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November 4, 2019

Mr. Perry Lund
Department of Ecology Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775

RE: Cowlitz County Permit SL 16-0975
Port of Kalama and Northwest Innovation Works – Applicants
Shoreline Conditional Use Permit #1056

Dear Mr. Lund:

This is the County's response to the Department of Ecology (Ecology) letter demanding additional information related to the Kalama Manufacturing & Marine Export Facility (KMMEF) Final Supplemental Environmental Impact Statement ("SEIS"), dated October 9, 2019. The letter also demanded additional information on Northwest Innovation Works-Kalama's (NWIW) Voluntary Mitigation Plan Framework (VMPF).[1] As was discussed with Ecology staff and its legal advisors, over the course of nearly one year—both in concert with the project proponents, and separately as the regulatory authorities in Shorelines—the VMPF was to be a framework for an innovative mitigation program, and to be refined in continued coordination with the County and Ecology staff once the shoreline permit review process had been completed (but prior to commencement of facility construction).

Even labeling the VMPF as simply a 'framework' is misleading, as the key facets of the greenhouse gas ("GHG") mitigation program (accountability, third party verification, and the ability to update the program consistent with scientific developments) had been dissected and discussed and detailed over many months, in many meetings and with many discussions involving the applicant, the siting port authority, and the County and Ecology. Given the time, effort and attention to the content of this VMPF by these parties, the County is confident the VMPF provides sufficient detail that the proposed mitigation will be effective and that it is "reasonably capable of being accomplished"—as is the State Environmental Policy Act ("SEPA") standard.

With this backdrop, the County expresses its disappointment with Ecology's requests for additional information, in lieu of timely rendering a decision on the permit, for three reasons. First, as you are well aware, and as noted above, the County repeatedly with Ecology, with other parties and singularly, for the purpose of discussing and addressing questions related to the VMPF and SEIS—matters about which Ecology is now requesting for additional information. To cement its disappointment, the County would note that since our last meeting on June 27, 2019 regarding the VMPF, Ecology evaded requests from the applicant, the port authority and the County to meet to discuss any lingering or additional concerns or comments by the agency on this draft mitigation plan prior to or after publication of the SEIS. Instead, the County was surreptitiously confronted with an uncompromising, 30-day, shot-clock letter, on threat of stalemating the permitting process. Adding to the County's dismay, and its imprudent presumption of

[1] *See* SEIS, Appendix C.

shared, regulatory authority over Shorelines, I was recently advised that Ecology staff have been in discussions with the applicant, without notice or involvement of the County.

Second, each of the informational demands raised in your question-set number 2 of the October 9th letter are either beyond what both SEPA or the SMA require, or have already been provided or answered within the SEIS document and attachments. This, in turn, raises concerns whether Ecology undertook a thorough and adequate review of the information provided by the County before tendering its letter. In an effort to remediate this concern, I would, below, direct Ecology to the specific section or sections of the SEIS and Appendices that corresponds to each question and demand raised it the letter. Separately, the County requested that NWIW—as the architect of the voluntary program– to provide additional information on the VMPF. The applicant's responses are also attached to my letter, under separate cover.

Third, and as addressed in my opening, the County finds it troubling that Ecology's demand for additional detailing on the VMPF, came before it has completed review of the shoreline conditional use permit, as contrary to the collaborative work and regulatory interactions of the County with Ecology since October of 2018. Up until October of this year, the County understood with Ecology that: the potentially copious details of the VMPF would be fully discussed, approved and incorporated into the regulatory framework following the release of the SEIS; and requests for additional GHG mitigation detail should be treated as premature in light of the further development-measures built into this framework approach. I also find it troubling that the level of review now superimposed on this project is inconsistent with how Ecology has addressed GHG mitigation within other, recent projects with Ecology as the SEPA lead, namely: the Millennium Bulk Terminal EIS (released April 28, 2017)[2], and the Tacoma WestRock MDNS (released November 15, 2018).[3] I am attaching relevant sections of these Ecology SEPA documents.

The County is frustrated that the KMMEF project is facially being held to a different standard on GHG mitigation detail in SEPA than Ecology proffered in its own environmental documents. The County has never disputed that additional detail (subject to approval from both Cowlitz and Ecology) will be required before the VMPF is implemented. The County does dispute Ecology's current demands inasmuch as SEPA does not require more than the level of detail as provided in Appendix C to the Final SEIS. *Citizens for Safe & Legal Trails v. King Cty.*, 118 Wn. App. 1048, No. 51464–4–I, 2003 WL 22172793 at *9 (September 22, 2003) (Finding that an EIS need not "include specific, detailed descriptions of planned mitigation.").[4] No more is required to complete review of the KMMEF under SEPA or the Shoreline Management Act.

Before responding to each of Ecology's specific GHG Emission questions, it is important to reiterate that the County has concluded that the existing shoreline conditional use permit is adequate as previously issued. This includes, in particular, Condition No. 4, which Ecology added as part of its 2017 permit approval that applies principles from the Washington Clean Air Rule ("WaCAR"), WAC Ch. 173-442, even if that rule is not in effect. Condition 4 demonstrates, in the County's view, the existing CUP requirement to apply WaCAR reporting methodologies that answers the questions Ecology is now raising in its October 2019 letter. Based on the discussions we have had with Ecology on the VMPF, it has been our understanding that Ecology encouraged this approach.

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[2] *See* Mitigation Measure GHG-4: "To address the potential impacts of greenhouse gas emissions attributable to the Proposed Action, the Applicant will prepare a greenhouse gas mitigation plan . . . [that] must be ready to implement prior to the start of full operations." Sec. 5.8.1.8 of EIS, at p. 5.8-24.

[3] "Emissions of greenhouse gases . . .must be mitigated using purchased certified GHG offsets ***or an alternative approved by Ecology***." Ecology MDNS, p. 1 (emphasis added).

[4] *See also City of Des Moines v. Puget Sound Reg'l Council*, 97 Wn. App. 920, 928, 988 P.2d 993, 998 (1999) (A "dire prediction that mitigation will never be undertaken because it has not been specifically imposed . . . is unfounded."); *Residents Opposed to Kittitas Turbines v. State Energy Facility Site Evaluation Council (EFSEC)*, 165 Wn. 2d 275, 312, 197 P.3d 1153, 1171 (2008) ("[A] FEIS does not require inclusion of specific remedies of each environmental impact.") (*distinguished on other grounds by Columbia Riverkeeper v. Port of Vancouver USA*, 188 Wash. 2d 80, 97, 392 P.3d 1025, 1033 (2017)).

With the approval of the Port, our SEPA co-lead, and assistance from the applicant, the County submits the below responses to Ecology's Question Set 2. Separately, the County requested information from the applicant for the response to Ecology's Question Set 1, with details of the VMPF, and which responses will also be attached.

Greenhouse Gas Emissions Analysis in the 2019 Supplemental EIS

1) ***An improved explanation of how the 2019 Supplemental EIS's conclusion that the facility will displace global methanol production is consistent with the 2019 Supplemental EIS's statement that global demand for methanol is projected to increase.***

RESPONSE: The SEIS, including appendices, contains a full explanation of the displacement analysis, which evaluates KMMEF's ability to displace coal-to-methanol and naphtha-to-olefin pathways. Before summarizing that analysis, however, the following three points merit clarification:

A. The stated purpose of the KMMEF facility is to accommodate growing demand for methanol *in China*, where it will be made into olefins.[5] As such, the displacement analysis addresses the effect that KMMEF would have on *Chinese* demand for methanol, rather than questions about "global demand for methanol."[6] These facts and circumstances necessarily narrow the scope of analysis from one of total "global methanol demand for methanol" to one focused on the area of impact. That said Response 3.b below augments this response and references Section 8 of Appendix B to the SEIS which notes the favorable KMMEF MTO economics to that of MTO from coal as well as the broader global marketplace competitiveness to naphtha.

B. The displacement analysis focuses on KMMEF's ability to compete with the primary *methanol* feedstocks in China (*e.g.*, coal and, to a significantly lesser extent, natural gas derived methanol). *See* SEIS Appendix A, Sec. 4.2.2 at pp. 59-62. At various points, commenters have requested that the County and Port review naphtha in the displacement analysis. As explained in the SEIS, KMMEF is designed to supply methanol-to-olefin (MTO) production facilities in China, which represents a different process and requires a different feedstock supply chain and market than crude oil-to-naphtha-to-olefin facilities because an MTO facility cannot use naphtha as a feedstock. Accordingly, although the SEIS analysis concluded that KMMEF would be cost competitive with a naphtha-derived olefin (even when crude oil prices are depressed),[7] the displacement analysis focuses on coal-to-methanol because KMMEF methanol directly enters that MTO marketplace and competes with that feedstock.

