**POLLUTION CONTROL HEARINGS BOARD**
**STATE OF WASHINGTON**

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| ADVOCATES FOR A CLEANER TACOMA, SIERRA CLUB, WASHINGTON ENVIRONMENTAL COUNCIL, WASHINGTON PHYSICIANS FOR SOCIAL RESPONSIBILITY, STAND.EARTH, and THE PUYALLUP TRIBE OF INDIANS,<br><br>Appellants,<br><br>v.<br><br>PUGET SOUND CLEAN AIR AGENCY and PUGET SOUND ENERGY,<br><br>Respondents. | PCHB No. 19-087c<br><br>FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER ON NOC ISSUES 4, 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k, 4o, 4p, 4u, 6, and 8. |

## I. INTRODUCTION

This case concerns the Puyallup Tribe of Indians' (Tribe) and Advocates for a Cleaner Tacoma, Sierra Club, Washington Environmental Council, Washington Physicians for Social Responsibility, and Stand.Earth (collectively, ACT's) appeals of Order of Approval for Notice of Construction (NOC) No. 11386 (Permit) issued to Puget Sound Energy (PSE) by Puget Sound Clean Air Agency (PSCAA) to construct the Tacoma Liquefied Natural Gas facility (TLNG) and related equipment. The Appeals challenged both the Permit and the State Environmental Policy Act (SEPA) supplemental environmental impact statement supporting the Permit.

The administrative record in this case reflects the protracted discovery and voluminous motions filed. The ten-day hearing on the consolidated appeals took place before the Pollution

Control Hearings Board (Board) via Zoom videoconference in April 2021. The Board was comprised of Board Chair Neil L. Wise, and Members Carolina Sun-Widrow and Michelle Gonzalez. Administrative Appeals Judge Heather C. Francks presided for the Board.

At the hearing, the parties presented expert and fact witnesses for direct examination, cross-examination, and questioning by the Board members. The Board also viewed portions of certain video deposition testimony as part of the evidence in the case, and PSE counter-designated portions of deposition testimony. Approximately 1,500 exhibits were filed, of which around 350 exhibits were ultimately admitted.

At the hearing, attorneys Jan E. Hasselman and Jaimini Parekh appeared on behalf of ACT. Attorneys Geoff Bridgman, Nicholas G. Thomas, and Andrew S. Fuller appeared for the Tribe. Attorneys Tadas A. Kisielius, Joshua B. Frank, Allison Watkins Mallick, and Sterling Marchand appeared for PSE. Attorneys Jennifer A. Dold and Jennifer Elias appeared on behalf of PSCAA.

The parties agreed to present evidence on the SEPA legal issues during the first five hearing days, and to present the Permit legal issues during the remaining five hearing days. As the Board's findings of fact, conclusions of law, and order on the consolidated appeals total over 150 pages, they are divided into two documents for ease of reading. The instant findings, conclusions, and order addresses the legal issues relating to the Permit. The legal issues relating to SEPA are addressed in the Findings of Fact, Conclusions of Law and Order on Issues 2a, c, d, e, f, and 9 (State Environmental Policy Act Issues). Together they comprise the Board's sole decision in this case, which affirms the Permit and supplemental environmental impact

statement, but remands to add a condition in the Permit to install a continuous emission monitoring system to monitor $SO_2$ and VOC emissions from TLNG's enclosed ground flare.

## II. PROCEDURAL HISTORY

On December 19, 2019, ACT and the Tribe separately appealed the Permit. The two appeals were consolidated. ACT and the Tribe will be referred to collectively as Appellants. ACT also intervened in the Tribe's appeal of the Permit. *See Order Granting Intervention*, PCHB No. 19-087c (Jan. 24, 2020).

The Presiding Officer consolidated the appeals and issued a Consolidation and Amended Prehearing Order which included the legal issues proposed by the parties. *Consolidation and Amended Prehearing Order,* PCHB No. 19-087c (Jan. 24, 2020). ACT filed a Motion for Stay, seeking a stay of the effectiveness of the Permit. The Tribe also filed a Motion for Stay of the Permit, joining ACT's Motion for Stay and providing additional reasons for a stay. PSE opposed both motions. PSCAA took no position on whether a stay should be issued in the consolidated appeal but filed a response on the issue of whether ACT or the Tribe has established a required element for obtaining a stay: the likelihood of success on the merits of the appeal. On March 17, 2020, the Board denied the Motions for Stay. *See Order Denying Motions for Stay*, PCHB No. 19-087c (March 16, 2020).

On May 6, 2020, PSE filed a Motion to Dismiss and for Partial Summary Judgment, joined in by PSCAA. The Tribe opposed PSE's Motion. ACT joined the Tribe's opposition and filed a cross motion for Partial Summary Judgment on Issue 1. The Board granted in part and denied in part PSE's Motion and denied ACT's cross motion. *See Order on Motion to Dismiss*

*and for Partial Summary Judgment*, PCHB No. 19-087c (March 26, 2021). The Board's order dismissed Issues 1, 3b-f, 4f (as to WAC 173-400-111 and WAC 173-400-112), 4l and 4m. Issues 4n, 4q, 4r, 4s, 4t and 5 were dismissed by agreement of the parties.

On August 3, 2020, the Tribe moved to bifurcate the SEPA issues from the non-SEPA issues on the grounds that resolution of the SEPA issues may eliminate the need for a hearing on the non-SEPA issues. The Presiding Officer denied the motion on grounds that bifurcation may result in piecemeal litigation, and continued the case to March 2021.

On November 30, 2020, PSE filed a Second Dispositive Motion. PSE moved to dismiss Issues 2a-d and 2f, 3a, 4o, p, v and w. PSCAA joined the motion. ACT and the Tribe opposed the motion. The Board granted in part and denied in part PSE's Second Dispositive Motion, granting Summary Judgment as to Issues 2b and 3a, and denying Summary Judgment as to Issues 2a, 2c, 2d, 2f, 4o and 4p. *See Order on PSE's Second Dispositive Motion,* PCHB No. 19-087c (March 26, 2021). Issues 4v and 4w were dismissed by agreement of the parties.

On January 6, 2021, the Tribe renewed its Motion to Bifurcate the SEPA issues from the Permit issues, to continue the hearing on the Permit issues, to allow time to complete discovery, and for a stay of the Permit. The Presiding Officer denied the motion, ruling, among other things, that bifurcation may result in piecemeal litigation. In the course of the briefing on the Tribe's motion, a two-week block of hearing time became available in the Board's calendar and all parties agreed to continue the case from March 2021 to April 2021.

The parties filed numerous Motions in Limine before hearing, as well as motions related to the order of witness testimony and the use of videotaped deposition testimony of corporate representatives and former employees.

The hearing took place on April 12-16, 20-23, and 27, 2021, by Zoom videoconference. On May 28, 2021, the parties filed closing briefs. On June 30, 2021, ACT submitted *Washington State Dairy Federation v. Dep't of Ecology,* 18 Wn. App. 2d 259, 490 P.3d 290 (2021), as supplemental authority on consideration of climate change.

## III. LEGAL ISSUES

The following legal issues proceeded to hearing, grouped into SEPA issues and Permit issues: [1]

SEPA Issues

2. Whether the supplemental environmental impact statement ("SEIS") assessing lifecycle greenhouse gas emissions that supported the Order of Approval was arbitrary, unreasonable, incorrect, or otherwise not in compliance with the State Environmental Policy Act ("SEPA"), including but not limited to the following:

   a. The SEIS relies on an incorrect and unsupported claim of 1-for-1 fuel displacement, and an assumption that fuel use will not change over 40 years, that masks the greenhouse gas ("GHG") impacts of the Order of Approval.

   c. The SEIS fails to acknowledge that maintenance of high-GHG-emissions status quo for the lifetime of the project is a "significant' impact under SEPA.

   d. The SEIS relies on displacement and/or mitigation that is unavailable under the project as currently configured, and otherwise fails to assess the current configuration of the project.

[1] Issue 2b was dismissed on summary judgment. *See Order on PSE's Second Dispositive Motion,* PCHB No. 19-087c (March 26, 2021).

e. The SEIS fails to properly address the facility's emissions of N2O, a potent greenhouse gas.

f. The SEIS relies on scenarios that have not undergone SEPA review.

9. Whether legally adequate environmental review under SEPA requires either denial or further mitigation of the Project or is a reviewable cause of action under SEPA.

