

POSITION OF TAHOMA AUDUBON SOCIETY CONSERVATION COMMITTEE  
CONCERNING PROPOSED  
NORTHWEST INNOVATION WORKS, LLC, TACOMA METHANOL PLANT

The proposed project consists of the construction and operation, by Northwest Innovation Works, LLC (NWIW), of a Natural Gas to Methanol Plant at old Kaiser Aluminum Smelter site on Blair Waterway, Port of Tacoma, to be operated under a 30 year lease. Projected full capacity output is for four production lines totaling 20,000 tons of methanol per day (7.3 Million tons per year). The projected cost of construction, designing, and permitting the project is 3.4 billion dollars.

Global demand for methanol is huge, largely driven in recent years by China. Thirty percent of the world's usage is to make adhesives, such as urethane adhesive (made from formaldehyde derived from methanol) used in making plywood. Methanol can be used as a carbon source for making carbon fibers. In the last decade there is an increasing demand for methanol to make olefin. Olefin is generally used for plastic fibers-- polyethylene and polypropylene--used extensively in clothing and products such as ropes (it is also used for consumer plastic for glasses, contact lenses, cell phones, and other products, as well as for butadiene for making vehicle tires). Methanol is valuable as a versatile chemical feedstock that can be produced in a variety of ways.

The methanol from the proposed plant would be shipped to China, where it is proposed to be used for making olefin.

Site characteristics include a 90-acre main site, with additional land including the site of a pier. It has access to a long pier in water 51 feet deep at MLLW. The site has good access to water, but poor rail access. Zoning and Land Use Classifications include Heavy Industrial, Port Maritime Industrial, and Manufacturing and Industrial Center. The Port purchased the site in 2003, for 21 to 23 million dollars (depending on which costs are included in the price computation) and has spent additional 15 million in cleanup costs.

This is a brownfield site still in cleanup and subject to monitoring. Carbon, fluoride salts, cyanide, and polyaromatic hydrocarbons were left on the ground by Kaiser. The Port commitment to DOE included redevelopment of the site for Port purposes, management of wastes, and performance of specified cleanup under a consent decree. A Consent Decree and Cleanup Action Plan are expected this spring. The Plan is for a cleanup to Industrial Standards, including a Materials Management Plan which must bind anyone doing redevelopment. Environmental covenants will be filed on property, and a financial guarantee will be required to cover future monitoring and cleanup. The property is presently ready for industrial redevelopment.

**Issues which must be reviewed in any Environmental Impact Assessment, along with our concerns:**

**Production of methanol requires a carbon source.** Natural gas is cleaner than coal, and the proponent suggests that the use of natural gas for this plant will supplant some of China's use of coal for methanol or olefin production, thereby lowering greenhouse gas (GHG) emissions on a global scale. Natural gas for the proposed plant would be delivered by a new pipeline, that would connect to the Pacific Northwest pipeline system. The gas would come from sources in British Columbia and various sites in the Rocky Mountains of the United States. Although we do not know the proposed amount of natural gas to be used for this plant, we do know that natural gas is abundant in this area.

The natural gas supply has increased by 125% in the last 12 years, due to the increased use of hydraulic fracturing and horizontal drilling. The available amount is adequate for the plant, according to the Northwest Gas Association (NWGA). Industrial use is declining in the region, but demand for electrical power generation is expected to increase, as hydropower availability is falling below demand. Natural gas is relatively cheap. It is also mostly methane, which is an extremely serious GHG. The environmental review must consider the GHG emissions from the production and transport of the gas, from the source to the plant.

As the gas must be compressed, we need to know the amount of possible leakage, and the likely result of a catastrophic release or explosion. Although pipeline leaks may be rare, when they occur they are highly consequential to both safety and to the environment; thus the analysis must not be limited to the likelihood of a catastrophic release, but must concentrate on the results of such a release assuming that one will occur during the 30 year projected life of this plant. This analysis must include a projection of costs and mitigation.

Hydraulic fracturing itself involves environmental impacts to water and to the atmosphere; these must be quantified and considered in the overall impact of the plant. We have serious concerns over the statements that the use of natural gas for this plant will be "clean" when we have no data to confirm that the entire process of supply and transport has been analyzed. We also have no proof that using natural gas for this one product—methanol—will actually decrease China's use of coal. If this plant is merely making use of methane from our area because it is cheap and abundant, then how would we know whether it will decrease dependence on coal or will be merely additive?