C. "Displace," as used in this analysis, does not necessarily mean only that a marginal or otherwise less market competitive existing coal-to-methanol facility will potentially shut down or that KMMEF will curtail production or alternatively, development of new coal-based methanol plans will be discouraged, but it does mean that a subset of the Chinese supply of methanol that is currently realized or would otherwise be realized through coal-based production will be replaced

[5] SEIS, Appendix A, at p. 56 ("This Study focuses on the demand for methanol on the east coast of China where demand has grown and continues to grow rapidly as a feedstock for olefin production. Most of this demand is met with domestic Chinese coal-based production and some by imports.").
[6] Assessing the impact of KMMEF production on East Chinese methanol use did, however, consider global production sources (*e.g.*, the effect of natural gas plants being built in countries that import to East China). *See* SEIS, Appendix B, Sec. 5 at 25-30.
[7] *See* SEIS, Sec. 4.3.6 at 4-9 (Standard Response 6); SEIS, Appendix B, Sec. 8 at pp. 46-50.

by KMMEF methanol through either or both of those means.[8,9] Under current conditions, coal-derived methanol will likely supply olefin producers in East China, but KMMEF methanol (which is estimated to cost 50% less than coal-derived methanol) would likely out-compete and displace current or future coal-based methanol production, thereby displacing the use of coal (and associated GHG emissions) to meet a growing and discreet regional MTO subset of the overall global olefin demand.[10] The analysis considers i) projected increasing demand for methanol in East China for olefin production; ii) the continued operation of existing facilities (including predominately coal-based facilities in China); iii) the potential for new facilities to be brought online; and iv) relative production costs of KMMEF, Chinese, and other sources of imported methanol to East China. The report then concludes that "continued growth of the use of Chinese coal as a feedstock for methanol production is the most likely alternative manufacturing method for methanol if the KMMEF is not built." SEIS, Appendix A, p. *x* (Executive Summary).

The following draws on information contained in the SEIS to further explain this analysis.

China's methanol production capacity is currently overwhelmingly coal-based (with an estimated 52,560 k tonne/year of coal-based capacity and only 6,835 k tonne/year of natural gas-based capacity)[11] and demand for methanol is increasing: "[t]he total capacity of existing MTO plants in East China with access to imported methanol is 8.2 million tonnes/year with a planned expansion of 7.5 million tonnes/year."[12,13] *See also* SEIS, Appendix A, Figure 4.6. This increasing demand (and a lower comparative price of imports) has contributed to China being a net importer of methanol for over a decade. "More imports to China have not occurred," however, "due to limitations on global methanol capacity as well as the transition time it takes for more cost-efficient producers to enter market." SEIS, Appendix A, Sec. 4.2.3 at 62. Chinese domestic methanol production from coal is less constrained.[14] Accordingly, under baseline conditions, the SEIS concludes that increased methanol demand in East China will likely be met through increased coal-based production in China. [15]

KMMEF methanol is much cheaper than coal methanol. The cash cost of KMMEF methanol is calculated as $150/tonne and the cash cost of a coal-based production is calculated to be over $300/tonne.[16] Accordingly, the SEIS concludes that as demand for methanol grows, "the continued development of high cost [coal to methanol] or [coal to olefins] plans will be reduced"[17] and that, ultimately, "based on market

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[8] MTO manufacturing (processing) facilities cannot utilize naphtha. Neither the process nor the feedstocks are fungible in these distinct pathways to olefin production. Accordingly, KMMEF methanol will directly compete with coal-derived methanol to meet the feedstock demand at these MTO facilities, and will not compete with naphtha to olefin in this market.

[9] SEIS, Appendix A at 78 ("The marginal plants are located at the intersection of the demand line and the supply curve assuming static demand. The mix of methanol plants on the margin indicates that methanol from the KMMEF will displace the methanol capacity shown immediately to the right of the demand line (see Table 4.5).").

[10] *See* SEIS, Appendix A 80 ("... the cost advantages of producing methanol at the KMMEF from natural gas and shipping it efficiently to Asian markets, including China's coastal chemical complexes, will displace methanol production from existing coal-based plants in China and should also discourage development of new coal-based methanol plants . . .").

[11] Note that this estimate excludes coal to olefin capacity in China. *See also*, Table 4.1 of Appendix A; SEIS, Appendix A at 59 ("Most of China's [methanol] supply is based on coal as a feedstock."); SEIS, Appendix A, Figure 4.2 at 61.

[12] SEIS, Appendix A at 62; SEIS, Appendix A, Sec. 4.3.3 at 65 (citing ASIACHEM, 2018).

[13] SEIS, Appendix A at 78 ("The demand for methanol is growing. Developing world scale methanol projects takes time. In the near term, some of the plants KMMEF will displace may continue to operate or enter operation to meet this growing demand until market forces take full effect and KMMEF displaces a combination of existing marginal producers and new CTM plants that fail to be developed.").

[14] *See* Section 4.2.2 of Appendix A (identifying proposed coal to methanol projects in China that could meet growing demand in East China, if it is not met by other sources such as KMMEF).

[15] *Id.*

[16] SEIS, Appendix A, Table 4.3 at 73 (cash cost of coal)-75; 78 (citing the delivered cash cost of KMMEF methanol as $150); see generally, Appendix A, Ch. 4 (pp. 56-82).

[17] Appendix A, p. 80.

profiles and anticipated price competiveness of the [KMMEF] project, displacement of coal-based methanol in the Chinese market would likely occur." SEIS at 4-9-4-10.

Applying this conclusion to the GHG impact analysis, the SEIS then considers the effect of KMMEF displacing an equal amount of coal-based production.[18] It concludes (under a range of assumptions) a net displacement of between 12.68 and 15.02 million metric tonnes of CO_2e per year. SEIS, Sec. 3.5.9. Given the large delta between KMMEF and coal-based GHG emissions, even if there was a less than total displacement of a coal-based production, KMMEF could still result in substantial GHG emissions benefits. *See* SEIS, Table 3-8 at p. 3-28 (summarizing displacement effects under a range of emission scenarios). Additional study by the Low Carbon Prosperity Institute (LCPI) further concluded that the KMMEF facility is consistent with projections that "coal-based methanol in 'Asia Pacific' is increasingly and almost exclusively substituted by natural gas-based methanol." LCPI Draft SEIS Comment Letter, p. 2. Additionally, LCPI concluded that the "KMMEF methanol is very likely to provide GHG benefits in the short to medium term (at least through 2030)" and that "[t]he methanol from the KMMEF facility would be entirely consistent with longer-term low carbon pathways that project an increasing role of natural gas based methanol, including much higher North American supply as an essential component of the strategy." *Id.*

2) A detailed sensitivity analysis that examines the high, low, and median ranges of the following variables:

a. Final end use of the methanol in which it is combusted as fuel;

RESPONSE: Analysis of a final end use of the KMMEF methanol as combusted fuel is not an alternative requiring consideration under SEPA. SEPA requires consideration of reasonable alternatives that meet the project purpose, which in this case is the manufacture of methanol from natural gas and shipment to Asia for production of olefins. Methanol as fuel is not consistent with the stated project purpose. Additionally, methanol as fuel is prohibited by the terms of The Dock Use Agreement contained in SEIS, Appendix E. SEPA does not require consideration of alternatives that are prohibited uses. See SEIS, Section 3.4.7, p. 3-22.

Nevertheless, to respond to comments and fully inform decision-makers, the SEIS, including appendices, contains an analysis of the potential GHG impacts of using KMMEF methanol for a fuel end use. For example, Standard Response No. 7, at page 4-10 of the Final SEIS, presents the GHG impact of burning KMMEF methanol as fuel as compared to other fuel sources, including petroleum gasoline and a coal-based methanol and concludes that the GHG impact of methanol use as fuel is comparable to gasoline and less impactful than a coal-based methanol fuel. Additional analysis and explanation of methanol's potential use as fuel is also found in SEIS, Appendix A, Section 4.3.5; Appendix A, Section 5.5 (pp. 93-94); and SEIS, Appendix B, Section 9 at pp. 50 (containing a table comparing an M15 splash blend with an octane blending under gasoline, KMMF and coal scenarios).

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[18] The GHG effects of a coal-based production were then analyzed in detail in Appendix A, Ch. 5 (pp. 82-91) and were estimated to be higher than the life cycle GHG impacts of KMMEF methanol, even when considering a range of GWPs and upstream methane leakage rates (including rates over 3%, which is the high-end rate forwarded by the Stockholm Environmental Institute) and both the AR-4 and AR-5 protocols. *See, e.g.*, SEIS, Appendix B, Section 7.4 at pp. 44 (Table 13) and 46. Olefins derived from KMMEF methanol were also found to have a smaller GHG footprint than naphtha-derived olefins under an inclusive range of assumptions about upstream fugitive methane emissions and AR-4 and AR-5 protocols and using both a 20 and 100 year GWP. SEIS, Appendix B, Section 7.4 at pp. 46. This SEIS analysis explains how the Stockholm Environmental Institute comments regarding naphtha to olefins GHG emissions failed to include the full life cycle emissions for naphtha to olefins and improperly allocated all of the upstream extraction emissions to natural gas production, ignoring other products from the extraction including, but not limited to, crude oil. Section 8 of Appendix B discusses the potential for a different olefin feedstock, naphtha, to affect KMMEF-induced market displacement.