Permit Issues

4. Whether the Puget Sound Clean Air Agency's ("PSCAA") December 10, 2019 Order of Approval ("Order of Approval") violates PSCAA Regulations, the Washington Clean Air Act (RCW Ch. 70.94), and/or the federal Clean Air Act, including but not limited to the following:

a. Whether PSCAA's conclusions concerning Tacoma LNG's emissions and the impacts from those emissions are erroneous when PSCAA relied on modeling using non- representative meteorological data.

b. Whether PSCAA's Order of Approval is premature when the design of Tacoma LNG was not yet complete and continued to change at the time PSCAA determined PSE's NOC Application was complete and when the Order of Approval was issued, and it was likely that the facility's design and its operations would need to undergo revisions, which would likely result in changes to facility details having bearing on the facility's emissions.

c. Whether PSCAA's Order of Approval is invalid, when PSCAA's decision to grant the Order of Approval was made in reliance on performance specification and process details that were not provided to PSCAA, including those from Chicago Bridge & Iron and other unidentified "vendors."

d. Whether PSCAA erred in concluding that Tacoma LNG is not a Major Source of one or more pollutants, including volatile organic compounds (VOCs)?

e. Whether PSCAA erroneously concluded that Tacoma LNG's emissions are below the Clean Air Act's regulatory thresholds, emission and air quality standards.

f. Whether PSCAA erroneously concluded that the emissions from Tacoma LNG will not violate WAC 173-400-113 (i.e., not cause or contribute to a violation of any ambient air quality standard).

g. Whether PSCAA erroneously concluded that Tacoma LNG's emissions will not exceed applicable acceptable source impact levels (ASIL).

h. Whether PSCAA erroneously concluded that Tacoma LNG's emissions will not exceed applicable small quantity emission rate (SQER) limits.

i. Whether PSCAA's Order of Approval is invalid, where a first-tier ambient concentration screening analysis was performed before all emissions of HAPs and TAPs from the flare were estimated.

j. Whether PSCAA violated WAC 173-460-060 by failing to require a demonstration that Tacoma LNG will employ tBACT for all TAPs for which the increase in emissions will exceed de minimis emission values found in WAC 173-460-150.

k. Whether the Order of Approval's requirement that "the sole source of natural gas supply used in all operations at the Tacoma LNG facility comes from British Columbia or Alberta, Canada" is enforceable.

o. Whether PSCAA's Order of Approval incorrectly fails to include the requirements of NSPS Subpart OOOOa (40 C.F.R. § 60.5430a et seq.) relating to the handling of acid gas from the facility.

p. Whether PSCAA's Order of Approval incorrectly fails to include a requirement that Tacoma LNG monitor and control fugitive GHG and VOC emissions in accordance with NSPS Subpart OOOOa (40 C.F.R. § 60.5430a et seq.).

u. Did PSCAA violate the Clean Air Act by allowing a known source of significant amounts of pollution to achieve BACT through "good combustion practices", when PSCAA fails to define that standard and when there are known and reasonably available methods which, if implemented, would better ensure the facility is not violating pollution standards?

6. Whether PSCAA's permitting decision is invalid in light of its failure to engage in formal government-to-government consultation with the Puyallup Tribe of Indians.

8. Does the Board have jurisdiction over issues raised in Advocates for a Cleaner Tacoma et al.'s appeal and the Puyallup Tribe's appeal that are outside of the Board's jurisdiction in this permit appeal, including: facial challenge to Agency regulations and/or provisions of the Washington Clean Air Act, Ch. 70.94 et seq. ("Act"); alleged constitutional, Civil Rights Act, or treaty-based claims; challenges to an alleged failure to pursue enforcement; challenge to elements of the City of Tacoma's 2015 Final

Environmental Impact Statement ("2015 FEIS") not properly before this Board; and/or issues outside of the Board's jurisdiction established in Ch. 43.21B et seq.?

Having received the sworn testimony of witnesses, admitted exhibits, and heard argument on behalf of the parties, the Board makes the following:

## IV. GENERAL FINDINGS OF FACT

### A. Appellants' Witness

1.

Dr. Ranajit Sahu has a Bachelor of Science in Mechanical Engineering, and a master's and Ph.D. in Mechanical and Combustion Specialization from the California Institute of Technology. Dr. Sahu is currently an independent consultant focusing on air quality requirements for private, public, and nonprofit clients. He was the Appellants' sole expert witness on the Permit issues, opining on, among other things, the deficiencies concerning the potential to emit calculations, dispersion modeling, use of meteorological data in the dispersion modeling, and Best Available Control Technology (BACT) determinations for pollutant emissions. *Ex. APTI-587 (Sahu Amended Pre-filed Testimony); Sahu Testimony at 1551-1748, 2549-2604.*[2]

### B. PSCAA Witnesses

2.

Steven Van Slyke is the Director of Compliance at PSCAA. Van Slyke is a registered professional engineer in Washington with over 38 years of air quality experience. During his time with PSCAA, he has reviewed and approved over 1,500 Permit applications. Van Slyke has

[2] Witness hearing testimony citations refer to transcript pages.

a bachelor's in Chemical Engineering. *Ex. RA-1.* He testified on the Permitting process, federal and state regulatory compliance issues, and the Permit conditions. He also addressed Dr. Sahu's criticisms of the Permit and PSCAA's review of the Permit application.

3.

Carole Cenci is a Senior Engineer with the PSCAA. Cenci has a Bachelor of Science degree in Mechanical Engineering and has been a licensed engineer since 1990. Her responsibilities with PSCAA include conducting SEPA reviews of project applications. *Ex. RA-2*.

4.

Ralph Munoz has been an engineer with PSCAA for approximately five years and served as PSCAA's Permitting Engineer for TLNG. Munoz's responsibilities include reviewing incoming Permit applications and determining the adequacy of proposed emissions control technology as well as the applicability of various regulations. Among others at PSCAA, Munoz reviewed PSE's Permit application. *Ex. RA-3.*

**C. PSE Witnesses**

5.

Keith Faretra served as PSE's Permit Application Manager and was responsible for settling the contents of the application for submittal to PSCAA. Including the TLNG Permit application, Faretra signed "almost all" of the various submittals to PSCAA and served as PSE's liaison with PSCAA and PSE's permitting consultants, including Landau Associates, the firm retained by PSE to prepare the Permit application. *Faretra Testimony at 1531-1532.*

6.

William Donahue is the Manager of Natural Gas Resources for PSE. Donahue is responsible for managing the entire portfolio of natural gas transportation contracts, which includes identifying opportunities for PSE to provide energy services. Prior to working for PSE, Donahue was employed by Northwest Pipeline. He testified to the infrastructure of the incoming natural gas to TLNG, explained how natural gas composition changes in the production pipeline are controlled, the timing and type of incoming feed gas changes relevant to this case, and the location of where TLNG would receive the incoming feed gas. *Donahue Testimony at 1790-1817.*

7.

Matthew Stobart is a Project Engineering Manager with Chicago Bridge & Iron (CB&I), the company that designed and constructed TLNG. Stobart served as the technical liaison between PSE and CB&I. *Stobart Testimony at 1991.* Stobart has a Bachelor of Science degree in Electrical Engineering and has been working for CB&I for approximately 37 years. Stobart has participated in the construction of 12 to 15 LNG facilities. He testified on TLNG's facility design, design and process changes, UniSim modeling, and bracketing cases. *Id. at 966-1048, 1990-2078, 2613-2617.*

8.

Pamela Berner is an employee of the NAES Corporation. NAES has been contracted by PSE to manage TLNG's operation. Berner's responsibilities as to TLNG include implementing permit compliance systems, developing a leak detection and repair (LDAR) plan, and a

monitoring and testing program. Berner drafted the LDAR plan at issue. *Berner Testimony at 1461-1474.*

9.

Louis Kalani is the Senior Project Manager for LFG Specialties (LFG) (owned by APTIM), which designs and manufactures flares. Kalani designed and built the TLNG flare. During his almost 30 years at LFG, Kalani has participated in the design and manufacture of nearly 1,200 flares. LFG started developing low nitrogen oxide (NOx) flares like the one at issue in 2014 to improve destruction efficiency of hydrocarbons and reducing NOx and carbon monoxide emissions. *Kalani Testimony at 2078-80.*

10.

Dr. Joseph Smith is a Professor of Chemical and Biochemical Engineering at the University of Missouri. Dr. Smith has a bachelor's, master's, and Ph.D. in Chemical Engineering. Combustion technology and industrial flare design and operation are Dr. Smith's area of academic and professional expertise. *Ex. PSE-649 (Smith Pre-filed Testimony)*. Dr. Smith testified to TLNG's flare design and operation, and to the modeling and calculations concerning the flare's destruction rate efficiency. *Id.; Smith Testimony at 2125-2195.*

11.

Eri Ottersburg has a bachelor's in Biomedical Engineering. Ottersburg is a Senior Scientist for Landau Associates. Ottersburg has 20 years of experience in air quality permitting and dispersion modeling, mostly gained from working on projects in Washington state. She was very involved in preparing the Permit application and is listed as "Primary Author" on the

application. *Ex. RA-21, p. 5.* She also personally oversaw the preparation of TLNG's emissions inventory and air dispersion modeling, which she testified on extensively. *Ottersburg Testimony at 2197-2200, 220; see also, Ex. PSE-374, Attach. B (Libicki Pre-filed Testimony).*

12.

Dr. Laura Kinner has a Bachelor of Science in Chemistry and a Ph.D. in Analytical Chemistry. Dr. Kinner's past research focused on testing of hazardous waste incinerators. She currently works for Emissions Monitoring Inc, where she provides consulting services to industrial clients in the area of stack testing. In her 35 years working in the stack testing field, she has completed over 900 stack testing programs and 50 continuous emissions monitoring system (CEMS) installation projects. PSE retained Dr. Kinner in November 2020 to assist with TLNG's stack testing program and to investigate the feasibility of installing CEMS on TLNG's flare. Dr. Kinner generally explained how TLNG's monitoring and flare stack testing required by the permit would ensure compliance with emission limits. *Kinner Testimony at 2392-95; see also Ex. PSE-374, Attach. C (Libicki Pre-filed Testimony).*

13.

