gas either from the north or from the south requires compression to move the gas along the pipeline. The incremental 320,000 MCFD natural gas required for this facility is a significant amount of gas on the entire transmission system and it requires horsepower to move the gas and incremental horsepower is emissions and GHG. It appears this subject is too challenging to admit that there is significant GHG related to Natural Gas Transmission and is avoided by "Wordsmithing" the revised Chapter 4. This is unacceptable.
http://kalamamfgfacilitysepa.com/wp-content/uploads/2016/09/FEIS-4-0-Air-Quality_GHG.pdf
The No Action Alternate is recommended for this project." William Brake, Formal comment #18 on FEIS, 2016 October 19

This raises doubt about the reliability of the GHG emission rate produced in the first GHG analysis and used again without correction in this second analysis.

In the first GHG analysis the upstream emission rate of 0.71% calculated 0.2848 tonnes CO2e per tonne methanol for BC gas feedstock and 0.3403 tonnes CO2e for North American gas, and possibly more. The baseline and market mediated rate were determined to be 0.289 tonnes CO2e/tonne methanol.

I believe these numbers are unreliable and low-balled. However, these numbers are brought into the second supplemental EIS uncorrected where they create a cascade of dubious conclusions. The 0.71% emission rate and 0.288 tonnes CO2e/tonne methanol are now considered 2nd SEIS low values. (SEPA 2nd SEIS, Sept 2020, p. 82) An upstream methane emission rate of 0.97 percent and 0.333 tonnes CO2e/tonne methanol, or the middle value, is considered more plausible. SSEIS, p. 80. This is the emission rate the EPA Shale GREET model produced for North American gas, Table A-3 Medium Emissions Scenario SSEIS.

While the plausible upstream emission rate is 0.97 percent, the analysis of alternate pathways for methanol imports to China sets KMMEF upstream emission rate at the low and questionable 0.71 percent. See Table A-7 where the GHG emission from upstream is set at 0.289 tonnes CO2e/T methanol, corresponding to the 0.71 percent emission rate. To further skew this input in KMMEF's favor, this same value is assigned to all other reviewed methanol producers.

The reasoning given is, "A key distinction in how the ESM handles emissions from this pathway compared to China-based natural gas methanol, is that upstream emissions related to natural gas extraction and processing is set equal to that of KMMEF. This assumption was made based on the lack of emissions data from the methanol exporters evaluated in this study and the uncertainty around upstream methane emissions from natural gas extraction and processing (Gan et al. 2020)." SSEIS, p. 62. [emphasis added]

Incongruously this statement follows the statement in the previous paragraph that, "The difference in life cycle GHG emissions is mostly due to upstream natural gas emission rates and the difference between KMMEF's ULE technology and the combined reforming technology used by some of the 29 existing facilities. To a lesser degree the emissions difference is attributed to electricity and transportation emissions. The lifecycle GHG emissions of imported methanol may decrease over time as new facilities come on-line using ULE technology or even newer processes."

Table A-7 compares other global producers to KMMEF using the same implausible upstream emission rate despite acknowledging much of the difference in life cycle emissions is due to upstream emissions. The low upstream emission rate attributed to KMMEF British Columbia gas feedstock compared to other producers seems more unrealistic considering BC gas will be transported and emitting along almost a thousand miles of pipeline compared to methanol producers on the Persian Gulf in Iran sited less than 100 miles from petroleum reserves ranking in the top five globally.

Further analysis based on data with such inaccuracies and unjustified assumptions on upstream gas emissions would seem an exercise in futility.

KMMEFF should be denied permits based on the multiple verifiable analyses the refinery will produce millions of tonnes of greenhouse gases in Washington.

3. The 786,117 MT CO2e estimate of in state emissions is misleading and without validity.

In reviewing 3.7 Significant impacts and mitigation, p. 105, there is the statement, "GHG emissions occurring within Washington State from the sources listed above are estimated to be between 786,117 and 1,421,748 MT CO2e per year." This range of in state GHG emissions is patently incorrect.