Applying the GHG impact of burning all KMMEF methanol to the sensitivity analysis in the SEIS is a straight-forward addition process (replacing the olefin production values with fuel burning values because all of the upstream values remain the same), as shown in the following table:

Scenario	Baseline		Lower		Upper		Market Mediated	
Construction Emissions	Total	WA	Total	WA	Total	WA	Total	WA
Direct	0.0004	0.0002	0.0004	0.0002	0.0004	0.0002	0.0004	0.0002
Upstream	0.015	0.0008	0.015	0.0008	0.015	0.0008	0.015	0.0008
Operational Emissions								
Upstream Natural Gas	1.04	0.052	1.025	0.052	1.41	0.16	1.041	0.052
Upstream Power	0.19	0.17	0.00	0.00	0.28	0.26	0.22	0.19
Direct Emissions	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Downstream Emissions	0.17	0.00009	0.17	0.00009	0.30	0.00009	0.17	0.00009
Petroleum Fuel Production	0.03	0.0048	0.03	0.0048	0.06	0.0048	0.03	0.0048
Fuel Use	4.94	0	4.94	0	4.94	0	4.94	0
KMMEF (if fuel) Subtotal	7.12	0.96	6.91	0.79	7.74	1.16	7.15	0.98
Voluntary Mitigation[1]	-0.96		-0.79		-1.16		-0.98	
KMMEF (if fuel) Total	**6.16**		**6.12**		**6.58**		**6.17**	

If the methanol "Fuel Use" figures above were similarly applied to coal-derived methanol burned as fuel, KMMEF would still reflect significantly less GHG emissions than coal-derived methanol.

b. Upstream natural gas emissions for gas supplied to the Project, using a variety of natural gas leak rates, at a minimum including the rates used in the report by the Stockholm Institute cited in Ecology's December 28, 2018, comments on the 2018 Draft SEIS.

RESPONSE: The SEIS, including appendices, contains analysis on the effect of a range of upstream fugitive emission rates on the projected GHG impacts of the project, including those presented by the Stockholm Environmental Institute ("SEI"). *See* SEIS, Standard Response No. 3 (p. 4-5, 4-6).

In footnote 2 of its December 28, 2018 letter,[19] the Department of Ecology references the Discussion Brief titled "Towards a climate test for industry: Assessing a gas-based methanol plant" published by SEI and available at https://www.sei.org/wp-content/uploads/2018/02/sei-2018-db-towards-a-climate-test.pdf. The SEI Discussion Brief cites a number of studies but concludes a range of 1% to 3% leakage is plausible and uses this range in assessing potential KMMEF GHG impacts.[20] This analysis was supplemented in a December 28, 2018 comment letter from the authors of the SEI Discussion Brief. *See* SEIS, Appendix D-3 at pp. 42-53. In their comment letter, SEI cites the need to evaluate "bottom up" inventories and concludes, "[i]n summary, we see little reason why methane loss rates from the gas provided to the Kalama facility (whether from Canada or the U.S.) would be lower than the current most

[19] This letter is included in SEIS, Appendix D-1 at pp. 6-15.

[20] Stockholm Environment Institute, *Toward a Climate Test for Industry: Assessing a Gas-Based Methanol Plant* (2018) at p. 2-3 ("For the 20-year lifespan of a facility such as the Kalama methanol refinery, it seems plausible that methane leakage, in a best-case scenario, could be reduced to 1% on average – if industry and policy efforts to reduce emissions are successful. However, it also seems plausible that leakage rates could be as high as 3% or more, especially if the Kalama facility draws from shale gas resources, and regulations such as the EPA methane rule (which the Trump Administration has sought to block) are not successfully implemented.") (footnotes omitted). Note that the highest leakage rate estimate cited by SEI, 4.3%, was mentioned as a potential global leakage rate, but was not considered further by SEI. *See* p.2 of SEI Discussion Brief. Therefore, we do not comment on it further here.

comprehensive (yet still incomplete) estimate of 2.2%, published in the journal *Science* in 2018." The 2.2% methane loss rate study is generally referred to as the "Alvarez" study and the SEI authors posit that this number would increase to "2.3% if local gas distribution were also included." *Id.*

The following summarizes information from the SEIS, including appendices, responsive to both SEI documents.

Appendix B, Section 3, Table 6, to the Final Supplemental EIS contains a discussion of the range of upstream leakage rates presented for review by decision makers, including the *Alvarez* study, which is listed in the last line of the table. The SEIS considered at least 13 different leakage rate methodologies including two that were not included in the Draft Supplemental EIS and Appendix A because they were not yet publicly available. As relevant here, and as discussed in Appendix B, the GREET model has been updated in 2018 to include a scenario to account for a higher range of methane emissions from more recent studies, including *Alvarez*. *See* Appendix B, Section 3, Table 6, n. f. The Final Supplemental EIS has been updated to include the 2018 GREET model (which is referenced throughout the report as the EDF value) that takes into account the higher range of CH_4 emissions. This value is included in the SEIS's Upper scenario. *See* SEIS, Sec. 3.4.5.3.

We note however, that contrary to SEI's assertion, a direct application of *Alvarez* has been determined to be inappropriate in this case by life cycle analysis modeling experts because it assigns all fugitive emissions to natural gas, whereas the wells being analyzed produce natural gas *and* oil (which is not a KMMEF feedstock).[21]

> The 2018 EDF study completed by Alvarez previously mentioned provided an assessment of estimated underreporting of the inventory of leak rates. The leak rate is reported as 2.3 percent of natural gas production. However, methane leaks occur in both oil and natural gas operations and the reported leak rate is for combined operations. To obtain an accurate estimate based on the component attributable to natural gas production the total leak rate needs to be converted to an LCA model inputs [*sic*], which was done by Argonne National Laboratory in the 2018 update to GREET. The GREET model includes an EDF assumption option for natural gas losses (but not for crude oil production). The increased leak rate used in ANL's GREET model is 60 percent greater than the EPA inventory which is also consistent with the reported increase over EPA inventory estimates in the Alvarez paper.

In short, SEI's application of the *Alvarez* emission factors improperly allocated all fugitive emissions to of the extraction emissions of natural gas alone thus overestimating the project's GHG emission under a high end scenario.

That said, Appendix B (replicating a chart found in Appendix A), provides decision-makers with the impact of assigning the full EDF/*Alvarez* value to KMMEF emissions.

[21] Appendix B, Section 3.3 at 21 ("Total fugitive emissions reported in the EDF studies correspond to oil and gas production and therefore it is necessary to allocate total fugitive emissions between the crude oil and the natural gas produced by the same well. The allocation depends upon the amount of associated gas produced with crude oil.").

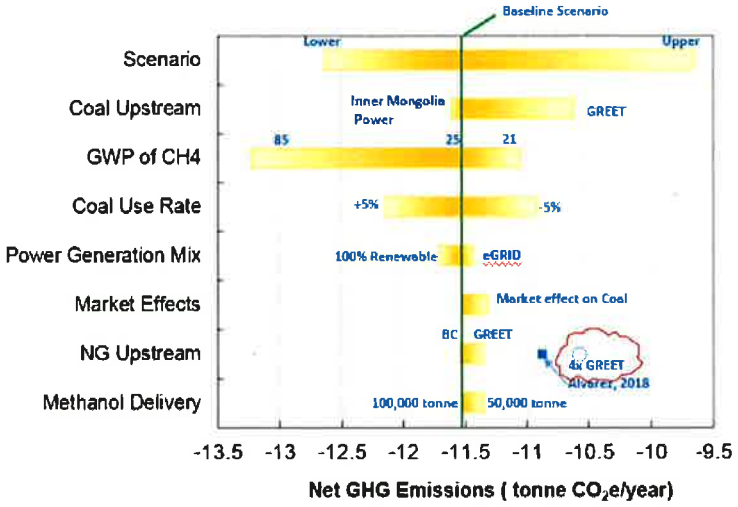

Figure 6.2. Sensitivity analysis to key inputs.

This sensitivity analysis represents a leakage rate of 3.05% (consistent with the high end of values presented by SEI). *See* SEIS, Appendix A at p.98. Accordingly, the SEIS and Appendices respond to the full range of studies identified in both the SEI Discussion Memo and comment letter.

3) A comparison of other displacement technologies in addition to coal-to-methanol facilities, including at a minimum:

a. Natural gas-to-methanol-to-olefin facilities;

We assume that this question intends to ask whether the construction of new natural gas to methanol facilities would affect KMMEF's ability to out-compete other sources rather than whether there are natural gas-to-methanol-to-olefin facilities.