**Production of methanol requires electrical power.** Many methanol plants burn about 33% of their carbon source to generate electricity on-site, which of course creates GHG emissions. The proposed plant would rely primarily on Tacoma Public Utilities (TPU) for electricity.

TPU plans for power capacity on two and ten year cycles, the most recent plan having been done last year. TPU serves about 350,000 customers. Its largest power customers in 2015 were WestRock (43.6 average daily megawatts—*aMW*), JBLM (40.26 *aMW*), and Praxair (15.5 *aMW*). All tide flats customers used 53.7 *aMW* total. The projected requirement for the

proposed plant is 400 aMW, which is a staggering amount.

TPU cannot provide sufficient electricity without purchasing it from other sources. As TPU purchases electricity only when it needs it, we have no assurance that the extra power will come from renewable sources. Solar and wind power sources are intermittent, so even if TPU concentrated on such sources it would need a more steadily reliable backup. As hydropower is presently fully utilized, the extra needed power would most likely come from burning natural gas. Or perhaps, would the extra supply require that existing coal fired generation be continued?

Even if TPU were to secure “green” sources for the extra power, it would only serve to restrict green supplies for other customers. Thus we are certain that generating the additional power needed for the operation of the proposed plant would increase GHG emissions. We are concerned that this source of GHG emissions should be carefully and seriously scrutinized, considering multiple possible generating scenarios, including the possibility that the plant will burn on-site some of the natural gas purchased for feeding the plant. We strongly urge that all sources of GHG emissions from the extra electricity be quantified, disclosed, and analyzed. We consider the discussion of GHG emissions (from power generation) in the DEIS for the Kalama proposed plant to be inadequate, in that it suggests that the plants electrical need would be met with “an average of northwest power sources”. (Page 1-10). We consider that the use of an average masks the true environmental cost of the electricity consumption, as explained above.

We also insist that the cost of extra generation be disclosed and considered. Perhaps TPU can, by contract, charge all additional costs to the plant without affecting the rates for other customers. However, such a contract would be subject to city government approval, which could modify it should the plant request lower rates and its project is preferred by the City Council for political reasons. Thus the actual costs must be disclosed and considered.

**Production of methanol requires oxygen.** We do not know whether the oxygen required for production will come from the process water, or if additional pure oxygen will be injected. Presumably, if additional oxygen is needed it would be supplied by Praxair. Generation of oxygen also requires a lot of electricity—Praxair is already one of TPU’s biggest power customers. We are concerned that Praxair might require even more generating capacity, and that this possibility be explored, with the possible increase in GHG emissions for that plant disclosed and considered in environmental review.

**Production of methanol requires water, both for the process and for cooling.** The proposed plant is projected to use 10.4 million gallons of water per day (MGD). Approximately 30 percent would be for the process, with the rest being used for cooling. Note that this projection is about 28% less than earlier projections. We are concerned that the sudden drop in projected use has not been explained. Is there a change in technology? This question is vexing and should be answered with supporting data.

The projected use would make this the second largest water customer for TPU (behind WestRock). Considering existing water rights and capacity, TPU states that it can serve the

proposed plant. To a great extent, the available capacity results from a reduced current use of water by tide flats customers. In 2015 tide flats customers used 16.9 MGD, compared with 35.4 MGD in 1985. Current total system demand is 56 MGD, so the proposed plant would represent a considerable, but not insurmountable, increase over current use. We are concerned that contracting to provide such a high percentage of available water to one plant would likely restrict future users in the city, and the tide flats in particular, and this question should be considered during environmental review. The use of water by NWIW must also consider water needs of the expected addition of 59,800 new housing units, 127,000 new residents expected in Tacoma by 2040. These allocations are significantly higher than current forecasts and represent a shift in current trends.

We have the same concerns about costs for water as expressed above concerning costs for power. Whether the costs can be born entirely by the proposed plant, with no other rate increases, may be questionable. The rates must be disclosed and considered.