For onsite process emissions alone, current air discharge permit, ADP 16-3204, issued by Southwest Clean Air Agency June 2017, states on p. 3,

"2.1 Emission Limits

No. 1 Combined greenhouse gas emissions from approved emission units shall not exceed

1,076,000 tons of C02e per calendar year. Annual emissions shall be calculated using

procedures consistent with the provisions of 40 CFR 98."

In metric units this is equal to 976,131 metric tons of CO2e. This would be a very minimum NWIW Kalama methanol refinery would emit annually. The technical support document, p. 18, states the facility-wide potential to emit is 1,119,890 tons per year (1,015,947 metric tons). The permit states NWIW agreed to a voluntary limit of less than potential capacity to emit.

The range for in state emissions should begin at no less than 1 million metric tons annually. This alone is a significant increase in Washington state emissions. Adding other in state emissions, including over 250,000 metric tons annually for power purchases, would make KMMEF Kalama methanol refinery one of the top three GHG emitters in the state, excluding TransAlta. Note, this makes data in SSEIS Figure 3-1 also invalid.

When the stated legislative goal in Washington state is to reduce current GHG emissions, there is no rational environmental reasoning to allow shoreline permits for KMMEF Kalama methanol refinery.

4. Can even 1 million metric tons of CO_2e be verifiably mitigated?

From information in the air discharge permit this refinery has the capacity to emit over 1 million metric tons of GHGs every year just on the process site.

NWIW states they will mitigate all in-state emissions. Priority will be given to projects in Cowlitz County. PLEASE - require specific examples of mitigation projects and their verifiable ability to remove greenhouse gases from the atmosphere.

The only viable way to remove CO_2 from the atmosphere that I am aware of is by growing trees or crops. According to the EPA greenhouse gas calculator it would take 1,306,000 acres of average forest land to remove 1 million tons of GHG in a year.

Cowlitz may be a large county but it only comprises about 746,000 acres. There is no way on God's green earth NWIW will be able to mitigate a fraction of its total emissions in projects in Cowlitz County or all of Southwest Washington.

Demand accountability for a realistic mitigation plan now because you surely will not get voluntary compliance later. Do not let NWIW be one more company that tries to buy its way out of fouling our environment and turns up the heat on climate change.

Deny shoreline permits for NWIW.

5. Greenhouse gas emissions from KMMEF marine dock operations are not examined in the DSSEIS and need to be evaluated and added to total project emissions.

The KMMEF marine dock is integral to this refinery project, otherwise we could just refer to it as the NWIW refinery project. However, GHG emissions, from dock operations have not been examined in this draft SSEIS or in the first supplemental environmental impact statement.

The first SEIS simply deferred discussion of marine dock GHGs, different from methanol vessel transport or process emissions, to what was included in the FEIS.

The FEIS states-

"The proposed marine terminal would accommodate the oceangoing vessels that would transport methanol to destination ports. It would also be designed to accommodate other vessel types and, when not in use for loading methanol, would be made available for use as a lay berth where vessels could moor while waiting to use other Port berths or for other purposes." 2.1

"The proposed project also incorporates the use of shore power for the marine terminal. Shore power allows ships to "plug into" electrical power sources on shore. Turning off ship auxiliary engines at berth would reduce ship diesel emissions and result in GHG emission reductions, depending on the source of electric power from the grid. GHG emission reductions from shore power have not been calculated for the proposed project, but studies completed in other locations show reductions of from 25 percent to 50 percent (EPA 2017)." p. 3-35&36

"Marine Terminal Alternatives

The Marine Terminal Alternatives would both result in the same potential impacts to energy and natural resources and are assessed together.

Both Marine Terminal Alternatives would generate demand for electricity for lighting, loading equipment, and the operations shack and dockworker shelter. They would also generate demand for electricity from the use of shore power (also known as "cold-ironing"). Both Marine Terminal Alternative would generate a peak electrical demand of approximately 3 megawatts (accounting for both methanol loading activities and the use of shore power by vessels serving the methanol manufacturing facility and lay berth vessels), and an estimated annual electricity use of approximately 11,000 megawatt-hours based on preliminary engineering estimates. This electricity demand would be negligible compared to the approximately 5 million megawatt-hours of energy sales by the Cowlitz PUD in 2013.