Dr. Shari Libicki has a Bachelor of Science in Engineering and Chemical Engineering, and a master's and Ph.D. in Chemical Engineering. Dr. Libicki is currently a Principal at Ramboll US Corporation, where she has been employed for 30 years as an air quality professional doing air quality permitting, dispersion modeling, exposure assessments for risk assessments, and emission estimates. She testified as an expert to the review and modeling that she performed for this case, including dispersion modeling of Dr. Smith's stack parameters,

dispersion modeling of worst case (unrealistic) flare temperatures and exit velocities, dispersion modeling of corrected wind data, review of Landau's dispersion modeling, review of Landau's estimates of TLNG's VOC emissions, and VOC emission estimates using unrealistic inputs. *Ex. PSE-374 (Libicki Pre-filed Testimony); Libicki Testimony at 2415-2531.*

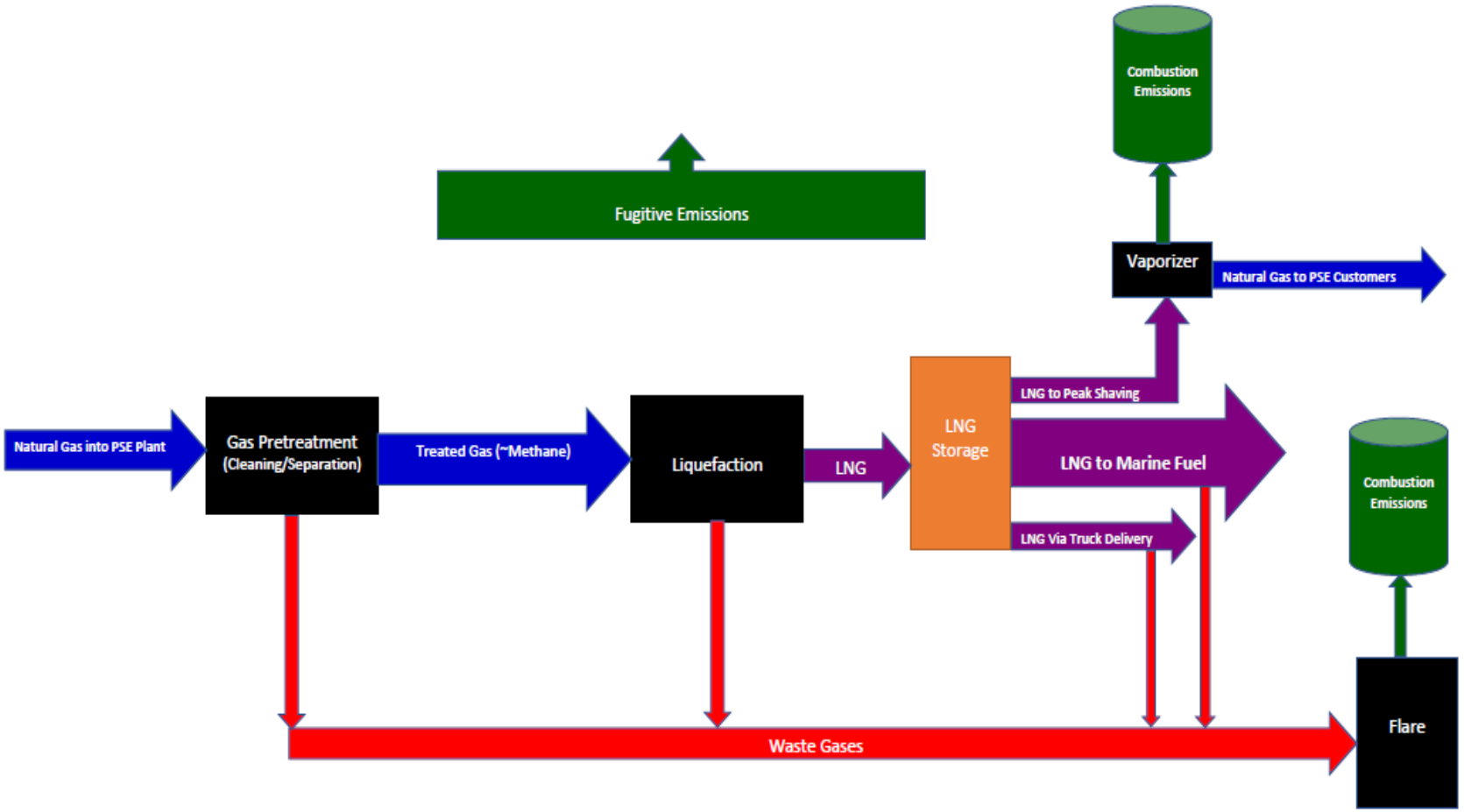
14.

CB&I designed and constructed TLNG, including identifying and selecting equipment vendors. *Stobart Testimony at 1992*. TLNG will emit criteria air pollutants, toxic and hazardous air pollutants, volatile organic compounds, and greenhouse gases. *Ex. RA-38, pp. 97-100.* Below is a simplified process flow diagram of TNLG. *Ex. RA-15.*

15.

The diagram below illustrates the different stages that natural gas from the pipeline goes through in the liquefaction process resulting in LNG for marine fuel or converting back to natural gas for distribution to PSE customers during periods of high demand (peak shaving). The diagram also shows the main components and the emissions attributed to each step of the process that is subject to regulation under the permit.

## Simplified Process Flow Diagram - Puget Sound Energy Tacoma Liquefied Natural Gas Plant



16.

The primary emission units at TLNG are the enclosed ground flare and the vaporizer. The flare would produce more emissions because the vaporizer is limited to a maximum of 10 days per year of operation. *Ex. RA-68, p. 34; Ottersburg Testimony at 2216*. The flare has four burners to combust waste gases generated by the pretreatment, liquification, and fuel transmitting processes. *Ex. RA-15*. PSE contracted with LFG to design and build the flare. PSE provided specifications for flare height, waste gas composition, and a desired destruction rate efficiency for waste gases from which LFG designed and built the flare. *Stobart Testimony at 1992-93.*

17.

CB&I used UniSim, a commercially available process simulator, to design TLNG. When a simulation is run in UniSim, it produces an output file or report. In this case, a heat and material balance (or heat and mass balance) from a UniSim TLNG simulation was produced containing both inputs and outputs. *Stobart Testimony at 2060-62*. Relevant here, UniSim was used to develop bracketing cases of operating scenarios at TLNG that affect the type and amount of waste gases going to the flare. But certain processes are omitted from the UniSim model here. For example, UniSim did not address the fate of BTEX[3] coming into TLNG through feed gas and did not address other sulfur compounds except hydrogen sulfide. *Id. at 2062.*

[3] BTEX refer to the chemicals benzene, toluene, ethylbenzene and xylene.

18.

A vaporizer is used to re-gasify LNG so that it can be introduced into PSE's distribution network. *Ex. RA-38, p. 54*. The vaporizer would consist of a warm water bath that heats the LNG to a gaseous state suitable for use in the pipeline. *Id.* Because only one pipeline would convey gas to and from TLNG, the LNG liquefaction system cannot operate when the vaporizer is operating. *Ottersburg Testimony at 2218.*

19.

Broadly, an air permitting agency must issue an NOC Permit if the new source of emissions: 1) meets all applicable emissions standards under the federal and state Clean Air Act, and implementing regulations, 2) uses BACT for all new pollutants, and 3) the emissions from the new source will not cause or contribute to a violation of any ambient air quality standards. *See ¶ 32*.[4]

**D. Potential to Emit**

20.

To estimate TLNG's emissions and determine whether they would comply with applicable emission limits under the law, PSE and PSCAA had to calculate TLNG's potential to emit certain pollutants.[5] *Ottersburg Testimony at 2216-17*; *Munoz Testimony at 1308-09*. In the

[4] Paragraph references are to internal paragraph numbers within this Order.

[5] WAC 173-400-030(76) defines "[p]otential to emit" as "the maximum capacity of a source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design only if the limitation or the effect it would have on emissions is enforceable. Secondary emissions do not count in determining the potential to emit of a source."

context of PSE's Permit application, a project's potential to emit is based on the physical design of the source along with pollution controls or conditions imposed by the agency. *Van Slyke Testimony at 1859-61*. Calculating total emissions for TLNG, or creating an emissions inventory, entails identifying the emission units for a facility on a pollutant by pollutant basis (flare, vaporizer, fugitive emissions), applying emission factors (using published information from government agency and vendor), and then adding the values together to obtain a facility's total emissions. *Ottersburg Testimony at 2216-19; Ex. PSE-75*.

21.

PSCAA and PSE (through Landau Associates) used AP-42 emissions factors to calculate TLNG's particulate matter ($PM_{2.5}$) emissions, a criteria air pollutant, as well as hazardous air pollutants and toxic air pollutants.[6] Emission factors are numeric values used to estimate emissions from a source like TLNG that has not yet been built and thus cannot be tested. *Ex. PSE-374, p. 25 (Libicki Pre-filed Testimony); Munoz Testimony at 1310-11, 1318-19; Ex. RA-68, p. 37*.

22.

PSE plans to operate TLNG year-round, except for seven days per year when liquefaction and vaporization operations would be shut down for maintenance. *Ex. R-68, p. 31.* As discussed above, bracketing cases are various facility operating scenarios created by CB&I which may arise during TLNG's day-to-day operations. Brackets identify worst case emissions rates for

[6] AP-42 emissions factors refer to the U.S. Environmental Protection Agency's document AP-42, which is a compilation of air pollutant emission factors. *See Mazdak Int'l, Inc. v. Northwest Clean Air Agency*, PCHB No. 13-008, p. 10 (Oct. 8, 2013).

each pollutant. *Ottersburg Testimony at 2224; Ex. PSE-374, pp. 104-143 (Libicki Pre-filed Testimony)*. Landau understood the bracketing cases to be the different processing rates at TLNG represented by a range of gas flow rate and gas characteristics going to the flare, such as heat content of the different gases. *Ottersburg Testimony at 2223-24; Ex. RA-68, pp. 41-42*. Landau and Dr. Libicki, air quality experts who testified on behalf of PSE, used these bracketing cases to calculate TLNG's potential to emit and to conduct dispersion modeling (see below).

