SHORELINES HEARINGS BOARD

FOR THE STATE OF WASHINGTON

COLUMBIA RIVERKEEPER, SIERRA CLUB, and CENTER FOR BIOLOGICAL DIVERSITY, Petitioners, vs. COWLITZ COUNTY, PORT OF KALAMA, NORTHWEST INNOVATION WORKS – KALAMA, LLC, and WASHINGTON STATE DEPARTMENT OF ECOLOGY, Respondents, WASHINGTON PUBLIC PORTS ASSOCIATION, Intervenor,	SHB No. 17-010c DECLARATION OF IAN GOODMAN
PORT OF KALAMA, Petitioners, vs. COWLITZ COUNTY and WASHINGTON STATE DEPARTMENT OF ECOLOGY, Respondents, COLUMBIA RIVERKEEPER, SIERRA CLUB, CENTER FOR BIOLOGICAL DIVERSITY, and WASHINGTON PUBLIC PORTS ASSOCIATION, Intervenors.	

I, Ian Goodman, declare as follows:

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1. My name is Ian Goodman. I am President and founder of The Goodman Group, Ltd. ("TGG"). My curriculum vitae is attached as Exhibit A to this Declaration. For over 35 years, I have conducted research and consulted in energy regulation and economics (related to conventional, unconventional and renewable energy, and energy efficiency). My practice has addressed a broad range of issues, including pipeline economics and regulation, evolving North American natural gas, oil and electric markets, and economic development and environmental impacts of various energy supply and transportation options. Since 2011, my focus has been on the supply and transportation of natural gas and oil (notably shale, Canadian tar sands, pipelines and rail). I also have expertise in the planning and operations of energy systems (including natural gas), as well as inter-jurisdictional energy trade in North America.

2. Since 1991, I have conducted over 50 national, regional, and state/provincial studies on the economic and environmental impacts of various energy options, infrastructure and systems throughout the US and Canada. I have prepared expert reports and testimony on natural gas system planning and operations, including analysis of pipeline expansions. Since 2011, I have co-authored twelve expert reports on the economic and environmental impacts of natural gas and crude oil production and transportation (particularly shale/unconventional production and interjurisdictional pipelines). I have co-authored expert reports and testimony on multiple natural gas and crude oil pipelines, including PennEast, Union Gas Dawn-Parkway/Trafalgar, Trans Mountain Expansion Project, Keystone XL, and Dakota Access. I have also prepared expert reports and testimony on multiple crude-by-rail ("CBR") projects, including the Vancouver Energy Distribution Terminal, which would be located on the Columbia River approximately 30 miles upstream from the Kalama Project. In addition, I have provided expert reports and testimony related to upstream greenhouse gas impacts of energy production and

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transport. In November 2016, my firm provided testimony before the Canadian Federal Government's Environmental Assessment Review Panel on the importance of accounting for upstream greenhouse gases in federal environmental assessments of major pipeline projects in Canada.

3. I am in the process of reviewing the Final Environmental Impact Statement ("EIS") and publicly available information in preparation for trial on this matter. I will provide testimony related to the failure of the EIS to adequately consider greenhouse gas emissions caused or induced by, or attributable to, the methanol refinery Project and will explain how the EIS either failed to consider all greenhouse gas emissions associated with the methanol production refinery and/or significantly underestimated them.

4. I will also provide testimony related to the following:

- claims that the facility can and will operate with a non-firm/interruptible gas supply;
- whether and to what extent the facility will cause or be a factor in the development of expanded natural gas pipeline capacity, including development of new pipelines or pipes added to existing pipelines;
- the emissions and other impacts associated with expanded pipeline capacity and operations; and
- the economics and emissions associated with natural gas production supplying expanded pipeline capacity and the Project.

5. My research is ongoing. I have provided answers to Interrogatories and Requests for Production as part of the discovery process and will supplement as required by the Civil Rules and as required by the Board through a Pre-Hearing Order. This information is representative of the research I have conducted at the time of this declaration. Further impacts may arise as a result of my research.

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6. My initial review reveals that natural gas supply for the Project will likely have very substantial greenhouse gas impacts relating to gas production and transportation, owing to the large volume of gas that will be consumed by the Project and the significant level of greenhouse gas emissions resulting from gas production and transportation. The Project is estimated to consume 290 million cubic feet per day of natural gas for the CR Alternative, and 270 million cubic feet per day for the ULE Alternative. Final Environmental Impact Statement ("EIS"), p. 7-5. The FERC Environmental Assessment document, an appendix to the EIS, states that the Kalama Lateral will provide 320 million cubic feet per day of gas supply for the Project. EIS, Appendix B, pp. I, 1-2, 87.