Therefore, the operation of the Marine Terminal Alternatives would not result in significant adverse impacts to energy and natural resources." P. 7-7 & 8

In the analysis of purchased power only power associated with methanol process is examined, not that from shore power required by vessels at berth, estimated to be 72 visits from Panamax methanol tankers and up to 12 other vessels using the dock as lay berth per year. (I will note this area of the river recently acquired additional stern buoys, meaning additional vessels under their own power awaiting berth will be emitting GHGs and air pollutants in the region.)

Looking just at shore power (aka cold-ironing or shore to ship power) use from vessels at berth, the preliminary estimate of 11,000 MW hours annually is likely lowballed. Per EPA GHG calculator this low amount of electricity generates 7,777 metric tons of CO_2e. This is more than other GHG emitting activities analyzed in both SEISs.

The peak electrical demand of about 3 megawatts is also of dubious credibility. The first shore power installed at a terminal for tankers in 2009 at Port of Long Beach had a capacity of 8 MW.

“What is claimed to be the world’s first oil tanker terminal equipped with shore power to eliminate air emissions from berthed vessels was unveiled this week.

Pier T at the Port of Long Beach, used by BP America affiliate Alaska Tanker Co, has been equipped with a BP shore power installation, which can deliver up to 8 MW at 6,660 v.”
http://www.tankeroperator.com/news/first-tanker-cold-ironing-facility-opened/1231.aspx

The Port of Boston commissioned a study to evaluate shore power requirements for various vessels and found power demands ranging from 3.36 MW to 13 MW.

“One Container vessel requires as much power as the largest Logan Airport Terminal (3.36 Megawatts).

Significant peak power demand on electrical grid. Just one cruise ship (Queen Mary 2) requires electrical demand equal to all required power to service all Logan Airport Terminals (13 Megawatts).”

Massport Shore-to-Ship Power Study August 5, 2016

https://globalmaritimehub.com/wp-content/uploads/attach_770.pdf

More recently the California Air Resources Board is determining regulations for emissions from ocean-going vessels at berth. In a lengthy report the following was stated about tanker vessels, “On average, a tanker’s auxiliary boiler can require one to several thousand kW of power during pumping operations, while auxiliary power load consumption for regular hotelling operations generally ranges between 700 kW to 1,000 kW per hour (Appendix H). Hotelling times for tankers transporting crude oil range between 5 to 173 hours per visit I-29 5. and the average berthing time for a product tanker is around 48 hours.” p. I-29, State of California AIR RESOURCES BOARD PUBLIC HEARING TO CONSIDER THE PROPOSED CONTROL MEASURE FOR OCEAN-GOING VESSELS AT BERTH STAFF REPORT: INITIAL STATEMENT OF REASONS DATE OF RELEASE: OCTOBER 15, 2019 SCHEDULED FOR CONSIDERATION: DECEMBER 5, 2019

https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/isor.pdf

I strongly urge you to review the above CARB report. California is suggesting stricter regulation of vessel emissions at berth from ports with more than 20 ocean-going vessel calls per year.

‘CARB staff’s proposal to further reduce emissions from ocean-going vessels would require emissions control requirements at any port or independent marine terminal exceeding a specific visit activity threshold. If a port or marine terminal surpasses the 20 visit threshold, they must submit a plan to CARB by the end of the following calendar year describing how they will control emissions from the vessel activity at their facility.’’ P. ES-15

This one new Kalama dock would receive four times the vessel traffic under the California regulation requiring stronger emission controls.

The FEIS statement the Marine Terminal Alternatives are not significantly impactful is false.

Please rectify the serious omission of greenhouse gas analysis from vessels at berth at the proposed KMMEF marine dock in the second supplemental EIS.