TPU's study of the possible effects of climate change generally indicate that capacity will remain roughly the same in the future, largely because the Green River is sourced more from rainwater than from snowmelt. Also, if runoff into the Green is reduced, TPU has backup capacity from wells. However, we have seen no consideration of the effect on flows downstream from the TPU Green River intake system. Climate change may or may not significantly affect total available water in the Green, but it will certainly affect the timing of supplies, as rainfall patterns will shift during the seasons. Contracting to supply a fixed minimum daily amount to large customers, and to the proposed plant in particular, might deplete the water in the downstream portions of the Green during critical fish runs. This possibility is particularly troubling, and must be considered, along with mitigations, during environmental review. Even from the changes already witnessed, climate change has had more effect on fish runs than on large municipal water supplies—but they both use the same rivers.

Tacoma has a Habitat Conservation Plan with NOAA Fisheries under the Endangered Species Act for its Green River water supply. That HCP allows for using the supplemental water supply. However, when the HCP was signed, NOAA anticipated that juvenile fish passage at Howard Hanson Dam would be completed, along with more habitat including shading and levee setbacks on the Lower Green River. Fish passage might be addressed before the proposed plant would be running, but not the habitat restoration improvements. If TPU should facilitate a controversial project such as the proposed plant—which would use the supplemental supply more quickly than would be the case if smaller uses were developed more slowly—the possibility that river conditions for ESA listed anadromous fish would be worsened in dry years must be considered. This could require that the HCP be re-opened to account for the worsened conditions.

The environmental consequences of an additional withdrawal of this much water on the downstream water table should also be considered.

**Production of methanol creates air and water emissions.** Likely air emissions from the plant will come from combustion of natural gas to make steam or electricity, venting and pressure

relief during operation and maintenance, volatilization from cooling water, and volatilization of methanol during storage, piping, and loading. Combustion will directly produce GHG, as well as simple hydrocarbon emissions. We don't have a good estimate of the amount of likely air emission from the proposed plant, but--given its size and the lack of any other comparably sized methanol plants--we are particularly troubled by this aspect and the amount and exact composition of air emissions must be disclosed and evaluated. There will be a large amount of CO<sub>2</sub>-equivalent emissions just from the sheer size of the plant. Consequently, any proposed capture methods must be clearly disclosed and carefully considered. This plant may require new capture technology, beyond present engineering standards, due to the plant's size.

From what data we have, it is apparent that the plant itself will result in a considerable increase in GHG emissions over present City of Tacoma and tide flats emissions. We need to see a quantification of the direct emissions from the plant, combined with emissions from extraction and transport of the natural gas, the transportation and use of the methanol, the generation of electricity needed by the plant, and the treatment, pumping and transportation of water used by the plant. We have, at present, no way to evaluate the overall GHG and other air emissions that the plant and its operations will create, and these questions are troubling and must be addressed during review.

Another source of air pollution is fugitive emissions from the venting of storage tanks, transport to ships, and from the tanks on the ships themselves. Methanol is highly volatile, and some will evaporate as the tanks are filled. Capture systems are never perfect, thus we are concerned that fugitive emissions from so large a plant might be of considerable size and quite dangerous. Although methanol in air is not considered to be a GHG, it is a source of photochemical smog and can be toxic. Methanol emissions must be quantified and studied along with existing methanol emissions from existing pulp mills in the region.

Shipping of the methanol from Tacoma to China will create air emissions from diesel ship engines. The proposed plant projects four to seven ships a month visiting the plant to load and disembark with methanol. This frequency should not impact Port operations, but it will result in GHG emissions. The plant projects the use of some of the largest tankers to visit the south Puget Sound. Their emissions must be quantified and considered.

Wastewater from the proposed plant will result in water emissions. Methanol, ethanol, trace metals, hydrocarbons, and dissolved solids must all be considered, as well as the heat released with the water. Again, the sheer size of the proposed plant makes this a serious concern. For example, we presently have no way to evaluate whether heat or toxins will be released into Commencement Bay and harm aquatic life.

**Transport of methanol by ships presents a danger to aquatic life.** Methanol tankers are not subject to the same strict regulations as oil or other industrial chemical tankers. As the ships will be large, a consideration must be made of the danger from a complete tanker spill into Puget Sound. Methanol degrades quickly in water, but a spill would have serious short-term effects. Degradation of one gallon of methanol depletes the oxygen in 198,000 gallons of water. Thus a

spill of a large tanker of methanol could deplete the oxygen in over eight cubic miles of Puget Sound water. Although the likelihood of a complete spill may be small, the resulting devastation of aquatic life would be enormous. We have serious concerns, not only of the possibility of a spill, but of the devastating effects if a large spill should occur during the proposed 30 year lifetime of the plant.