**E. Dispersion Modeling**

23.

Air dispersion modeling is the process of considering the meteorology, terrain, and components of a project, and then analyzing those factors with a project's emissions inventory in order to predict the resulting potential concentrations of a given pollutant offsite. *Van Slyke Testimony at 1862-64; Ottersburg Testimony at 2206*. Dispersion models are used to determine compliance with National Ambient Air Quality Standards, and other requirements in New Source Review. *Van Slyke Testimony at 1862-64; Exs. RA-23, RA-107, RA-143*. Landau Associates performed the dispersion modeling for PSE.

**F. Timeline of Permit Application Process**

24.

PSE submitted the application for Permit No. 11386 to PSCAA on May 22, 2017. PSCAA issued the Order of Approval authorizing TLNG's emissions on December 10, 2019. The timing of numerous actions relevant to the process of reviewing the Permit application were presented through exhibits and testimony from numerous witnesses. For brevity, the timeline

will not be set out in this decision as they are fully described in PSCAA's NOC worksheet. *Ex. RA-68 (excerpted timeline in PSCAA's Prehearing Brief, p. 13).*[7]

**G. Order of Approval on NOC application No. 11386 (Permit)**

25.

Broadly, PSCAA reviewed the Permit application to identify the amount of criteria air pollutants, volatile organic compounds, hazardous air pollutants, and toxic air pollutants that TLNG will emit, and to determine whether the emissions and their impacts on ambient air complied with applicable limits. *Ex. RA-68, p. 31*.

26.

The Permit approved TLNG's equipment (flare, vaporizer, LNG storage tank, and two pretreatment heaters), set emission limits for several pollutants through BACT, and set forth 48 conditions that work together to constrain and control TLNG's operations. Those conditions include emission limits for specific pollutants, equipment or process specific conditions, and general conditions applicable to all equipment. *Munoz Testimony at 1333-34; Ex. RA-132*. The Permit also included standard Condition No. 1, which requires PSE to install and establish the approved equipment or process "in accordance with the plans and specification on file" at PSCAA. *Ex. RA-132; Van Slyke Testimony at 464-65*.

[7] Citations to page numbers in the parties' briefs refer to pdf page numbers.

## V. GENERAL CONCLUSIONS OF LAW

27.

The Board has jurisdiction over the subject matter and the parties pursuant to RCW 43.21B.110. As the parties appealing the SEIS and order approving the Permit application, the Tribe and ACT have the burden of proof. WAC 371-08-485(3); *MYTAPN v. Dep't of Ecology*, PCHB No. 10-162, COL 1 (July 25, 2012).

28.

The Board's standard and scope of review is *de novo*. WAC 371-08-485(1). The Board makes findings of facts based on a preponderance of the evidence. WAC 371-08-485(2). The Board gives great weight to PSCAA's interpretation of the laws it is charged with administering, and deference to PSCAA's specialized knowledge and expertise on complex scientific or technical judgments. *Port of Seattle v. Pollution Control Hr'gs Bd.*, 151 Wn.2d 568, 592-93, 90 P.3d 659 (2004); *Marine Vacuum Svcs. v. Puget Sound Clean Air Agency*, PCHB No. 16-130c, COL 2 (Feb. 8, 2018). The Board also gives deference to PSCAA's interpretations of Permit conditions that involve technical or scientific judgments. *City of Snoqualmie v. Dep't of Ecology*, PCHB No. 14-064, p.16 (Feb. 2, 2015).

29.

Under its *de novo* scope of review, the Board can decide a case based on all of the evidence available at the time of the hearing, including additional information gathered after issuance of the challenged order. *Port of Seattle,*151 Wn.2d at 597-98; *BNSF Ry Co. v. Dep't of Ecology*, PCHB No. 11-150, p. 11 (Dec. 4, 2012). Yet considering such additional evidence

under a *de novo* standard of review does not supplant the need for an agency charged with administering an air permit program to first analyze all applicable facts and authority before issuing a decision for the parties to litigate and the Board to review. Allowing the agency to analyze such additional information allows the Board to fulfill its charge to give deference to a permitting agency's expertise on issues that involve technical or scientific judgments. *Port of Seattle*, 151 Wn.2d at 592-593; *Buxton v. Dep't of Ecology*, PCHB No. 07-033, p. 10 (Dec. 21, 2007).

30.

PSCAA regulates TLNG as a stationary source of air emissions under the New Source Review provisions in the Washington Clean Air Act, ch. 70A.15 RCW (formerly codified in ch. 70.94 RCW), its accompanying regulations (ch. 173-400 WAC), PSCAA regulations (PSCAA Regulation I, Article 6), and the federal Clean Air Act. *Van Slyke Testimony at 1826-27; Exs. RA-8, RA-11.* New source review refers to the preconstruction permitting programs of the Clean Air Act required for the construction and operation of any new stationary source of emissions. The purpose of new source review is to ensure compliance with ambient air quality standards and emission standards, and to confirm that appropriate control technologies are used. *Ex. RA-38, p. 100;* WAC 173-460-040.

31.

Emissions from TNLG are regulated through several PSCAA regulations, but the main one is the Permit review in PSCAA Regulation I, Art. 6, which expressly adopts and enforces the Washington State Department of Ecology's new source review regulations in ch. 173-400 WAC

and controls for new sources of toxic air pollutants. PSCAA Reg. I, Art. 6*; Van Slyke Testimony at 1827.*

32.

In reviewing an application to establish a new source of emissions in an attainment area, the permitting authority must issue an order of approval if it determines that the proposed new source satisfies three criteria:

1) Meet "all applicable new source performance standards, national emission standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, emission standards adopted under chapter 70.94 RCW and, for sources regulated by an authority, the applicable emission standards of that authority;

2) Employ BACT for all pollutants not previously emitted or whose emissions would increase as a result of the new source; and

3) Allowable emissions from the proposed new source or the increase will not cause or contribute to a violation of any ambient air quality standards.

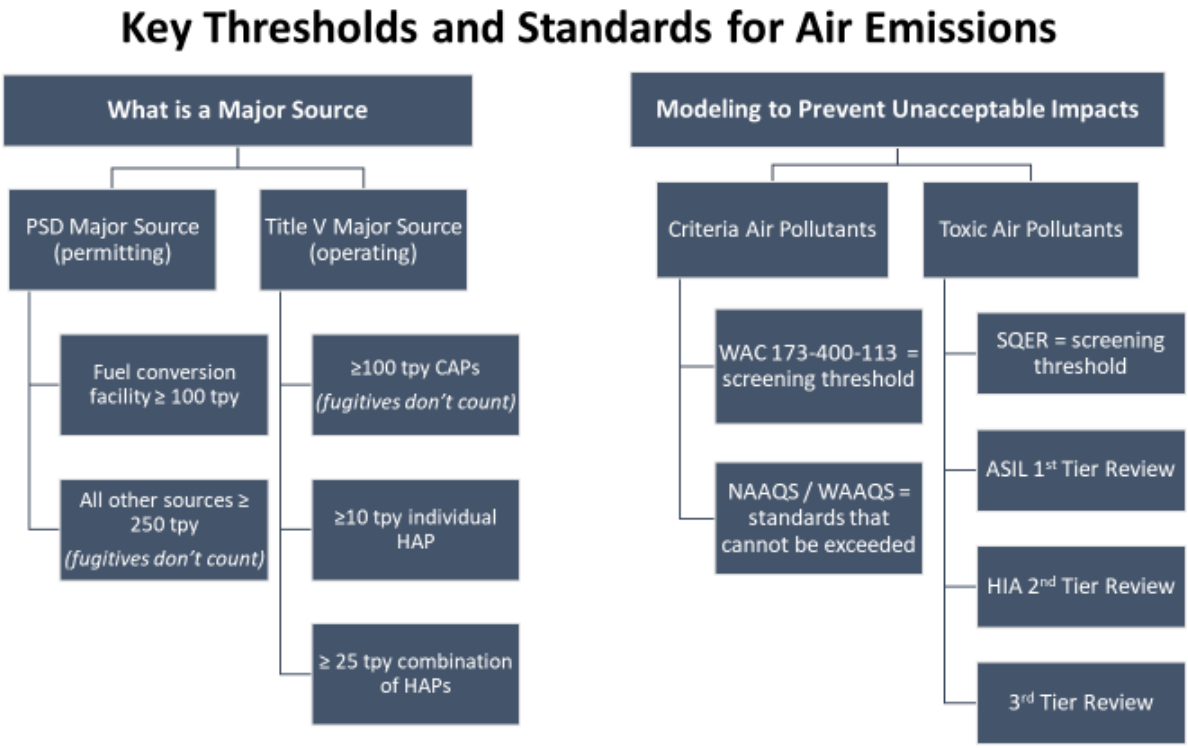
WAC 173-400-113;[8] *Van Slyke Testimony at 1828-30*.