6. The data on purchased power is incorrect and based on speculative assumptions.

Purchased power is detailed in Appendix C of the SSEIS and includes the following:

Purchased power

The proposed project will import 100 MW (864,000 MWh) of electric power from the regional power market through the Cowlitz PUD transmission system during continuous operation. Power demand is reflected in Megawatt Hours (MWh). Total power demand is shown in Table C-17 for the ULE Alternative. Power demand over the 100 MW provided by purchased power is provided for by the on-site natural gas combustion turbines (emissions from the on-site power generation are captured in the ULE Production Scenarios). P. C-20

Electrical power demand

Electrical power will be required for KMMEF operations. A portion of the power required will be generated from onsite combustion turbines, and the rest, estimated to be 100 MW by NWIW, will be purchased from the power market. Emissions from electrical generation by the onsite combustion turbines are included in the emission calculations for methanol production for the ULE alternative. Emissions for the 100 MW of purchased power are based on three generation scenarios:

• Low Scenario. All purchased power is generated from renewable sources. The current renewable mix from Cowlitz PUD is 86% hydroelectric, 8% nuclear, and 6% wind.

• Mid Scenario. Purchased power is from a mix of generation sources, which changes over time in line with the expected, future energy mix in accordance with the Washington State Clean Energy Transformation Act (CETA) signed into law on May 7, 2019. In the mid scenario, generation from 2020 to 2030 is from the current marginal power source (defined as the source of electricity that is first or cheapest available to meet an increased power demand), generation from 2030 to 2045 is from a mix of 20% marginal power and 80% renewable power, and generation from 2045 and beyond is all from renewable sources.

• High Scenario. Purchased power is all from the current marginal power source.

A NW Power and Conservation Council study of CO2 emissions in the NW power system published in 2018 concluded that the expected emissions over the time frame of the project from marginal power sources were in a range that correlates well with the emissions from a combined cycle natural gas-fired powerplant. Therefore, for the purposes of this study, a combined cycle natural gas-fired powerplant was assumed as the current marginal power source.

Emission factors for combined cycle natural gas-fired powerplants, hydroelectric generation stations, nuclear powerplants, and wind turbines were derived from GREET and are shown below in Table C-1." SSEIS p. C-3

Table C-1 shows range of emissions from power purchases from low to high scenarios. [extracted data]

Purchased Power GHG Emission Factors (g/kwh)

CO2e	0.61	216.57	431.43

The 864,000 MWh from 100 MW demand for continuous operation is incorrect. Multiplying 24 hours of 100 MW demand for 365 days yields 876,000 MWh.

As noted in a previous comment, nowhere in the SSEIS are the electrical power requirements and sources for operating the KMMEF marine dock, including shore power provided to over 80 vessels at berth annually, evaluated. The GHGs generated from this power and marine dock vessel operation are not evaluated.

Based on scenario descriptions above, GHG emissions from on-site purchased power range from 526.7 for low estimate, 187,112 mid estimate, to 372,752 MT CO2e/year for high estimate per Table 3.5-2.

So which of the electrical power resource scenarios and resulting GHG emissions are most likely and reasonable?

All the estimates are low given the absence of including KMMEF dock operations and error in calculating the hours of operation in a year.

The low estimate is unlikely given a large new industrial load will not be allowed as a priority customer for Cowlitz PUD's hydropower resources. Current policy dictates NWIW will be required to purchase power from the open market.

The mid estimate is speculative based on the ability of current electrical power resources to move towards clean and renewable resources. [It is also speculative dirtier generation from coal will be replaced by arguably cleaner gas generated electricity given the huge amount of gas NWIW will be sucking out of the limited PNW gas infrastructure.] It is speculative and dubious NWIW will even be operating at the farthest time frame that includes the cleanest power.

The high scenario, with estimate of 372,752 MT CO2e/year by using current marginal resources, is the most likely and reasonable number to work with.

To put the high scenario GHG emission number in larger context, the EPA GHG calculator states 876,000,000 kWh of electricity produces 619,367 metric tons of CO_2e.