We consider the discussion of a potential methanol release into the water in the DEIS for the proposed Kalama plant to be inadequate, in that it does not discuss the rapid oxygen depletion from a large spill. (Page 1-18)

**Several risks are made unusually dangerous by the size of the proposed plant.** Presumably environmental regulations would require that any chemical spills be confined within the perimeter of the plant. Still, the size of the proposed operation will tend to offset the effectiveness of standard regulations. The plant proposes to store 300,000 tons (about 100 million gallons) of methanol in tanks on the site.

Methanol is a flammable solvent. It is not likely to explode unless contained. When burning it has a heat of combustion of 49% of an equivalent volume of gasoline.

A massive spill is unlikely. However, we strongly urge the application of what is usually called the “Precautionary Principle,” due to the significant amount of methanol to be stored on the site. Any massive spill, perhaps from a failure of a line to a tanker or from a tank failure, would inundate the ground with solvent that would carry pollutants remaining from the Kaiser plant into the ground, creating large ground water pollutant plumes. We consider the discussion of a potential ground release of methanol in the DEIS for the proposed Kalama plant to be inadequate, in that it only discusses the short life methanol itself in the soil, rather than the likelihood of other, longer lived, pollutants being drawn into the soil as the methanol is absorbed. The Kalama DEIS also ignores the potential for spilled methanol to provide a medium for existing chemical pollutants in the soil to dissolve and enter surrounding waters.

A failure of the pressurized natural gas line could lead to an explosion, which could rupture a tank and release massive amounts of flammable liquid, leading to a significant fire. The site does not have ideal road access. If land access to the site is impaired, by rail or auto traffic, the fire could be impossible to extinguish, and could lead to explosions in other tanks. A massive fire could interact catastrophically with the Puget Sound Energy LNG plant.

Standard engineering earthquake modeling should be enhanced (beyond the level of building code seismic standards, as used in the DEIS for the proposed Kalama plant), again due to the size of the operation. Extremely strong earthquakes may be unlikely, however one is expected to eventually occur. A “mega-quake,” if it should happen any time during the life of the plant, would of course have devastating impacts on all infrastructure, but the effects would likely be made worse if they caused a methanol spill and fire involving the plant’s entire storage capacity (with a heat of combustion equivalent to burning 49 million gallons of gasoline).

Even in its day-to-day operation, we have no equivalent model to help predict the level of emissions that would be released. The Australian Coogee Methanol Plant is the only one we know of using a similar production process, but it is a pilot plant producing only 80,000 tons of methanol a year (four days at the rate of maximum production from the proposed plant). The size disparity makes direct comparison uncertain at best.

**Issues exist concerning the investors and accountability for possible catastrophic occurrences.** Northwest Innovation Works, LLC is 87% owned by various Chinese entities, both governmental and private, and 13% by a British chemical technology company. We are concerned, considering the business model and the breadth of the investors, about accountability should a catastrophic accident occur.

The Port states that the lease requires a liability insurance policy of 50 million dollars, and another 25 million for pollution cleanup. The environmental review, in consideration of safety for the entire community, should require a legal review of the commitment inherent in these policies. For example, would the policies provide liability protection for people in the community if an accident was caused by an “Act of God”? Presumably the Port as landlord would be ultimately liable for costs—would they exercise their taxing ability to cover the damage costs?

**The cumulative impacts must be explored much more extensively than is usual for most projects .** Our opinion is that the cumulative impact study in the DEIS for the proposed Kalama plant is inadequate, in that it is largely limited to an examination the plant’s impact combined with nearby projects. GHG emissions from the proposed plant are compared with a state-wide emission rate. Of course, any comparison with a much larger area will dilute the apparent effect of the emission rate. Locally, the proposed Tacoma plant will represent a considerable increase in GHG emissions for the tide flats, as well as for Tacoma.

The proposed plant offers to use a low-carbon activity to create a product in demand in China, which will displace higher carbon production activities in that country. We have no proof that the proposed plant will actually reduce GHG emissions in China. There is no evidence that we can control how the Chinese would actually use the methanol, nor do we know whether the end products will themselves be environmentally friendly.