[8] WAC 173-400-113 states in relevant part (emphasis added):

> The permitting authority that is reviewing an application to establish a new source . . . in an attainment or unclassifiable area *shall* issue an order of approval if it determines that the proposed project satisfies each of the following requirements:
> (1) The proposed new source or modification *will comply with all applicable new source performance standards, national emission standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, emission standards adopted under chapter 70.94 RCW and, for sources regulated by an authority, the applicable emission standards of that authority.*
> (2) The proposed new source or modification *will employ BACT* for all pollutants not previously emitted or whose emissions would increase as a result of the new source or modification. (3) Allowable emissions from the proposed new source . . . *will not cause or contribute to a violation of any ambient air quality*

33.

Most of the legal issues challenging the Permit ask whether the Permit complies with the three requirements of WAC 173-400-113. In turn, the three requirements contain standards and procedures which Appellants contend were violated. The graphic below illustrates the key regulatory thresholds and standards for air emissions governing this case.[9]




*standard*. If the modeled concentrations of allowable emissions from the proposed new source . . . are below the levels in Table 4a, the proposed source does not contribute to a violation of an ambient air quality standard.

[9] The graphic was presented without objection as a demonstrative during Dr. Libicki's direct testimony.

## VI. FINDINGS/CONCLUSIONS BY LEGAL ISSUE

### A. Meteorological Data (Issue 4a)

34.

Appellants presented Dr. Sahu's testimony to challenge in Issue 4a the meteorological data used as inputs in the air dispersion modeling, claiming that on-site meteorological data should have been collected rather than relying on data collected from nearby monitors. The meteorological data and dispersion modeling was used to evaluate the toxic air pollutant impacts and to determine whether TLNG's criteria air pollutant emissions will cause or contribute to a violation of National Ambient Air Quality Standards. *Van Slyke Testimony at 1868; Ottersburg Testimony at 2237-39; Ex. PSE-374, pp. 105-06 (Libicki Pre-filed Testimony)*. Thus, resolution of whether PSCAA used the appropriate meteorological data in Issue 4a affects the analysis of toxic air pollutant emissions in Legal Issues 4g, 4h, 4i, as well as the legal issues concerning criteria air pollutants in Issues 4e and 4f.

35.

Not all Permit applications require air dispersion modeling if emissions are low enough. Consistent with U.S. Environmental Protection Agency (EPA) guidance, meteorological data is not required to be included in air dispersion modeling; but if included, it is used to improve the accuracy of the predicted impact analysis. *Van Slyke Testimony at 1863-64, 1866*. Because meteorological data is often not available for the exact location of a project site, dispersion models often rely on representative meteorological data from nearby sites. *Ottersburg Testimony at 2241-45; Ex. PSE-374, p. 90 (Libicki Pre-filed Testimony).*

36.

Meteorological data include hourly wind speed, hourly wind direction and additional parameters such as surface characteristics (surface roughness), which are inputs in air dispersion modeling that may affect modeling results. *Ex. APTI-587, p. 28 (Sahu Amended Pre-filed Testimony); Van Slyke Testimony at 1397*.

37.

Applicable EPA guidance states that meteorological data should be "adequately representative" and may be site specific data. *See* 40 C.F.R. § 51, App. W, § 8.4.1(c) (2008) (Appendix A of EPA's *Guideline on Air Quality Models* (also published as Appendix W), hyperlinked in *Ex. RA-107*). Relevant here, offsite meteorological data may be adequately representative; conversely, meteorological data collected on a source's property does not by itself guarantee adequate representativeness. *Id*. at § 8.4.4.1(a), (c).

38.

Surface characteristics such as terrain, surface roughness, and distance are factors in determining whether meteorological data is representative of conditions at the TLNG site. *Ottersburg Testimony at 2241-45; Libicki Testimony at 2444; Ex. PSE-374, p. 93 (Libicki Pre-filed Testimony)*. PSCAA's Engineer Munoz testified that engineering judgment is used to determine whether meteorological data from a particular monitor is sufficiently representative of where the source will be located for air dispersion modeling use purposes. *Munoz Testimony at 1304.*

39.

PSE collected wind speed and wind direction data for a period of five years from the PSCAA Tideflats monitor located about a mile southeast from the TLNG project site. *Ex. APTI-587, p. 29 (Sahu Amended Pre-filed Testimony); Libicki Testimony at 2444-45*. Missing hours of wind speed and direction were supplemented with data from other monitors located at Tacoma South L Street, Seatac, and McChord Air force Base. *Ex. APTI-587, p. 29*. Supplementing missing hours of meteorological data with adequately representative alternative data, such as National Weather Service data, is acceptable and consistent with common practice and EPA guidance. *Ex. PSE-374, pp. 92-93 (Libicki Pre-filed Testimony).*

40.

PSCAA and PSE followed the applicable EPA guidance when selecting site specific meteorological data for air quality dispersion modeling. *See* Appendix A of EPA's *Guideline on Air Quality Models* (also published as Appendix W) of 40 C.F.R. Part 51; *Ex. PSE-373, p. 1 (Libicki Pre-filed Testimony Addendum); Libicki Testimony at 2444; Ex. RA-107;*[10] *Van Slyke Testimony at 1864-67*.

[10] EPA guidance states that

> [t]he meteorological data used as input to a dispersion model should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern.

EPA's Guideline on Air Quality Models, Appendix A of 40 C.F.R. part 51, 82 Fed. Reg 5182 p. 5222, Section 8.4.4.1, (Jan. 17, 2017) (hyperlink available in *Ex. RA-107*). The Guideline further states:

> Spatial or geographical representativeness is best achieved by collection of all of the needed model input data in close proximity to the actual site of the source(s). Site-specific measured data are, therefore, preferred as model input, provided that appropriate instrumentation and quality assurance procedures are followed, and that the data collected are adequately representative (free from inappropriate local or microscale influences) and compatible with the input requirements of the model to be used. It should be

41.

As part of the air dispersion modeling for PSE, Landau Associates evaluated surface characteristics and wind speed when selecting the Tideflats monitoring data as representative for the TLNG site. *Ottersburg Testimony at 2242-45; Ex. RA-23, p. 12.* Dr. Libicki agreed with PSCAA that the Tideflats meteorological data were both representative and site specific to provide a reliable basis for dispersion modeling – the Tideflats monitoring station is within one mile of the TLNG site, on the same pier, has similar terrain and land use, and has similar distance to over-water influence. *Libicki Testimony at 2443-44; Ex. PSE-374, p. 93 (Libicki Pre-filed Testimony)*.

42.

Appellants presented Dr. Sahu's opinion that wind fields in the Port of Tacoma are complex and therefore meteorological data from the Tideflats station and others cannot be site specific and representative. *Sahu Testimony at 1717, 2584-86*. Dr. Sahu also stated that meteorological data should have been collected and used in dispersion modeling from an onsite monitor. *Ex. APTI-587, p. 28 (Sahu Amended Pre-filed Testimony).*

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> noted that, while site specific measurements are frequently made ''on-property'' (i.e., on the source's premises), *acquisition of adequately representative site specific data does not preclude collection of data from a location off property. Conversely, collection of meteorological data on a source's property does not of itself guarantee adequate representativeness* . . . Site-specific data should always be reviewed for representativeness and adequacy by an experienced meteorologist, atmospheric scientist, or other qualified scientist in consultation with the appropriate reviewing authority (paragraph 3.0(b)).

*Id*. at p. 5223 (*emphasis added*).

43.

To support his opinion of complex wind fields, Dr. Sahu compared hourly wind speed and wind direction data from the Tideflats monitor with the same parameters from a nearby National Oceanic and Atmospheric Administration "buoy" monitor located closer to the TLNG site.[11] The TLNG site is located between the buoy monitor and the Tideflats monitor. *Ex. APTI-587, pp. 29-30 (Sahu Amended Pre-filed Testimony).* Dr. Sahu's comparison purportedly showed wide variability in wind speed and directions recorded at the two closely located stations. *Id*., *pp. 29-37*. However, PSE's expert Dr. Libicki thoroughly analyzed and explained the reason for the wide variability in Dr. Sahu's comparison – the comparison failed to adjust for the fact that the Tideflats and buoy monitors reported data in different time zones and thus did not compare data hour by hour, but instead compared data recorded eight hours apart. The error affected Dr. Sahu's results because winds differ significantly when measured hours apart, especially at locations near water. Once Dr. Libicki corrected the time zone error, there was little difference in wind speed between the two monitors. Thus, similar wind speed at both the buoy and Tideflats monitors located closely supports Dr. Libicki's opinion that the Tideflats meteorological data was representative of the TLNG site. *Ex. PSE-373, pp. 1-6 (Libicki Pre-filed Testimony Addendum).*

[11] Although referred to as the buoy monitor throughout the hearing, the monitor is located on land at the tip of a pier with trees growing nearby. *Libicki Testimony at 2445-46; Ex. PSE-374, pp. 94-95 (Libicki Pre-filed Testimony)*.

44.

On April 8, 2021, PSE informed the parties that the air dispersion modeling it had submitted to PSCAA, which was considered in the review that led to issuance of the permit, had erroneously input Tideflats monitor wind directions that was reversed 180 degrees.[12] *Munoz Testimony at 1295-96; Van Slyke Testimony at 1868*. Thus, on April 12, 2021, the first day of hearing, PSE submitted a revised air dispersion modeling with the correct wind directions. *Ex. RA-143; Cenci Testimony at 1267-70, 1275-76*. Dr. Libicki performed the revised dispersion analysis. *Ex. PSE-373, pp. 6-19 (Libicki Pre-filed Testimony Addendum)*.