As an initial matter, KMMEF's proposed use of the ULE technology to mitigate for GHG emissions has significant GHG benefits as compared to facilities that employ Combined Reforming ("CR") technology (which is currently considered by the EPA as the Best Available Control Technology). Because, to our knowledge, KMMEF is the first methanol facility to propose the use of ULE technology, it is reasonable to assume that it will have GHG benefits over other natural gas to methanol facilities.[22]

Section 5 of Appendix B to the Final Supplemental EIS specifically responds to commenters who asked whether the construction of additional natural gas based methanol plants other than KMMEF would change the displacement analysis by limiting KMMEF's ability to out-compete other market sources.

This analysis assumed the construction of three new natural gas to methanol plant locations (U.S. Gulf Coast and Trinidad, Iran, and Australia), which were chosen because they hypothetically have access to the East China market. SEIS, Appendix B at 27. The report concluded that the low comparative production cost of KMMEF methanol still out-performed coal-based methanol production even when hypothetical natural gas import competitors came online. *Id.* at 29. Other natural gas-to-MTO facilities and the potential for KMMEF displacement are also discussed in Section E.2 of Appendix A at p. 141.

[22] *See* SEIS, Sec. 3.5.8 at 3-31 ("direct emissions within Washington are lower for the ULE technology (0.96 million tonnes per year) compared to the CR technology (1.29 million tonnes per year from Table 11).").

b. Naphtha-to-olefin facilities.

Analysis of the GHG impacts of naphtha-to-olefins is not required under SEPA, because it does not meet the KMMEF's project purpose and need and is therefore not a reasonable alternative. Additionally, it bears noting that KMMEF methanol would not directly compete with naphtha producers because facilities that produce olefins from methanol cannot use naphtha as a feedstock (see response to Question 1, above).

Responsive to comments, however, a comparative analysis of naphtha-to-olefin facilities is provided in Section 5.4 of Appendix A.[23] Additionally, Section 7 of Appendix B to the SEIS analyzes the GHG emissions from the crude oil to naphtha-to-olefins production route as well as other issues relating to this production methodology. Finally, Section 8 of Appendix B to the SEIS explored the potential for the proposed project to result in displacement of crude oil-to-naphtha-to-olefins sources.

A comparison of the GHG impacts of the crude oil-to-naphtha-to-olefin pathway as compared to the natural gas-to-MTO pathway concluded that, under all scenarios analyzed, the KMMEF ULE technology alternative had a lower life cycle GHG footprint than production from naphtha. Figures 4-2 and 4-3, at p. 4-9 of the SEIS and reproduced below, compares the annual GHG emissions of the proposed project, the crude oil-to-naphtha-to-olefins method and the coal-to-MTO method under a range of potential modeling inputs (*e.g.*, under the AR-4 and AR-5 methodologies, and under a range of assumptions on upstream leakage rates, including EDF which contains the most conservative numbers on upstream emissions).

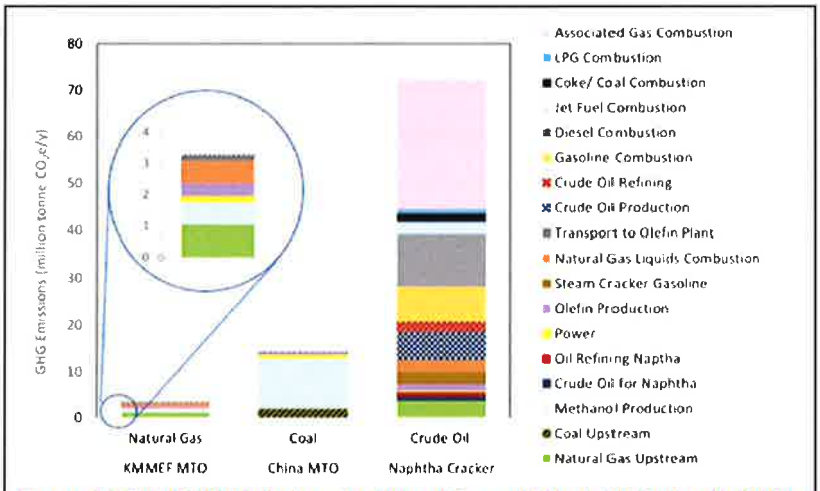

Figure 4-2. Total GHG Emissions for Natural Gas and Crude Oil Routes to Olefins before Allocation to Products (Figure 13 Appendix B)

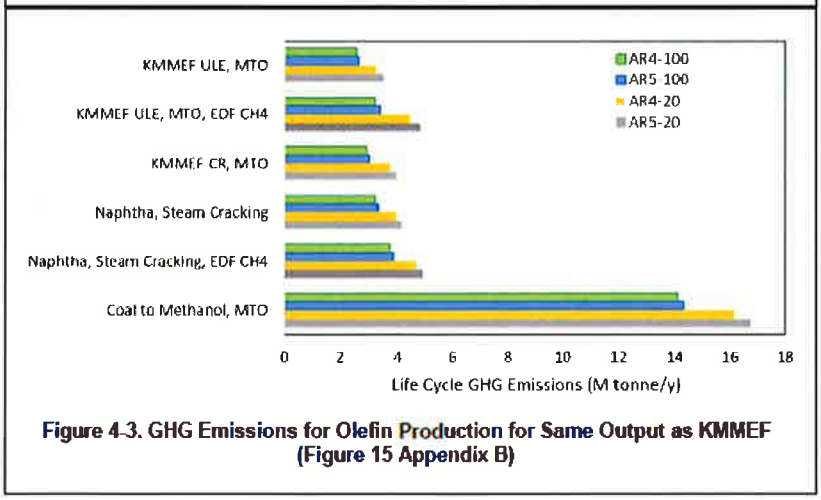

Figure 4-3. GHG Emissions for Olefin Production for Same Output as KMMEF (Figure 15 Appendix B)

[23] Please refer to Standard Response No. 5 ("Consideration of other Methods of Creating Methanol/Olefins") at p. 4-8 of SEIS.

The analysis provided in the referenced sections of the SEIS and Appendices supports the conclusion that the KMMEF facility would produce lower GHG emissions than other displacement technologies, including coal-to-methanol and naphtha-to-olefin facilities.

Conclusion. Based on these clarifications, together with the contents of existing environmental documents already before Ecology, it's the County is satisfied the agency's October 2019 letter has been addressed adequately for the purposes of validating a "complete submittal." Based on the County's SEPA record, the County considered—and until October of this year understood Ecology to be in accord—that the SEIS conclusions regarding GHG impacts were accurate, well supported, and consistent with the legal framework required by SEPA.

There exists a deafening silence and disingenuous discounting in the letter of a Shorelines applicant voluntarily agreeing to mitigate all GHG emissions resulting within the State of Washington—and of the months of work of and costs to the other Washington public agencies pursuing this mitigation. This was an unprecedented commitment within the SEIS regarding no significant adverse impacts—independent of any coal-to-methanol displacement assumptions and independent the County's conclusion that no modification to the existing Shoreline Conditional Use Permit was necessary.

In sum, the County believes Ecology has all of the information necessary to timely issue a decision in this matter. As to any collateral perspectives on the analyses conducted for the SEIS, as having the ear of Ecology, the EIS adequacy appeal currently pending before the Shoreline Hearings Board would be the proper forum to unmask and defend those perspectives.

I look forward to a prompt decision from Ecology. If you would like to discuss any of the statements in this response, please do not hesitate to call.

Regards,

E. Elaine Placido, DPA
Director of Community Services

Enclosures: October 30, 2019 Letter from Northwest Innovation Works-Kalama

Attachments: Attachment to Ecology Response Memo including *Millennium Bulk Terminals – Longview, Final SEPA Environmental Impact Statement 5.8-24* and *SEPA MDNS Notice of Construction Order 4153-AQ07, Modification 1(DeMay. 2018, November 15)*

Cc: staff
Mark Wilson, Port of Kalama
Brian Carrico, WSP
Vee Godley, NWIW

Double Green Bridge NW INNOVATION WORKS KALAMA

380 West Marine Drive, Kalama WA

October 30, 2019

Dr. E. Elaine Placido
Cowlitz County
207 Fourth Avenue N
Kelso, WA 98626-4187

Re: Response to October 9, 2019 letter from the Department of Ecology requesting additional information - Question Set 1.

Dear Dr. Placido:

You have asked NW Innovation Works ("NWIW") to respond to the portion of the Department of Ecology's ("Ecology's") letter related to the "In-State Greenhouse Gas Emissions Mitigation Plan" for use in the County's reply. We have addressed the seven inquiries included in that question set below.

While NWIW remains concerned with the lack of a regulatory basis for Ecology's imposition of Clean Air Rule limitations on our voluntary State Environmental Policy Act ("SEPA") mitigation plan, we nonetheless appreciate that this is a novel and robust effort towards comprehensive mitigation and the need to determine technical and regulatory parameters within Ecology's regulatory framework requires diligent inquiry.