In order to accept the assertion that the plant will ultimately reduce GHG emissions, we would need a full “cradle to grave” analysis of all the GHG sources—including at least the production and transport of the natural gas, the manufacture, storage, and shipment of the methanol, and the transport overseas and the uses made of the product at its destination, including inland transport and manufacturing processes. The plant would obviously create a new market for abundant Northwest natural gas, but beyond that we have no proof that it will actually displace the use of any other fuel in China.

Although NWIW states that they plan to ship all of the methanol to China there is no assurance that, over the life of the facility, this will always be the case. We note that the Port has initiated a

multimillion dollar rail access improvement project. Given the volatility of the market, and the Chinese economy, the EIS should not accept transport overseas as the only alternative and fully evaluate other transportation methods to domestic users.

In order to explore the actual cumulative impact in the Northwest, we would need a cumulative analysis including all of the proposed hydrocarbon export facilities along our coast. If we limit the analysis to the cumulative impact of proposed methanol facilities, we need at least a study of all three proposed Northwest Innovation Works, LLC, projects in our region. The proposed Oregon and Kalama plants are projected to produce 3.6 million tons of methanol per year each, while the proposed Tacoma plant is projected to produce 7.3 million tons per year. This total, of 14.5 million tons per year, is considerably more than the projected output of all the proposed plants along the Texas and Louisiana coasts, which total 9.3 million ton per year. NWGA has predicted that the Northwest natural gas pipeline and storage capacity, alone, would have to be enlarged to serve all three plants. A cumulative impact study would have to include the environmental effects of all three plants, due to their massive total projected size.

**Alternatives must be seriously explored.** The DEIS for the Kalama plant compares, as alternatives, only one other method of producing methanol. The “no action” alternative essentially predicts that the Kalama site eventually will be used for some other, unknown, industrial purpose. Due to the huge size and potential impact of the proposed Tacoma methanol plant; SEPA and NEPA require that more extensive alternatives be explored.

The plant investors propose a significant investment of 3.4 billion dollars in the plant, but the economic benefits, particularly when compared to the resource costs, for the community are limited. For such an investment, could the site be cleaned to a higher standard, and eventually rezoned, for development similar to the initially much more polluted Asarco site? Could a more energy efficient method of making either olefin or methanol be adopted for the site? Could rail and road access be improved, to make the site attractive to a different industrial use that has less GHG emission potential? Could the plant be made smaller—much smaller—so as to present less danger of catastrophic failure and to allow for more varied industries to develop uses for the huge electric power requirements that a plant of this size would consume.

The economic impact analysis for the Kalama plant includes the following “NWIW will ship some major components into Kalama. This includes air separation units and distillation columns. Local labor will unload them from ships and install them at the jobsite, but the work going into building these large components will be done elsewhere. This type of equipment is not locally available.” Not only does this process transfer the economic benefit out of the area, but potentially outside of the State or the United States. Examining other U.S. projects by Chinese investors reveals a frequent pattern of utilizing Chinese nationals as managers and technicians. The use of non-U.S. staff lowers the economic benefit to the community.

**Tacoma 2040 created policy goals for the City and contains the following:**

GOAL EN-2 Protect people, property and the environment in areas of natural hazards

GOAL EN-3 Ensure that all Tacomans have access to clean air and water, can experience nature in their daily lives and benefit from development that is designed to lessen the impacts of natural hazards and environmental contamination and degradation, now and in the future.

GOAL EN-4 Achieve the greatest possible gain in environmental health City-wide over the next 25 years through proactive planning, investment and stewardship.

The NWIW Methanol project is clearly contrary to these goals.

**We are committed to a more livable future for Tacoma.** The city has made great strides in that direction. From what we know, and from what we are likely to know, we do not envision this plant as supportive of that commitment. At this point, we must express a position in opposition to the proposed plant.

*Adopted by the Board of Directors on April 14, 2016.*

References: Center for Urban Waters Methanol Series presentations Feb. 11, 2016; Feb. 25, 2016; March 3, 2016; March 10; 2016; TNT articles Feb. 28 and March 17, 2016; Seattle Times article March 6, 2016; Draft Environmental Impact Statement, Northwest Innovation Works, LLC, proposed Kalama methanol plant; Tacoma Comprehensive Plan –Tacoma 2040; Verbal contact with American Rivers Northwest Division.