45.

In an April 14, 2021, letter to PSE, PSCAA acknowledged that on April 12, 2021, it had received the additional revised analysis (and the summary tables):

> The original dispersion modeling analysis was reviewed and considered in the process that led to the issuance of [OOA] No. 11386 on December 10, 2019. The agency has completed its review of the clarifying … dispersion modeling analysis[.] This analysis was submitted because PSE became aware that the wind directions used in the original analysis had been reversed by 180 degrees when running the dispersion models.

*Ex. RA-143*. PSCAA reviewed the revised modeling and found minimal differences in the results between the original and revised dispersion modeling, with no change in the criteria pollutant thresholds in WAC 173-400-113 and the TAP thresholds in WAC 173-460.[13] *Van Slyke Testimony at 1870; Ex. RA-143*. The revised modeling also did not change the BACT or

[12] The error was caused by a spreadsheet equation not properly formatting the wind direction data. *Libicki Testimony at 2452; Ottersburg Testimony at 2249-50*.

[13] "Toxic air pollutant (TAP)" or "toxic air contaminant" means any toxic air pollutant listed in WAC 173-460-150. *See* WAC 173-400-030(96).

tBACT determinations since those determinations are separate and distinct from ambient air quality impact analysis. Finally, PSCAA also determined that the revised modeling did not create a reason to revise any specific approval conditions in the Permit. *Ex. RA-143*. PSCAA noted that the additional revised air dispersion modeling will be added as additional information to the Permit application file as "part of the plans and specifications on file with the Agency, as identified in Condition No. 1 of the order of approval." *Ex. RA-143, p. 2.*

46.

Dr. Libicki explained in detail that the wind direction error in the original air dispersion modeling did not affect either the results of the original dispersion modeling of toxic air pollutants and criteria air pollutants for compliance with applicable standards. She prepared tables showing the modeled concentrations of those pollutants with the reversed wind direction data and compared them to tables showing the same with the correct wind direction data. *Ex. PSE-373, pp. 6-10 (Libicki Pre-filed Testimony Addendum); Libicki Testimony at 2455-58.*

47.

Dr. Libicki also redid air dispersion modeling with the correct wind direction data using stack parameters for flare temperature and exit velocity from Dr. Smith, and the results for those parameters were the same as the original air dispersion modeling. *Libicki Testimony at 2458; Ex. PSE-373, pp. 11-18 (Libicki Pre-filed Testimony Addendum)*.

48.

Dr. Libicki also testified that the wind meteorological data in the original dispersion modeling did not change her opinion that TLNG is not a major source of emissions because it is

the mass quantity of emissions (expressed in tons per year) that determines whether a facility is a major source. In contrast, dispersion modeling models concentrations of specific emissions and do not affect the size or quantity of the source of emissions. *Libicki Testimony at 2459*.

49.

Dr. Sahu testified that he also adjusted the wind speed and direction hour by hour but found nothing that would change his conclusion that the meteorological data used was non-representative. *Sahu Testimony at 1715-16*. Weighing the testimony of Dr. Sahu and Dr. Libicki's extensive analysis and testimony, the Board finds that PSCAA relied on representative meteorological data in modeling air dispersion emissions. The Board also finds that the revised air dispersion modeling with the correct wind data did not affect the conclusion in the original dispersion modeling that emissions of criteria air pollutants and hazardous air pollutants will not exceed applicable limits.

50.

For the first time in the post-hearing brief, Appellants argue that the Board should remand the Permit because PSCAA approved it with flawed air dispersion modeling. They contend that Dr. Libicki's new modeling fails to cure the defect that the Permit was obtained with incorrect wind direction data for four reasons. First, Appellants argue that the new modeling was not presented for public comment and would violate the Clean Air Act. *See The Puyallup Tribe of Indians' Closing Statement, pp. 13-14.* For support, Appellants cite provisions from federal regulations pertaining to public comment requirements for state operating programs

for *major source* of emissions. *See, e.g.*, 40 C.F.R. § 70.1. As analyzed in ¶¶ 65-105, TLNG is not a major source.

51.

Appellants also cite the definition for completeness in WAC 173-400-111(1)(b) and the public notice components for air quality actions in WAC 173-400-171(6)(a). Similar to the analysis in ¶¶ 55-63, the definition of application completeness simply does not require that the revised air modeling be included in the application or made available for public comment - all it requires is sufficient information to enable PSCAA to undertake review. Moreover, Appellants provide no authority for their claim that noncompliance with the public notice provisions require their requested remedy of reversal of the Permit and remand to PSCAA for "a full, transparent, and public review of PSE's permit application do-over." *The Puyallup Tribe of Indians' Closing Statement at 16*. As discussed below, Appellants agreed to proceeding with the hearing on the Permit the second week so that it would have time to analyze the new modeling.

52.

Second, Appellants claim it is unfair to rely on Dr. Libicki's new modeling to affirm the Permit when it was created during hearing, and where Appellants' expert, Dr. Sahu, did not have sufficient opportunity to analyze it and develop rebuttal opinions. The Board disagrees because counsel for the Tribe requested, and the Presiding granted, rebuttal testimony from Dr. Sahu specifically to address the reversed wind evidence, among other things. *Hearing Transcript Day 10 at 2535, 2538*. Moreover, the procedural history surrounding the new modeling in ¶¶ 44-45 and below, belies Appellants' claim of unfair process. Upon being notified of the correct wind

data, all parties agreed to proceed with trying the SEPA issues the first week of hearing, and then not to resume hearing until the following Tuesday so the parties could spend the intervening three days analyzing the new modeling before resuming with hearing on the air permit issues. No party asked to continue the hearing beyond what was agreed. Dr. Sahu, the Appellants' expert, reviewed the new modeling with the correct wind data and subsequently testified regarding the correct wind data. Under its *de novo* review, the Board is authorized to take in evidence during hearing that was not before PSCAA when it reviewed PSE's Permit application, affording the Board opportunity to consider PSCAA's review of that new evidence using PSCAA's technical expertise and judgment.[14] *See Port of Seattle*, 151 Wn.2d at 594-95; 597-99; *cf*., *Painted Summer Hills, LLC v. Dep't of Ecology*, PCHB No. 09-006, pp. 13-16 (Oct. 6, 2011) (concluding that state agency not precluded from asserting before the Board new reasons to support its initial decision when those reasons were not explicitly identified in agency's initial decision); *see also, K.P. McNamara Nw., Inc. v. Dep't of Ecology*, 173 Wn. App. 104, 108, 292 P.3d 812 (2013) (due process satisfied if administrative adjudicator bases findings against a party only on matters brought to the party's attention in complaint *or* during administrative hearing that are fully litigated).

[14] Appellants assert that the situation here created by the newly discovered wind flip data and ensuing modeling using the correct wind data is precisely the moving target problem which the Court in *Port of Seattle* identified (but rejected as not implicated in that case). The Board disagrees. The "moving target" problem is also not implicated here because the revised modeling was done as soon as the wind error was discovered. There is no evidence that Respondents willfully waited past the discovery deadline to present the data and revised air modeling. In short, the Board's consideration of the wind evidence under its *de novo* review authority as construed in *Port of Seattle* was an appropriate and efficient way to address evidence occasioned by a spreadsheet mistake and discovered right before hearing.

53.

Third, the Tribe argues that discovery of the reversed wind data days before hearing proves that PSCAA failed to properly review the original Permit application. The Board disagrees as the evidence does not support such a conclusion.[15] In any event, the Board reviews the Permit *de novo*, and after hearing extensive testimony regarding both the original and revised air dispersion modeling from multiple witnesses, the Board concludes that the wind data that necessitated a revised air dispersion modeling did not have any effect on the Permit's conclusions that TLNG's emissions meet all applicable law. Because the reversed wind data did not materially change the original air dispersion modeling results, the Board also rejects Appellants' fourth claim that remand is necessary.

54.

The Board concludes that Appellants did not meet their burden to show that TLNG's emissions violated applicable law or are otherwise erroneous by virtue of not using representative meteorological data on the TLNG property site. *See* ¶¶ *34-49*. The Board also concludes that the reversed wind data did not materially change the original air dispersion modeling results showing that criteria air pollutants and toxic air pollutants emissions are below applicable thresholds and limits. *See* ¶¶ *34-53*.

[15] *See, e.g., Libicki Testimony at 2452; Ottersburg Testimony at 2249-50* (testifying that the error was caused by a spreadsheet equation not properly formatting the wind direction data).

**B. TLNG Facility Design Completeness/Sufficiency of Information provided to PSCAA (Issues 4b, 4c)**

55.

Issue 4 asks whether PSCAA's Permit violates PSCAA regulations, the Washington Clean Air Act, and/or the federal Clean Air Act, including but not limited to the following sub-issues:

4b. Whether the Permit is premature when the design of TLNG was not yet complete and continued to change at the time PSCAA determined PSE's Permit application was complete and when the Permit was issued, and it was likely that the facility's design and operations would need to undergo revisions, which would likely result in changes to facility details having bearing on the facility's emissions;

4c. Whether the Permit is invalid when PSCAA's decision to issue the Permit was made in reliance on performance specifications and process details that were not provided to PSCAA, including those from Chicago Bridge & Iron (CB&I) and other unidentified vendors.

56.