7. Delivery of the gas that will be consumed by the Project requires production and transport of a somewhat greater amount of gas than is needed/consumed by the Project. Gas production and transportation results in some gas being consumed (notably in pipeline compressor stations) and lost (notably due to venting and leakage). The Project would require a more than a one-third increase in gas supply relative to current usage in Washington.[1] Gas supply for the Project will be produced outside Washington and transported over considerable distances both outside of Washington (from the supply basins to the Washington border) and within Washington (from the Washington border to the Project). Washington is affected by greenhouse gases regardless of where they are emitted, and whether this occurs outside or within Washington; these greenhouse gas emissions are an impact attributable to this Project. The EIS (pp. 4-20–4-21) acknowledges that gas production and transportation can result in a variety of

[1] https://www.eia.gov/dnav/ng/ng_sum_lsum_dcu_SWA_a.htm; https://www.eia.gov/dnav/ng/ng_sum_lsum_dcu_SWA_m.htm. In addition to gas delivered to consumers, another 3-4% of gas (about 30 million cubic feet per day) is used within the Washington gas system. The EIS (p. 7-5) identifies British Columbia, Alberta, Rocky Mountain, and San Juan Basin as possible supplies.

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greenhouse gas emissions, including both methane (an especially potent greenhouse gas) and CO_2 (from fuel combustion).

8. Given the nature of both the Project and natural gas production in proximate supply basins, gas supply for the Project will most likely be from new wells. The Project is a major new, capital-intensive facility, intended to operate for many years, and the gas supply requirements for the Project are very large. Gas available to the Project from the proximate supply basins is mainly from shale production. Ongoing shale production typically requires extensive ongoing development of new wells, since production from new wells usually declines rapidly. Hence, for the long-term large gas supply required by the Project, all (or at least virtually all) of this production will be from new wells.

9. Given the nature of the Project and the regional pipeline system, the most reasonable assumption is that gas supply for the Project will require expansion of the pipeline system, over and above any expansion that would have occurred absent the Project.[2] There is limited spare capacity available on the existing regional pipeline system to enable growth in gas demand. Thus, the regional pipeline system would need to be expanded to accommodate significant growth in gas demand, and especially gas demand during peak winter usage periods. While it is appropriate to consider a range of potential regional pipeline capacity expansions to

[2] The discussion of the regional pipeline system relies in part on the following: Northwest Gas Association (NWGA) 2016 Gas Outlook. http://www.nwga.org/wp-content/uploads/2016/10/2016NWGA-Gas-Outlook.pdf; Northwest Gas Association (NWGA)/Pacific Northwest Utilities Conference Committee (PNUCC), The Power & Natural Gas Planning Taskforce, The Northwest Gas Landscape–Looking Forward, July 2015: http://pnucc.org/sites/default/files/Northwest%20gas%20inf%20FINAL%20Jul%202015.pdf; NW Natural 2016 Integrated Resource Plan (IRP): https://www.nwnatural.com/uploadedFiles/LC64-Errata.pdf; Cascade Natural Gas 2016 Integrated Resource Plan: https://www.cngc.com/docs/default-source/irp-docs/2016-natgas-irp.pdf?sfvrsn=2%3fsfvrsn%3d%3fsfvrsn%3d%3fsfvrsn%3d%3fsfvrsn%3d%3fsfvrsn%3d.

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bracket likely impacts, it is unreasonable and incorrect to conclude that the Project will not result in any increase in overall natural gas demand or expansion of pipeline capacity.