Refining the power resource further, the following is the result from 2018 eGRID data for the same amount of electricity:

"Using the eGRID subregion NWPP (WECC Northwest) emission rates and 4.80% percent line loss, your estimated annual use of 876,000,000 kWh of electricity results in 586,632,672 pounds CO_2, 367,219 pounds SO_2, and 550,829 pounds NOX emitted in one year from the power plants in your area.

It would take 6,896,152 seedlings grown for 10 years or 313,053 acres of forests in one year to offset those CO_2 emissions."

https://www.epa.gov/egrid/power-profiler#/NWPP

Converting the above to metric tons, the CO_2 alone represents about 262,000 metric tons of GHG. Nitrous oxide has 298 time the global warming potential of CO_2.
https://climatechangeconnection.org/emissions/co2-equivalents/

Even the estimate of GHGs from purchased electrical power for on-site consumption in the high scenario is lowballed. Please redo the purchased power calculations and emissions to reflect reality.

7. What is a reasonable answer to the basic question, how much CO_2e will be produced in refining 3.6 million metric tons of methanol per year?

When science looks at a question and comes up with an answer the usual first response to the answer should be another question. Is the answer reasonable? In the case of NWIW the answer is no.

Looking only at methanol process, from Table 3.5-2 GHG Emissions from On-site Sources, the ULE process and purchased power (the 100 MW demand required for the process) will produce GHG emissions ranging from the low estimate 728,535.7, to mid estimate 915,121, to the high estimate 1,347,803 MT CO_2e/year.

The high estimate means 0.374 metric ton of GHG would be emitted for every metric ton of methanol produced. The low estimate yields 0.202 metric ton GHG per ton of methanol.

The methanol industry would likely find these answers ludicrously implausible.

"Ten or more years ago, a typical methanol manufacturing plant would emit about 0.9—1.0 metric tonnes of carbon dioxide for every ton of methanol produced. In addition to the environmental concerns, large CO_2 emissions represent operational inefficiencies in a methanol plant, since the carbon emitted as CO_2 is not available for making methanol molecules. In fact, excess CO_2 from other industrial facilities can also be captured and consumed to increase methanol production. Through the implementation of efficiency improvements and through replacing of older facilities with newer plants that use more efficient technologies, over the last decade methanol plants have been able to significantly reduce CO_2 emissions by up to 40%. Some facilities report emissions as low as 0.54 tonnes of CO_2 / tonne of methanol produced. This is equivalent to emitting 3.8 lbs of CO_2 per gallon of methanol." https://methanolfuels.org/about-methanol/environment/

The ULE process is not new. It is based on a small prototype, the Coogee facility in Australia, operational more than twenty years ago.

Here is what I told Southwest Clean Air Agency about the Coogee ULE process in my comments January 2019 regarding extension of NWIW Kalama's air discharge permit.

"The ULE process is not a conventional methanol process with conventional equipment and has only been used in one small facility that has since been closed, the Coogee Methanol Plant, Laverton North, Victoria, Australia, operated by Coogee Energy Pty Ltd.

https://insider.thewest.com.au/august-2017/power-played/

The best information on the Laverton Coogee methanol process and emissions can be found in Coogee Energy Pty Ltd Methanol Plant Environment Improvement Plan, December 2003. Attached.
http://s3.amazonaws.com/zanran_storage/www.coogee.com.au/ContentPages/1245343343.pdf

This was the plant's third improvement plan (EIP). They had problems. They admitted it was an experimental process that needed improvement.

"The Coogee Methanol Plant is Australia's only methanol production facility, and is currently capable of producing between 70,000 to 80,000 tonnes per annum of chemical grade methanol. The plant operates 24 hours a day, 7 days a week, all year round." EIP p. 10 The Coogee methanol plant had capacity to produce in one year what NWIW Kalama plans to produce in 8 days. In other words, the NWIW production capacity is proposed to be about 45 times greater than the prototype on which it is designed.

In 2003 the Coogee plant had been operating almost ten years. Their aim was to produce methanol with greater efficiency and less CO_2e emissions. The EIP states in 2002 that 0.781 Tonnes CO_2e were produced per tonne of methanol, EIP p. 21. If this emission rate were applied to NWIW Kalama production of 3.6 million tons methanol per year, then NWIW would be emitting 2,811,600 tons of CO_2e annually at the refinery site alone, over twice the estimate projected in the ADP."