Van Slyke explained that PSCAA employs the definition of application completeness in the Washington Administrative Code (WAC), instead of the federal regulations relied on by Appellants. *Van Slyke Testimony at 1840-42, 1841-44*. That definition provides in part that a complete application contains all the information necessary for processing the application and must provide the location, design, construction, and operation of the new source, as well as information on the nature and amounts of emissions to be emitted to enable the permitting

authority to determine whether the proposed project will meet the requirements of WAC 173-400-113. WAC 173-400-111(1)(b). Van Slyke testified that PSCAA properly determined that PSE's Permit application was complete under WAC 173-400-111. *Van Slyke Testimony at 1841-44*.

57.

Van Slyke and Munoz explained in detail PSCAA's review of PSE's Permit application, and the numerous analyses and calculations PSE submitted to PSCAA (including information submitted in response to PSCAA's specific request for more information) in support of its application. As a result, they testified that PSCAA obtained sufficient information to assess TLNG's emissions. *Van Slyke Testimony at 1840, 1868-69, 1875, 1880, 1893-94, 1908, 1946; Munoz Testimony at 2313-14, 2322; see also Cenci Testimony at 2366, 2370, 2374*. PSCAA considered project changes as PSE submitted them during the application review and evaluated them for their emission impacts. *Ex. RA-68, pp. 6-7; Van Slyke Testimony at 1923-27 (changes in incoming feed gas composition, among others, listed in Ex. RA-68), 1905-06*.

58.

Van Slyke disagrees with Dr. Sahu's testimony that PSE's Permit application did not have sufficient information. Van Slyke stressed that PSCAA interprets the application completeness requirement in WAC 173-400-111(1)(b) as requiring sufficient information for PSCAA to begin their review of the application. *Van Slyke Testimony at 1843-44.* Van Slyke also emphasized the last sentence of WAC 173-400-111(1)(b) providing that designating an application complete for purposes of Permit processing does not preclude the reviewing authority

from requesting or accepting any additional information. *Van Slyke Testimony at 1841, 1844*. Van Slyke specifically disagreed with Dr. Sahu that PSCAA did not have enough information to determine BACT for TLNG given the completeness determination and the research PSCAA undertook that informed PSCAA engineers on the choice of BACT. *Van Slyke Testimony at 1936*.

59.

PSE also presented evidence that its Permit application contained sufficient information on TNLG facility and processes to satisfy WAC 173-400-111 and enable PSCAA to evaluate TLNG emissions for compliance with applicable regulations. Dr. Libicki explained that it is common for air permits such as the one at issue to be based on a facility's early conceptual design stage where the focus is on the technical requirements. *Ex. PSE-374, p. 17 (Libicki Pre-filed Testimony); see also Van Slyke Testimony at 1923*. Dr. Sahu agreed. *See Ex. APTI-587, p. 62 (Sahu Amended Pre-filed Testimony).* This allows for the facility design to evolve and respond to agency review and public comment so that any design changes resulting from the review process can be incorporated in the final design. *Ex. PSE-374, pp. 16-18, 25 (Libicki Pre-filed Testimony).* Dr. Libicki opined that PSCAA had sufficient information about the proposed facility to estimate emissions. Specifically, Dr. Libicki presented her analysis (discussed in other legal issues), that TLNG's emitting equipment (mainly the flare and vaporizer) and operational design impacting emissions from them were sufficiently detailed and final when PSE submitted to PSCAA its emissions information and air dispersion modeling results. *Id., pp. 20-25.*

60.

Stobart testified to the facility process design changes made to accommodate information received from PSE in 2017, that the incoming feed gas contained heavier hydrocarbons. *Stobart Testimony at 2005-11*. Ottersburg also testified that CB&I's process changes and Landau's recommended physical changes were taken into account in the emissions calculations and dispersion modeling that was submitted to PSCAA.[16] *Ottersburg Testimony at 2228-29*. The Board therefore does not assign much weight to Dr. Sahu's opinion that TLNG's process design was not sufficiently mature or stable as it lacks evidentiary support.

61.

Similarly, the Board rejects Appellants' claim that CB&I and other unidentified vendors withheld process details and performance specifications from PSCAA rendering the Permit invalid. The Board considered the numerous e-mail communications involving PSE, the flare vendor, CB&I, and Landau that were shown during the hearing. *See, e.g*., *Exs. APTI-587, p. 75, APTI-558, APTI-206, APTI-219.*

62.

In the end, the Board finds and concludes that the evidence does not establish that any such withholding materially affected emissions calculations and modeling so as to render the

[16] Ottersburg also testified that she did not try to hide information from PSCAA, that she responded quickly and thoroughly to PSCAA's requests for more information that it needed to complete review of the Permit application, and that Landau gave PSCAA everything that the agency asked for. *Ottersburg Testimony at 2204-05*. She also explained broadly the steps she took in preparing Permit application, noting that most of the information came from CB&I, which promptly provided all the information Landau needed to do dispersion modeling and emissions calculations. *Id. at 2207*. Ottersburg had no reason to doubt the accuracy of the information she obtained from CB&I. *Id. at 2215*.

Permit invalid. By way of example, TLNG's revised process flow diagram and heat material balance tables were all finalized before PSE submitted the Permit application. *Stobart Testimony at 2043*. Moreover, both inputs and outputs to the UniSim model that CB&I used to model TLNG process changes are shown in the heat and materials balance tables. Those tables were provided to Appellants, thus undercutting Dr. Sahu's claim that he did not have access to them to do the analysis to support his claims. *Stobart Testimony at 2043, 2613-15*.

63.

Based on ¶¶ 55-60, the Board concludes that testimony and exhibits presented by Respondents refute Dr. Sahu's opinion that changes in the composition of the incoming feed gas rendered TLNG's underlying process design insufficiently mature or stable to allow for proper emission estimates and air dispersion modeling. *Ex. APTI-581, pp. 55-67*. Process and physical changes to TLNG were taken into account in PSCAA's emissions calculations and dispersion modeling. The Board defers to PSCAA's determination that PSE's Permit application complied with the WAC definition of application completeness because it contained sufficient information to allow PSCAA to estimate emissions and determine compliance with applicable law. *See* ¶¶ *56-58*; *PT Air Watchers v. Dep't of Ecology*, 179 Wn.2d 919, 929 (2014); *Marine Vacuum Svcs. v. Puget Sound Clean Air Agency*, PCHB No. 16-130c, COL 2 (Feb. 8, 2018).

64.

The Board also concludes that Appellants have not sustained their burden to prove in Issue 4c that the Permit is invalid because PSE withheld material information (flare performance specification and process details) from PSCAA. ¶¶ *61-62*. The Board's analysis resolving Dr.

Sahu's more specific opinions that insufficiently stable or mature facility design affected $SO_2$ emissions, the flare's destruction efficiency, and BTEX calculations in the modeling for hazardous air pollutant impacts, are discussed in their respective analyses below.

**C. Major Source of Emissions (Issue 4d)**

65.

Issue 4d asks whether PSCAA erroneously concluded that TLNG is not a major source of one or more pollutants, including volatile organic compounds (VOCs).

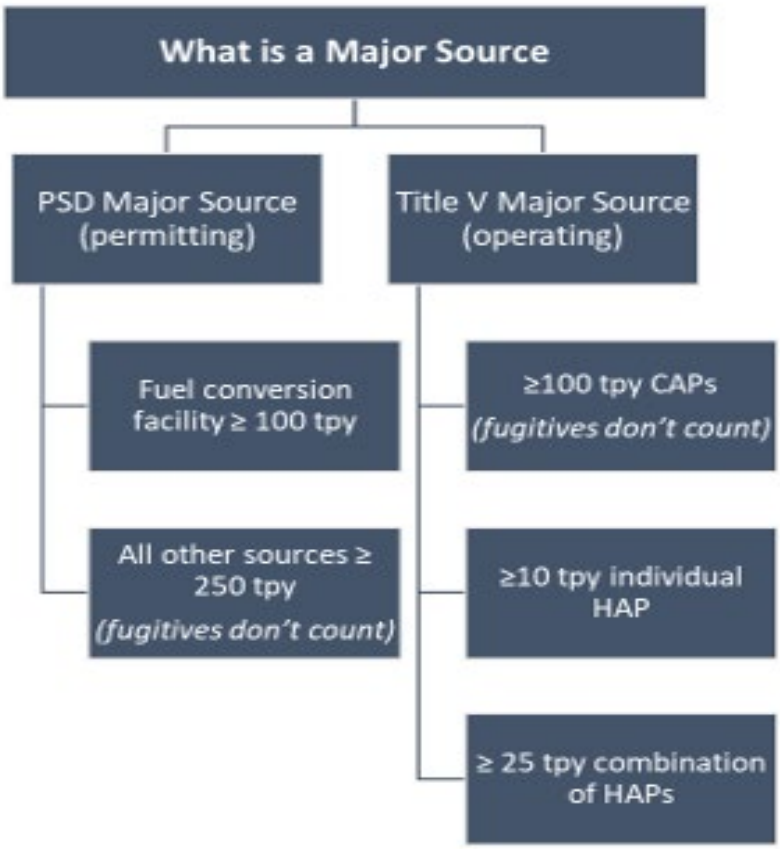
66.

VOCs are organic chemical compounds that are both indoor and outdoor air pollutants. Emissions of VOCs to the outdoors are regulated by EPA mostly to prevent the formation of ozone, a constituent of photochemical smog. *Ex. RA-17, pp. 3-4*. VOCs include hydrocarbons "heavier" than methane such as propane and butane, as well as other compounds regulated as hazardous air pollutants, such as benzene, formaldehyde, toluene, and xylene. *Exs. APTI-587, p. 9, PSE-374, pp. 70-75 (Libicki Pre-filed Testimony), PSE-137.*

67.