10. In fact, gas supply for the Project will likely have very substantial greenhouse gas impacts relating to gas production and transportation, owing to the large volume of gas that will be consumed by the Project and the significant level of greenhouse gas emissions resulting from gas production and transportation, including the following greenhouse gas impacts, specific to the Project:

a) greenhouse emissions from the production of the large volume of gas that will be consumed by the Project (estimated at 270-290 million cubic feet per day plus additional gas consumed and lost in production and transportation), notably from new wells in proximate supply basins, including:

i. emissions (notably from leakage) of methane (an especially potent greenhouse gas), for gas production relating to the Project in the US[3] and Canada[4];

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[3] Skone, T. J., Littlefield, J., Marriott, J., Cooney, G., Demetrion, L., et al. (2016). *Life Cycle Analysis of Natural Gas Extraction and Power Generation*. DOE/NETL-2015/1714. U.S. Department of Energy National Energy Technology Laboratory. https://www.netl.doe.gov/energy-analyses/temp/LifeCycleAnalysisofNaturalGasExtractionandPowerGeneration_083016.pdf. U.S. EPA (2017). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015*. U.S. Environmental Protection Agency, Washington, DC. https://www.epa.gov/ghgemissions/draft-inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015. Brandt, A. R., Heath, G. A., Kort, E. A., O'Sullivan, F., Pétron, G., et al. (2014). *Methane Leaks from North American Natural Gas Systems*. Science, 343(6172). 733–35. DOI:10.1126/science.1247045. http://science.sciencemag.org/content/343/6172/733 https://nature.berkeley.edu/er100/readings/Brandt_2014.pdf. ICF International (2014). Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries, prepared for Environmental Defense Fund. https://www.edf.org/sites/default/files/methane_cost_curve_report.pdf.

[4] Environment Canada (2017), National Inventory Report 1990-2015: Greenhouse Gas Sources And Sinks In Canada Canada's Submission To The United Nations Framework Convention On Climate Change, Parts 1, 2 and 3. Cat. No.: En81-4/1E-PDF, Environment and Climate Change Canada, Gatineau, QC. https://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/can-2017-nir-13apr17.zip. ICF International (2015). Economic Analysis of Methane Emission Reduction Opportunities in the Canadian Oil and Natural Gas Industries, prepared for Environmental Defense Fund and Pembina Institute. http://business.edf.org/files/2015/10/canada_methane_cost_curve_report.pdf?_ga=2.42221605.1004384026.1502989853-96732109.1502817762.

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ii. emissions from production wells (development, completions, and operations);

iii. emissions from associated infrastructure (development and operations);

iv. emissions from processing facilities (producing pipeline specification gas from raw feed);

v. methane emissions (relating to gas production and processing);

- vented/intentional emissions (notably blowdown)
- fugitive emissions

vi. combustion emissions (relating to gas production and processing; and

b) greenhouse gas emissions from transportation of the large volume of gas that will be consumed by the Project (as indicated in a) above), notably in existing and expanded pipelines from proximate gas supply basins to the Project, including:

i. emissions (notably from leakage) of methane (an especially potent greenhouse gas), for gas transportation (e.g. gathering lines and transmission lines) relating to the Project;

ii. emissions of other greenhouse gases (notably relating to compressor stations), for gas transportation relating to the Project from pipeline attributes such as length, compressor stations, facilities such as metering and regulating, dehydration etc.;

iii. methane emissions (at compressor station and elsewhere);

- vented/intentional emissions (notably blowdown)
- fugitive emissions; and

iv. combustion emissions (from compressor stations), related to:

- type and efficiency of compression drive power (including gas-fired turbines, gas-fired reciprocating engines, and electrically driven)
- use if any of waste heat (notably for electricity generation)
- greenhouse gas and other impacts for electricity supply (relating to compressor stations).

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11. Additional environmental impacts will also result from the need for expanded natural gas pipeline capacity and operations, as well as from the emissions and other impacts associated with expanded capacity and operations. The Project will require gas supply that is long-term and large; in turn, the Project could be a key driver requiring and enabling significant expansion of the regional pipeline system, especially within the next few years. Given that the Project will likely result in an expansion of the regional pipeline system, the Project could result in a number of adverse environmental impacts, other than greenhouse gas impacts, associated with additional pipeline capacity and operations. These could include:

- air emissions from fuel combustion at compressor stations;
- adverse impacts on flora and fauna related to pipeline construction and operation (e.g. disturbance flora and fauna during construction and particularly of species at risk or areas of ecological sensitivity);
- adverse impacts on waterways related to pipeline construction and operation (e.g. disturbance of waterways from construction).

12. My initial review of the EIS and research indicate that there are significant upstream impacts which the EIS failed to adequately consider. These impacts can and should be analyzed. In preparation for trial, I plan to identify impacts that were not adequately considered and (to the extent possible) provide approximate estimates of these impacts.

I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct. Executed this 18th day of August, 2017, at Berkeley, California.

IAN GOODMAN

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