When scientific inquiry reveals extraordinary results, extraordinary proof is required. The unrealistically low emissions Northwest Innovation Works claims will result from their ULE methanol process demands extraordinary proof. Chemical equations describing a perfect process are not sufficient or realistic.

Demand real world examples the NWIW ULE process will produce the extremely low emissions as claimed on a large industrial scale.

8. Why does this SSEIS devote about two-thirds of the intended greenhouse gas analysis on an economic study, and poorly done at that?

"Economic Analysis: A market-based evaluation was conducted to assess whether methanol produced by the project would substitute for or replace other sources of methanol, rather than supplement them." SSEIS p. 38

According to Washington law and Department of Ecology website the purpose of SEPA and environmental impact statements is to identify and analyze environmental impacts. This begs the question why more consideration was not given to identified GHG emissions. Fugitive and transportation emissions from a long pipeline route are not analyzed. Emissions from operation of the KMMEF marine dock are ignored. There is no substantiation of low emission claims from the ULE process itself, despite the ULE process being untested on a huge industrial scale and results from the Coogee ULE facility contradicting such low emission claims.

Yet this SSEIS goes into mind boggling detail, or perhaps obfuscation, to guess what methanol markets will look like in forty years to support a result intended to make Kalama methanol look like the cleanest and most competitive methanol on the planet.

The most obvious economic question might be, if NWIW's ULE methanol process is so wonderful then why aren't other methanol producers replicating it? Especially the big players in the market, like Methanex? After all, the technology has been around for more than twenty years. If no one else is using it, the logical course would be to find out why not? Could it be the most forward-thinking methanol producers are moving to LCM, low carbon methanol, and fossil free renewable gas feedstock?

Why does the economic analysis not mention NWIW's parent company GTM's intentions to produce methanol in British Columbia, closer to gas feedstock producers?

Financial advisors have a fiduciary responsibility to advise that past performance is no indication of future returns when it comes to investment risk. Yet this SSEIS seems to have no doubt about the reliability of their future assumptions in drawing a conclusion.

Indeed, there is not even past performance when it comes to Northwest Innovation Works. It is a paper LLC created in January 2014 to pursue a speculative venture. A major investor, British Petroleum, pulled out within a year after the price of oil dropped precipitously making the economic viability of the venture too risky. The principals have no credible background in petrochemicals. President Vee Godley was previously involved in the failed Hoku silicon plant in Idaho.

While supporters complain vociferously about the lengthy permit process, NWIW has never produced complete financial and facility plans. They have claimed much, yet never revealed the project would be the world's largest methanol refinery. One would think this might be a selling point for a worthy project.

The original idea was to use the CR process and not more than 36 MW demand from the power grid. This got changed when they realized the air pollution controls from burning so much natural gas for power generation was too costly.

Then there was the issue of wastewater disposal and impingement on shorelines and wetlands.

When they were caught hawking the project to investors as producing methanol for fuel instead of the stated purpose as plastic feedstock, they needed another port lease amendment.

NWIW is promoted as producing taxes and jobs. Yet the port agreement only requires 80 permanent jobs, less than one job per acre of waterfront industrial property. NWIW has lobbied the legislature for tax benefits. The project has applied numerous times for federal tax dollars to build the dock. It has applied for a two-billion-dollar federal loan to build the refinery.

The tax benefits and two billion loan should be considered in the SSEIS economic analysis considering the implications such subsidies might have on relationships with global trading partners, if the state subsidies to Boeing are any indication.

After more than six years of experience with Northwest Innovation Works, please heave this project overboard. It is a risky financial investment and a sure route to environmental and climate degradation.

Thank you for pursuing environmental truth and providing decision makers with the best most credible information we can obtain in these trying times. The health of Washingtonians and a high-quality environment that sustains us depend on your efforts.

Diane L. Dick

13 Saint Helens Lane

Longview, WA 98632