In that context, it is notable that Condition 4 of the current Shoreline Conditional Use Permit ("SCUP") already requires adherence to the Rule's 1.7% annual facility emission reduction requirement while the Voluntary Greenhouse Gas Mitigation Program Framework ("VMPF") presented represents a separate 100% mitigation of in-state related emissions, including greenhouse gas ("GHG") emissions beyond the facility itself. The VMPF sets forth a mitigation program that ensures accountability to Ecology and the County and third party verification of the quality of GHG mitigation projects.

Further refinement and details are appropriately to be determined (subject to Ecology and County approval) prior to program implementation. It would appear inconsistent with Ecology practice, the Shoreline Management Act and SEPA to require this anticipated detailed program delineation beyond what is provided in the VMPF and these clarifying responses prior to Ecology concluding SCUP review.

We look forward to working with Ecology and the County to further refine the VMPF and enable subsequent program implementation. To that end, and in an effort to enable Ecology's review of our existing SCUP, NWIW offers the following responses to Ecology's requests for additional information.

1) A list of the greenhouse gas emissions intended to be covered by the Project's final greenhouse gas mitigation plan, using Table A-1 as provided in WAC 173-441-040.

Kalama Manufacturing & Marine Export Facility ("KMMEF") project will result in CO_2, CH_4 and NO_x emissions. NWIW will use the emission conversions factors and 100-year Global Warming Potential to calculate the CO_2e for construction and operating emissions from the project set forth in WAC 173-441-040, Table A-1.

The VMPF requires mitigation for the following list of emissions within Washington State:

- Construction emissions (equipment, fuel and materials);
- Onsite direct emissions including
    - Natural gas combusted in Power Generation, steam boiler and start-up heater
    - Purge gas from the process combusted in the steam boiler
    - Emissions from the flare
    - Diesel fuel used to test firewater pumps and emergency generators;
- Transport emissions including
    - Marine
    - On road or off-road emissions related to the transport of people and materials to and from the site;
- Upstream natural gas (within Washington state); and
- Purchased Power.

For additional information, please review Attachment A of the VMPF.

2) A more detailed description of the quantification methods that NWIW proposes to use to measure in-state greenhouse gas emissions associated with the Project, using the reporting framework provided in WAC 173-441-030(4) and WAC 173-441-120(3).

Consistent with WAC 173-441-030(4), the VMPF provides that "[f]or those VMP Emissions subject to reporting requirements under WAC Chapter 173-441, Reporting of Emissions of Greenhouse Gases, the methodologies for measuring and calculating Project VMP GHG Emissions shall be as provided in that WAC chapter, including the provisions of 40 C.F.R. Part 98 that are incorporated by reference." VMPF at 4-5 (*see also* VMPF, Attachment A). "VMP Emissions that are not subject to the provisions of WAC Chapter 173- 441, shall be measured, calculated or estimated as described in Attachment A, or by such other method as may be recommended by the VMP Board, and approved by Ecology and Cowlitz County." VMPF at 5. In the event that the VMP Board is non-operational, NWIW will identify accounting

methodologies subject to Cowlitz County and Ecology approval[1]. Finally, "unless or until the Washington Clean Air Rule (WAC Ch. 173-442) (which provides for certified third party verification of GHG reporting and mitigation) is re-instated, the Department of Ecology may provide verification of all Project VMP GHG Emission reporting that would otherwise be subject to the reporting requirements of WAC Chapter 173-441." VMPF at 5. Additionally, should methodologies change over the life of the project, the VMPF anticipates application of such newly adopted methodologies.

This framework, which again incorporates the reporting requirements of WAC Ch. 173-441, is consistent with WAC 173-441-120(3), which provides that "GHG emissions reported voluntarily under WAC 173-441-030(4) must be calculated using the following methods:

(a) If the GHG emissions have calculation methods specified in Table 120-1 of this section, use the methods specified in Table 120-1.

(b) If the GHG emissions have calculation methods specified in WAC 173-441-130, use the methods specified in WAC 173-441-130.

(c) For all GHG emissions from facilities not covered in Table 120-1 of this section or persons supplying any product other than those listed in WAC 173-441-130, contact ecology for an appropriate calculation method no later than one hundred eighty days prior to the emissions report deadline established in WAC 173-441-050(2) or submit a petition for alternative calculation methods according to the requirements of WAC 173-441-140.

The following provides additional detail on how NWIW (subject to approval by Ecology and the County) proposes to fully account for in-state GHG emissions as set forth in the VMPF. The following section is broken into two subsections, construction emissions and operational emissions. Under both categories of emissions, we provide the estimate of total emissions (as set forth in the SEIS) as well as the conversion factors provided to calculate CO_2e for each GHG. We then explain that the estimated emission quantities will be updated, where possible, based on actual emissions data.

[1] In this or any subsequent reference to the VMP Board, note that in the event the VMP Board is unable to discharge its duties, NWIW is required to fulfill its mitigation obligations and functions in accordance with the purposes and intent of this VMP framework. NWIW is responsible for this obligation regardless of the status of this Board or any other advisory panel.

I. Construction Emissions

a. Construction-related Fuel Emission Quantification

The Life Cycle Analysis[2] ("LCA") at Table 3.1, p. 40, currently provides the following estimates on fuel use during KMMEF construction:

Estimate of Construction Fuel Use

Construction Fuel	gallons
Diesel	493,762
LPG	154,135
Gasoline	283,961
Marine Diesel	44,452

Marine diesel includes fuel used for dredging operations plus a fraction of the marine fuel used to haul equipment within the maritime limits of the WA used for inventory calculations.

As part of the VMPF accounting, these estimates will be updated based on actual fuel use to ensure that in-state GHG emissions are fully mitigated. Specifically, and subject to Cowlitz County and Ecology approval, the actual fuel consumed on the construction site will be recorded at the point of purchase and actual numbers used for the construction fuel calculation. The commuter gasoline use will be estimated based on average commute distance multiplied by the number of worker commutes and average vehicle fuel efficiency. Marine diesel use for dredging will be based on the hours of dredging operations as well as material delivery by truck, rail, and marine vessel will be estimated by the distanced travelled in Washington and cargo hauling intensity. The final construction fuel consumption can then be adjusted to the actual value.

b. Construction-related Fuel Emission CO_2e Emission Factors

Following an analysis of actual fuel use, CO_2e emissions will then be calculated using the Emission Factors for Fuel Combustion from WAC 173-441-130, Table 130-1, which are replicated here to facilitate Ecology's review.

Emission Factors for Fuel Combustion from WAC 173-441-130 Table 130-1

Pollutant	CO_2e (Emission Factor (metric tonne/gallon)
Diesel Fuel	0.010230
LPG	0.005593[3]

[2] Kalama Manufacturing & Marine Export Facility (KMMEF) SEPA Final Supplemental Environmental Impact Statement and Appendices ("SEIS"), Appendix A.

[3] WAC 173-441-130, Table 130-1 refers to LPG as propane, which is used interchangeably in commerce. EPA AP-42 emission factor for propane and LPG are within 1% in kg CO_2/gal.

Gasoline	0.008960
Marine Diesel	0.01150[4]

Estimated Emissions from Construction Fuel Use

Pollutant	CO_2e using WAC 173-441-130 Table 130-1 propane value for LPG
Emissions (tonne)[a]	
Diesel	5,051
LPG Equipment	862
Gasoline Commute	2,544
Marine Diesel	511
Total	8,968

c. Construction Materials Quantification

Table 3.5 of the LCA contains estimates of all materials required to construct the KMMEF. Consistent with the methodology described in the VMPF, these estimates will be updated based on actual weight of material use as set forth in shipping bills of lading for equipment and materials. The weight of concrete and aggregate will be estimated from the dry volume of delivered concrete. The fraction of petroleum asphalt and aggregate in paving material will be estimated from the material specifications. Finally, the split between basic materials and delivered materials will be estimated based on final design specifications.

d. Construction Material CO_2e Conversion

WAC 173-441 does not contain emission factors for the production of materials. Subject to future oversight by Cowlitz County and Ecology, the LCA values for of the emissions related to construction materials will be used.

LCA Table 3.1. Upstream Emissions Conversion Factors for Construction Materials

Pollutant	CO_2	CH_4	N_2O	CO_2e	Source
Life Cycle Emission Rate (kg/tonne)[a]					
Structural Steel	2,687	4.3	0.022	2,802	GREET2_2017
Rebar	2,020	3.5	0.023	2,115	GREET2_2017
Stainless Steel[b]	5,204	11.3	0.090	5,512	GREET2_2017
Copper [b]	3,083	6.3	0.0555	3,257	GREET2_2027
Asphalt [c]	639	0.4	0.003	651	GREET1_2027
Aggregate [d]	300	0.2	0.000	305	US LCI
Cement [d]	2,900	0.7	0.002	2,918	GREET1_2017

[4] Table 130-1 does not provide and emission factor for marine diesel, which is expected to be marine gas oil, or No. 2 diesel. Marine diesel emission factor is a conservative estimate based on mix of No 5 and No. 6 oil from AP-42.

Using the estimated construction material quantities, the LCA estimates that there will be a total of 574,649 tonnes CO_2e emitted from the production of materials required for facility construction. The emissions released within Washington were estimated as being 5% of the global total, which equates to 28,733 tonnes CO_2e.

However, during KMMEF construction, the quantity of materials sourced in Washington State will be recorded at the point of purchase and actual quantities used to calculate NWIW's VMPF obligation. Accordingly, the 5% estimate on Washington-based materials sourcing will be adjusted to reflect actual data prior to assigning the total VMPF obligation.

II. Operational Emission Quantification and CO2e Conversion

KMMEF continuous emissions and associated conversion factors have been estimated in the LCA. Additional intermittent emissions and emissions related to staff commutes have been added with the emission estimation method identified in the following table.

Emission Source	Estimated 1st year GHG Emissions (million tonne CO_2e)	Emission Estimation Method
Upstream Natural Gas	0.052	WA inventory[5]
Upstream Power	0.37	NWPPC marginal mix[6]
Boilers	0.347894	LCA
Onsite Combustion Turbine	0.379232	LCA
Downstream Emissions	0.00009	LCA
Petroleum Fuel Production	0.005	LCA
Firebox Heater	0.001397	EIS
Flare Pilot	0.000155	EIS
Flare	0.003175	EIS
Vent Scrubbers/Fugitive	0.000006	EIS
Emergency Generators	0.000301	Air permit page section 6.l
Emergency Fire Pump	0.00005	Air permit page section 6.m
Staff commute	0.00043	WAC 173-441-130
Deliveries	0.000056	WAC 173-441-130
KMMEF Total	**1.159786**	

[5] EPA FLIGHT data https://data.wa.gov/w/kuv4-tmbd/mncn-zj8q?cur=CMvJkJRWaTv&from=root, combined with Williams pipeline throughput, http://www.northwest.williams.com/NWP_Portal/CapacityResultsScrollable.action and pipeline segment lengths http://www.northwest.williams.com/NWP_Portal/downloads.action combined with 220 mile transport distance within Washington.

[6] NWIW assumes actual power consumption as determined from utility invoices, as noted in the subsequent table, will be the preferred measure for calculating emissions resulting from upstream power once operational.

Note that these emission estimates rely, in part, on WAC Ch. 173-441 factors and, in part, on factors drawn from the LCA and the EIS/SEIS. The emissions from boilers in the LCA are based on a carbon balance for the system and will be quantified through continuous monitoring. Emissions from natural gas combustion will be based on WAC 173-441 Table 130-1. Note that the emission factor in the LCA was within 0.3% of the Table 130-1 value.

NWIW understands, however, that Ecology prefers application of emission calculation methodologies presented in WAC 173-441-120, which is the approach adopted in Attachment A to the VMPF. The following table gives suggested calculation methods following the guidance from WAC 173-441-120.

Emission Source	Emission Type	Suggested Emission Measurement Method	Suggested Emission Calculation Method
Upstream Natural Gas	Suppliers of Natural Gas and Natural Gas Liquids	Actual natural gas flow to the plant as measured by the custody / fiscal meter on utility invoices	494 g CO_2e/MMBtu Based on EPA Flight Tool and Williams pipeline throughput[7]
Upstream Power	Electricity Generation	Actual power consumption as determined from utility invoices	Table 120-1 in WAC 173-441-120 40 C.F.R. Part 98 Subpart D
Boilers	General Stationary Fuel Combustion Sources	Measure flowrate and composition of the fuel flows to the boiler	Table 120-1 in WAC 173-441-120 40 C.F.R. Part 98 Subpart C
On site Combustion turbine	General Stationary Fuel Combustion Sources	Measure natural gas flowrate to the turbine	Table 120-1 in WAC 173-441-120 40 C.F.R. Part 98 Subpart C
Downstream Emissions (marine)	Vessel emissions	Estimate diesel consumption based on number of ships /distances to open water/fuel efficiency	Table 130-1 in WAC 173-441-130

[7] Note that WAC Ch. 173-441 lacks an upstream natural gas emission calculation method.

Emission Source	Emission Type	Suggested Emission Measurement Method	Suggested Emission Calculation Method
Firebox Heater	General Stationary Fuel Combustion Sources	Measure natural gas flowrate to the firebox	Table 120-1 in WAC 173-441-120 40 C.F.R. Part 98 Subpart C
Flare Pilot	General Stationary Fuel Combustion Sources	Measure natural gas flowrate to the flare pilot	Table 120-1 in WAC 173-441-120 40 C.F.R. Part 98 Subpart C
Flare	General Stationary Fuel Combustion Sources	Measure flowrate, time and composition and calculate for actual value based on composition and flow for start-up, shutdown and emergency release though valves.	Table 120-1 in WAC 173-441-120 40 C.F.R. Part 98 Subpart C
Vent scrubbers/fugitive	Direct air emissions	Measure composition and flows to calculate for actual value	Use formula A-1 in WAC 173-441-030
Emergency Generators	General Stationary Fuel Combustion Sources	Measure annual diesel consumption via fill volumes to fuel tank	Table 130-1 in WAC 173-441-130
Emergency Fire Pump	General Stationary Fuel Combustion Sources	Measure annual diesel consumption via fill volumes to fuel tank	Table 130-1 in WAC 173-441-130

Emission Source	Emission Type	Suggested Emission Measurement Method	Suggested Emission Calculation Method
Staff commute	Vehicle Emissions	Estimate gasoline consumption based on actual days worked	Table 130-1 in WAC 173-441-130
Deliveries	Vehicle Emissions	Estimate diesel consumption based on number of deliveries	Table 130-1 in WAC 173-441-130
Petroleum Production	Upstream Emissions for petroleum Production	Estimate diesel consumption based on number of deliveries	Upstream factor based on LCA report excluding crude oil production

Applying the methodologies presented in this table, KMMEF emission calculations are as follows:

The emission factors for liquid fuels primarily affect construction emissions. The overall total emissions between the LCA report and using the emission factors in the WAC is less than 0.1%.

Scenario	LCA Marginal Power	WA WAC EFs
Construction Emissions		
Direct	0.000221	0.000224
Upstream	0.00081	0.00081
Operational Emissions		
Upstream Natural Gas	0.052	0.053
Upstream Power	0.370	0.370
Direct Emissions	0.728	0.728
Downstream Emissions	0.00009	0.00009
Petroleum Fuel Production	0.0048	0.0048
KMMEF Total	**1.156**	**1.157**

A comparison of the total estimated GHG emissions based on LCA methodology as opposed to WAC Ch. 173-441 shows that the differences in methodologies affects less than one percent of the total final emissions estimate.

3) The specific criteria NWIW intends to use to determine whether to employ a mitigation activity or program, using WAC 173-442-150 as a guide.

Consistent with parameters found in WAC 173-442-150, the VMPF requires use of established protocols and third-party verification to ensure that mitigation efforts are:

1. Real, specific, identifiable and quantifiable;
2. Permanent;
3. Verifiable; and
4. Additional to existing law or rule.

Mitigation efforts are enforceable by Cowlitz County and the Department of Ecology as they retain approval authority over qualifying protocols.

As explained further in the VMPF:

> Qualifying offset verification protocols will be those that qualify for use in regulated carbon markets (for example protocols used to calculate offsets for the California Air Resources Board) and/or through protocols published by established registries, including, but not limited to, Verra (formerly Verified Carbon Standard), American Carbon Registry, Climate Action Reserve, or the Gold Standard. The VMPF Board will require project applicants to verify their GHG reduction or offset benefits. Qualified verification protocols are subject to review and approval by the Department of Ecology and Cowlitz County…
>
> NWIW has built accountability into the VMPF through the Department of Ecology and Cowlitz County's roles in assessing GIIG impacts in Washington and reviewing qualified mitigation projects identified by a VMP advisory board ("VMP Board") and by requiring that NWIW submit annual GHG emission reporting and mitigation compliance to the Department of Ecology and Cowlitz County. Additionally, consistent with the approaches employed in existing GHG regulatory frameworks, like the protocols used to calculate offsets before the California Air Resources Board, the carbon benefit of qualifying mitigation projects must be confirmed by an independent third-party verification entity.

We note that many of these third-party verifiers (*e.g.*, Climate Registry and Climate Action Reserve) are listed approvingly in WAC 173-442-220(6).

4) A list of the specific protocols that NWIW intends to initially use for the Project's final greenhouse gas mitigation plan, using WAC 173-442-160 as a guide.

NWIW is committed to working with Cowlitz County and the Department of Ecology, as well as a Voluntary Mitigation Plan Advisory Board (VMP Board) to solicit specific activities and programs for emission reductions. NWIW does not have an initial set of mitigation projects

proposed for meeting its initial mitigation obligation (*i.e.*, mitigation for the first year of construction activities).

However, protocols and projects in Washington State that have been identified in various carbon emissions reduction registries are a likely guide for initial projects, including:

Registry	Protocol	Project Locations
ACR	Forest Carbon	Poulsbo, Morton
ACR	Livestock Waste Management	Lynden
ACR	Forest Carbon	Nespelem
ACR	Transport / Fleet Efficiency	Spokane, WA
CARB	Forest Carbon	Colville, Nisqually
CARB	Livestock	Lynden, Yakima
CAR	Improved Forest Management - CARB Compliance	Ashford
CAR	Organic Waste Composting	King County
CAR	Organic Waste Composting	Everett, Washington
CAR	Livestock Gas Capture/Combustion	Lynden, WA
CAR	Livestock Gas Capture/Combustion	Whatcom County, Near Lynden
CAR	Livestock - CARB Compliance	Lynden, WA
CAR	Livestock Gas Capture/Combustion	Mount Vernon
CAR	Improved Forest Management - CARB Compliance	Stevens County
CAR	Livestock Gas Capture/Combustion	Near Yakima County
CAR	Livestock - CARB Compliance	Near Yakima County
CAR	Organic Waste Composting	Stanwood, WA
CAR	Livestock Gas Capture/Combustion	King County; Enumclaw
CAR	Landfill Gas Capture/Combustion	Walla Walla
CAR	Livestock Gas Capture/Combustion	Whatcom County; Lynden
CAR	Livestock - CARB Compliance	Lynden, Washington
CAR	Organic Waste Digestion	Yakima County
VCS	Waste handling and disposal	Moses Lake

In addition to the types of projects listed above and consistent with the goals of WAC 173-442-160, NWIW expects that the VMP Board will build on this list of successful in-state project protocols and explore additional emission reduction initiatives, including, but not limited to:

- Direct GHG reductions;
- Biogas;
- Landfill gas capture;
- Emission Reductions through Improved Efficiency of Vehicle Fleets;
- Support for electrification of the transportation sector;

- Energy efficiency and emission reductions in the agricultural sector, including bioenergy and renewable natural gas projects;
- Investments in equipment for renewable natural gas processing, conditioning, and production, or equipment or infrastructure used solely for the purpose of delivering renewable natural gas for consumption or distribution;
- Combined heat and power projects demonstrating GHG emission reductions;
- Renewable energy projects;
- Acquisition of conservation and energy efficiency in excess of the targets required by the Energy Independence Act;
- Organic Waste Digestion; and
- Wetland Restoration.

5) An explanation of how carbon sequestration projects could reliably meet the 1:1 greenhouse gas emissions reduction described in Table 1-1 of the 2019 Supplemental EIS.

NWIW intends to work with Ecology and Cowlitz County to identify and approve carbon sequestration protocols for projects in Washington State and the Pacific Northwest and understands that Ecology may seek rule-making under the Clean Air Rule to ensure the reliability of GHG reduction associated with various project types. NWIW has included sequestration in its VMPF because carbon sequestration is internationally recognized as a critical component to prevent excessive global warming. The Paris Agreement calls for a balance between emissions reductions from emission sources and "removals [of GHGs] by sinks of greenhouse gases" in order to achieve the long-term temperature goals established by the Agreement. This approach is echoed by the California Air Resources Board, which implements the state's rigorous offset program and has approved carbon sequestration protocols for U.S. forest and urban forest projects.[8]

Sequestration projects and forest projects in particular, are also important to NWIW fulfilling its commitment to prioritize carbon reduction investments in the state of Washington, as well as providing near-term environmental co-benefits to ecological systems and species disproportionately impacted by climate change.[9] For example, forest sequestration projects (*e.g.*, reforestation, avoided conversion, improved forest management) in southwest Washington could help to preserve areas of marbled murrelet habitat.[10] Accordingly, the VMPF contemplates a

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[8] Over the life of the VMP, other sequestration protocols may develop, but we limit our response to forest sequestration projects and protocols because it is the only sequestration protocol approved for use as offsets by the California Air Resources Board.

[9] *See, e.g.*, Griscom, B. *et al.*, *Natural Climate Solutions*, Proceedings at the National Academy of Sciences (Oct. 31, 2017) (concluding that "[a]longside aggressive fossil fuel emissions reductions, [natural climate solutions] offer a powerful set of options for nations to deliver on the Paris Climate Agreement while improving soil productivity, cleaning our air and water, and maintaining biodiversity."), *available at* https://www.pnas.org/content/114/44/11645 (last accessed Oct. 22, 2019).

[10] *See, e.g.*, E. Bush, The Seattle Times, *How restoring old-growth forest in Washington state could help fight climate change*, (Sept. 23, 2019), available at https://www.seattletimes.com/seattle-news/environment/how-restoring-old-growth-forest-in-washington-state-could-help-fight-climate-change/.

mix of mitigation and U.S. based sequestration projects, verified through approved protocols, to meet its emissions reduction targets.

NWIW understands, however, that rigorous accounting for the carbon benefits of sequestration projects is paramount in order to reliably meet the 1:1 greenhouse gas emissions reduction described in Table 1-1. There is a temporal aspect to carbon sequestration projects which needs to be taken into account to offset annualized CO2e emissions. Under the VMPF, NWIW and the VMP Board will work with the Department of Ecology and Cowlitz County to identify and approve verification protocols for sequestration projects and will ensure third-party verification

Existing protocols approved for use in voluntary and regulated U.S. markets would be used to evaluate sequestration projects. The Washington projects and associated protocols below demonstrate several methods of how projects have calculated carbon sequestration.

Confederated Tribes of the Colville Nation and the California Air Resources Board Offset Credit (ARBOC)

The California Air Resources Board has approved a forest carbon project on the lands of the Confederated Tribes of the Colville Nation (Colville Tribes). The Colville Tribes used the CARB US Forest Projects Compliance Offset Protocol[11] to account for carbon sequestration for the improved forest management of their reservation lands. The CARB Forest Offset Protocol (FOP) provides requirements and methods for quantifying the net climate benefits of activities that sequester carbon on forestland.

According to Sightline, the FOP carbon stock inventory and verification methodology "may be the toughest of any cap and trade program on the planet."[12] The protocol requires volume and biomass calculations for each carbon pool in the forest project's offset boundary, including standing livestock and standing dead stock. It mandates an inventory audit and data management to ensure annual monitoring of forest inventory and carbon stock, as well as annual verification by a third-party auditor.

Under this protocol, the Colville Tribes calculate the annual increase in carbon on their forest lands due to the longer harvest cycles that are mandated by their improved forest management plan.

King County and the Verified Carbon Standard (VCS) Protocol

King County has applied to the Verified Carbon Standard (VCS) for a rural forest carbon credit protocol. The VCS is well-established voluntary protocol that is used for most rural forest carbon projects globally. The King County Rural Forest Carbon Project will achieve net GHG

[11] The ARB U.S. Forest Projects Compliance Offset Protocol adopted on October 20, 2011 ("Forest Offset Protocol"; "Protocol"; COP; or FOP)

[12] https://www.sightline.org/2019/10/23/colville-tribes-washington-combat-climate-crises-carbon-forests

emissions reductions and removals by conserving the carbon contained in the current forest biomass, sequestering additional carbon in retained forests, and avoiding emissions from logging and associated transportation and processing of harvested wood, in comparison to the net emissions under the relevant baseline scenario.

The VCS protocol application determines the annual net GHG emissions reductions through the following formula:

$ER_y = ER_{y,GROSS} - LE_y$ where:

- ER_y = the net GHG emissions reductions and/or removals in year y (the overall annual carbon change between the baseline and project scenarios, net all discount factors except the permanence buffer) (t CO_2e yr-1).
- $ER_{y,GROSS}$ =the difference in the overall annual carbon change between the baseline and project scenarios (t CO_2e yr-1).
- LE_y = Leakage in year y (t CO_2e yr-1), as calculated.

The VCS protocol requires annualized monitoring for:

- Carbon Stock Inventory
- Activity-shifting leakage
- Market-shifting leakage

Climate Action Reserve and Forterra

Forterra's Evergreen Carbon Capture ("ECC") program uses the Climate Action Reserve's Urban Forest Tree Carbon Calculator to calculate carbon sequestration of Pacific Northwest conifers. Through their program, Forterra plants 1 tree for every 5 tons of carbon to be sequestered. This number was calculated using data which indicates that the average Pacific Northwest conifer tree will sequester 13.9 tons of carbon by its 100th birthday. The Evergreen Carbon Capture program plants almost three times as many trees as needed as a method of guaranteeing carbon sequestration. ECC also monitors survival rates at three years and will replant the urban forest if tree survivability falls below 50%.

Nisqually Land Trust and the California Air Resources Board Offset Credit (ARBOC)

The Nisqually Land Trust uses the forest carbon offset protocol of the California Air Resources Board. The ARBOC process "is the most rigorous in the nation," according to the Washington Environmental Council, a project participant. The program requirements include:

- Offset project boundary (which carbon pools are being measured)
- General inventory design
- Inventory sampling methodology
- Stratification
- Inventory updates
- Modeling (how inventory data interfaces with the model)
- Quality assurance and quality control procedures
- Measurement standards

- Data measurement and quality assurance
- Volume and biomass calculations
- Confidence deduction calculation
- How future changes will be handled (change log)

The Nisqually project installed 128 plots over 520 acres to measure and monitor its carbon stock as one measure to ensure that the credits generated are verifiable.

The carbon sequestration protocols above are examples of how NWIW envisions verifiable carbon sequestration projects in Washington and the Pacific Northwest. NWIW is confident that sequestration protocols approved by Department of Ecology and Cowlitz County will ensure reliable 1:1 greenhouse gas emissions reductions described in Table 1-1 of the 2019 Supplemental EIS. NWIW is also cognizant that the limitations, if any, on sequestration in the Clean Air Rule do not apply to the KMMEF facility.

6) An explanation of how NWIW proposes to select appropriate out-of-state carbon markets as mitigation for in-state emissions, using WAC 173-442-170 as a guide.

Because Washington does not currently have a carbon market or statutory carbon mitigation framework that applies to the KMMEF, NWIW has proposed looking to regulated U.S. markets, as a last resort, when unable to discharge its VMP obligation through verified projects. Consistent with WAC 173-442-170(1), existing regulated U.S. carbon markets have established multi-sector GHG emission reduction programs that NWIW can participate in (i.e., NWIW can purchase carbon from both markets). Each regulated market has GHG reporting requirements generally congruent with Ch. 173-441 WAC.

As set forth in the VMPF:

> The intent of this program is to develop a cost-effective suite of mitigation projects that maximize carbon reduction benefits (in no case less than the total VMP obligation identified by the Department of Ecology and Cowlitz County, with recommendations from the VMP Board), addressing the local and project priority preferences described below. Where the available cost-effective verified local mitigation projects do not fully discharge the VMP obligation, ***the VMP Board shall purchase carbon credits from U.S. carbon credit markets or voluntary U.S. carbon registries as an option of last resort***.
>
> Examples of qualifying GHG mitigation markets include the Regional Greenhouse Gas Initiative or California Cap-and-Trade allowances/credits. Whether the portfolio is "cost-effective" is measured by whether the total cost of the VMP portfolio is equal to the total VMP obligation multiplied by the then-current cost of U.S. carbon market credits. Where the portfolio exceeds this benchmark, the VMP Board shall discharge its project selection obligations through the purchase of carbon credits from regulated U.S. carbon markets only to the extent necessary to remain cost-effective.

7) A detailed description of the role of cost effectiveness in determining NWIW's selection of greenhouse gas mitigation activities and programs, including an explanation of how the use of cost effectiveness will not affect the quality of the mitigation program intended to be utilized by NWIW.

The VMPF's definition of "cost-effectiveness" adjusts with the changing average costs of purchasing one ton of carbon mitigation from a regulated U.S. carbon market. By relying on regulated U.S. carbon markets, NWIW builds accountability into the VMPF while ensuring that the cost of its mitigation commitment is in scale with the market cost of carbon. The verification processes in place in regulated carbon markets (*e.g.*, CARB) are robust and will not dilute the quality of mitigation projects or allowances. Where the portfolio of projects available exceeds the average cost of mitigating through a regulated market, NWIW would be able to discharge its VMP obligation through the purchase of credits in these markets. This framework was adopted, in part, because Washington currently lacks a regulated carbon market or regulatory framework for mitigating carbon from facilities like the KMMEF.

Also, as explained in the VMPF,

> NWIW's voluntary GHG mitigation program will commence upon start of construction of the Facility and will continue for the life of its operation (currently estimated at 40 years). If, during that time, it is determined there is a comparable national, state, or local programmatic, regulatory, or statutory framework adopted for reducing and/or mitigating GHG emissions (including, for example, imposition of a carbon tax or GHG emission cap and/or reduction programs for industrial facilities) that directly applies to the proposed project and replaces some or all of the full mitigation contemplated, then that alternative GHG emission mitigation requirement shall replace whatever portion of the VMP obligation that is addressed by the replacement program.

In sum, unless and until Washington State, directly or by proxy or delegation through another level of government, implements a superseding GHG reduction or mitigation structure appropriately replacing, all or in part, the VMPF as fully implemented, this cost effectiveness structure ensures both a comprehensive and defined valuation tool from an evolving funding level standpoint, as well as a reliable and verifiable programmatic qualification and quantification portfolio.

NWIW hopes the above responses are of assistance in the County's overall response to Ecology's request for additional information related to the KMMEF SEIS.

Sincerely,

Kent Caputo
On behalf of Northwest Innovation Works

ATTACHMENT TO ECOLOGY RESPONSE MEMO

MM GHG-1. Provide Fuel Efficiency Training to Equipment Operators.

To reduce greenhouse gas emissions from construction equipment, the Applicant will provide a fuel efficiency training program to locomotive, vessel, and construction equipment operators.

MM GHG-2. Implement an Anti-Idling Policy.

To reduce emissions from vessel and locomotive idling in the project area, the Applicant will implement an anti-idling policy.

MM GHG-3. Reduce Emissions from Cars.

The Applicant will evaluate the use of electric cars for company cars, incentivize the use of electric vehicles by providing charging stations, and develop an incentive program for carpooling.

MM GHG-4. Mitigate for Impacts on Washington State from Net Greenhouse Gas Emissions Attributable to the Proposed Action.

Under the 2015 U.S. and International Energy Policy scenario, which best reflects the current policy requirements and conditions, the average net greenhouse gas emissions for operations from 2028 to 2038 would be 1.99 million metric tons of CO_2e per year.

To address the potential impacts of greenhouse gas emissions attributable to the Proposed Action, the Applicant will prepare a greenhouse gas mitigation plan that mitigates for 100% of the greenhouse gas emissions identified in the 2015 U.S. and International Energy Policy scenario. For operations at maximum capacity this is 1.99 million metric tons CO_2e per year from 2028 through 2038. The plan must be approved by the Washington State Department of Ecology. For mitigation that occurs in Cowlitz County, the plan will be approved by Cowlitz County and Ecology. The plan must be ready to implement prior to the start of full operations. The measures described in the plan may include a range of mitigation options. The measures must achieve emissions reductions that are real, permanent, enforceable, verifiable, and additional. The emissions reductions may occur in Washington State or outside of Washington State but must be demonstrated to meet all five criteria (e.g., using internationally recognized protocols). For example, carbon credits could be purchased through existing carbon markets, or through on-site reductions achieved through efficiency measures or changes in technology.

5.8.1.9 Unavoidable and Significant Adverse Environmental Impacts

Implementation of the proposed mitigation measures described above would reduce impacts from greenhouse gas emissions and there would be no unavoidable and significant adverse environmental impacts from greenhouse gas emissions.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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STATE ENVIRONMENTAL PROTECTION ACT
MITIGATED DETERMINATION OF NONSIGNIFICANCE

Proposed Action: Notice of Construction Order 4153-AQ07, Modification 1

Description of proposal:

On August 10, 2018, WestRock submitted an application to modify Notice of Construction (NOC) Order No. 4153-AQ07, in accordance with Washington Administrative Code (WAC) 173-400-111(8). The modification request was to restore the steam limit at #6 Power Boiler to original capacity, following the installation of low-NOx burners.

The Washington State Department of Ecology (Ecology) is modifying NOC Order No. 4153-AQ-07 to restore the steam limit at #6 Power Boiler to the original design capacity (1,517,829 kilopounds per year) and adding a fuel oil firing reporting requirement.

Proponent: WestRock CP, LLC
801 Portland Avenue
Tacoma, Washington 98421

Location of proposal: 801 Portland Avenue, Tacoma, Washington 98421

Lead agency: Department of Ecology, Solid Waste Management Program, Industrial Section

The lead agency for this proposal has determined it does not have a probable significant adverse impact on the environment if the following mitigation measures are taken:

> Emissions of greenhouse gases (GHG) from steam production at Power Boiler 6 above a 1,142,000 kilopounds per year (on a calendar year basis) action level must be mitigated using purchased certified GHG offsets or an alternative approved by Ecology.

An environmental impact statement (EIS) is not required under RCW 43.21C.030 (2)(c). This decision was made after review of a completed environmental checklist. This information is available to the public on request.

This Determination of Nonsignificance is issued under WAC 197-11-340(2); the lead agency will not act on this proposal until the comment period ends December 21, 2018.

Responsible official:

James DeMay, P.E.
Industrial Section Manager
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600
(360) 407-6868

Date November 15, 2018 Signature