PSCAA regulates stationary sources of air pollution emissions through two Clean Air Act programs: Prevention of Significant Deterioration of air quality (PSD) and the Title V operating permit program. A stationary source can be either an emission unit or a combination of emissions units on a site. The amount emitted from a source determines its permitting requirements. For minor preconstruction sources, the Permit Program applies. For major

preconstruction sources, the Prevention of Significant Deterioration (PSD) program applies.[17] *Van Slyke Testimony at 1824-25, 1983*. At issue is whether TLNG is a minor source or major source of VOC emissions.[18] The diagram below, which PSE presented as a demonstrative exhibit without objection, illustrates the WAC criteria for determining whether TLNG is a major source.




[17] After construction, a minor source's ongoing operations would be subject to PSCAA's registration program, while a major source of operations would be subject to the Title V operating permit program. Air operating permits, which are also referred to as Title V permits, are required for major sources of air pollution. *Van Slyke Testimony at 1824-25, 1983*.

[18] Appellants' sole witness, Dr. Sahu, also makes passing assertions that TLNG is a significant source of hazardous air pollutants, but the Board rejects any argument on the issue of whether TLNG is a major source of hazardous air pollutants as it is devoid of supporting evidence.

68.

Under the PSD program, a source is major if: (1) it is one of the 28 PSD source categories and has the potential to emit pollutants (other than GHGs) equal or greater to 100 tons per year (tpy), *or* (2) it is not one of the listed source categories and has the potential to emit greater than or equal to 250 tpy. *Ex. PSE-374, pp. 53-54 (Libicki Pre-filed Testimony);* WAC 173-401-200(19)*; Ex. RA-68, pp. 49-50.* If a source belongs to a listed source category, fugitive emissions are counted towards the threshold. If not, then fugitive emissions are not counted. *Van Slyke Testimony at 1917; Libicki Testimony at 2430, 2437.*

69.

Under the Title V operating permit program, a source is major if it (1) emits 100 tpy or more of any criteria pollutant, or (2) emits any individual hazardous air pollutant (HAP) in amounts greater than or equal to 10 tpy, or any combination of HAPs in an amount greater than or equal to 25 TPY. WAC 173-401-200(19)*; Exs. RA-68, pp. 49-50, PSE-374, p. 54 (Libicki Pre-filed Testimony).*

70.

PSCAA reviewed Landau's estimate of 49 tpy of VOC emissions and concluded that it fell below to threshold amounts to qualify TLNG as a major source under either Title V or PSD programs. *Exs. RA-68, pp. 48-50, RA-36, Attachment A (11/2017), RA-61(c); Van Slyke Testimony at 1914-17, 1921; Ottersburg Testimony at 2222, 2219-20*. Both Landau and Dr. Libicki performed the analysis underlying the estimated VOC emissions. *Ottersburg Testimony*

*at 2216-19; Libicki Testimony at 2422, 2424, 2429-37; Ex. PSE-374, pp. 52-80 (Libicki Pre-filed Testimony).*

71.

Ottersburg explained that she estimated TLNG's maximum VOC emissions by identifying the emission units, applying emission factors, and then adding emissions from all the units to obtain the facility wide total. Throughout this process, she chose the highest value from each TLNG operating scenario so that she would obtain the facility's worst case potential to emit VOCs. *Ottersburg Testimony at 2216-19; Ex. RA-36*. In the end, Ottersburg calculated that TLNG would emit 49 tpy of VOCs from the facility's worst case operating mode for emitting VOCs, which was liquefying case scenario 5 (45 tons from flare + 4.2 tons from fugitive emissions). *Ottersburg Testimony at 2219-20.*[19]

72.

Appellants offered Dr. Sahu's opinion that TLNG is a fuel conversion plant (listed as one of the 28 PSD source categories) and is therefore subject to the 100 tpy threshold under PSD program (including fugitive emissions) instead of the 250 tpy threshold (excluding emissions). *Exs. RA-68, p. 50, APTI-587, p. 10 (Sahu Amended Pre-filed Testimony).* Respondents disagree.

[19] Ottersburg explained that liquefying case scenario 5 resulted in maximum emission of VOCs (had highest percentage of VOCs in it) because it was the highest British thermal unit (BTU) content of any of the flaring cases due to the larger hydrocarbon content of the feed gas. The larger or "heavier" the hydrocarbon, the higher the heating value and therefore the higher BTU content. *Ottersburg Testimony at 2225. See also Ex. PSE-374, pp. 70-75 (Libicki Pre-filed Testimony).*

73.

Although TLNG's emissions would not meet either threshold as explained below, the Board finds and concludes that TLNG is not a fuel conversion plant based on the most current EPA guidance. *Ex. RA-127*. The guidance is a 2017 letter from EPA Region 10 responding to the Oregon Department of Environmental Quality's question whether the proposed Jordan Cove LNG export facility is a "fuel conversion plant" for purposes of determining whether it is a major source. EPA determined it was not because the facility did not change the state of fuel where the fuel remains natural gas in a liquefied state that can be reversed. *Id*.

74.

Importantly, EPA's analysis considered earlier guidance letters, including the 2007 Kenai LNG facility guidance[20] cited by Appellants, and explicitly rejected earlier guidance that defined a fuel conversion plant differently. Earlier EPA guidance only assumed a simple change of fuel state was sufficient to qualify a facility as a fuel conversion plant without inquiring into "whether the facility was irreversibly converting one fuel type to another." *Ex. RA-127, pp. 2-3* ("a change in state is a possible characteristic of a fuel conversion plant but not the sole characteristic – i.e, not everything that accomplishes a change in state is a fuel conversion plant."). Thus, contrary to Dr. Sahu's interpretation, the 2017 Jordan Cove guidance's analysis broadly rested on the reversibility of the fuel conversion as a key factor, not whether the Jordan Cove facility was an LNG export facility for the purpose of transporting natural gas. Here, TLNG's process of

[20] *Ex. APTI- 422*.

converting natural gas to LNG is reversible because LNG will be reconverted to natural gas for PSE customers during periods of high demand. *See ¶ 15*; *Ex. PSE-374, p. 58 (Libicki Pre-filed Testimony)*.

75.

In short, TLNG is not a fuel conversion plant and is therefore subject to the 250 tpy major source threshold. But even assuming that TLNG is a fuel conversion plant, it would only be classified as a major source if its emissions are equal or greater than 100 tpy. The Board finds that its emissions would not exceed the 100 tpy threshold.

76.

Appellants contend that TLNG is a major source emitting 100 or more tpy of VOCs because: (1) "bypass" emissions from the flare should have counted; (2) emissions from the flare should have been estimated using less than 99% destruction removal efficiency (DRE); (3) fugitive VOC emissions were underestimated; and (4) PSCAA failed to account for process heaters as emitting units. Appellants solely rely on Dr. Sahu's opinion for their contention that VOCs were underestimated. *Ex. APTI-587, pp. 9-26 (Sahu Amended Pre-filed Testimony).*

77.

However, Dr. Sahu presented no calculations or analysis to support his opinion that the identified four shortcomings "*significantly and materially* understated" TLNG VOC emissions. *Ex. APTI-587, p. 11 (Sahu Amended Pre-filed Testimony)* (emphasis added). By contrast, Respondents' experts presented detailed calculations and specific evidence to refute the four bases upon which Dr. Sahu's opinion rests. The Board finds and concludes that the quantity and

quality of the evidence do not support Appellants' claim that VOCs emissions were underestimated. Each of the four reasons are analyzed below.

**1. Bypass flare**

78.

Permit Condition 11 prohibits emissions from bypassing the flare, stating that the flare shall operate at all times that gases are routed to it, and that if the flare goes out of service "due to malfunction or maintenance, all systems being routed to the flare shall shut down until the flare can be brought back into service." *Ex. RA-132, p. 2*.

79.

Despite condition 11, Dr. Sahu opined that flare bypass emissions during malfunctions should have been included in the calculations for TLNG's potential to emit VOCs. *Ex. APTI-587, p. 21 (Sahu Amended Pre-filed Testimony)*. Respondents countered with clear and convincing evidence that Dr. Sahu's position is contrary to the air agencies' practice of calculating a source's potential to emit under normal facility operations, which does not include emissions during emergency conditions, or emissions that are prohibited by a permit condition. *Ex. RA-16; Van Slyke Testimony at 1946-47, 1888-92; Ex. PSE-374, pp. 13-14, 78-79 (Libicki Pre-filed Testimony)*. PSE also explained that in the event the flare is out of service, the facility must shut down and will do so within ten minutes, which is the length of time waste gas may bypass the flare instead of Dr. Sahu's hypothetical of one day of bypass emissions during flare malfunction. *Stobart Testimony at 2040.*

80.

The Board finds and concludes that Dr. Sahu's opinion runs counter to the definition of potential to emit in WAC 173-400-030(76), which provides that enforceable emissions limitations are taken into account when calculating potential to emit. *See, e.g.*, *Protect the Peninsula's Future v. Olympic Reg. Clean Air Agency*, PCHB No. 11-103 (Jan. 4, 2012); *MYTAPN v. Dep't of Ecology*, PCHB No. 11-134 (Feb. 7, 2013); *Communities For a Better Env't v. Cenco Ref. Co*., 179 F. Supp. 2d 1128, at n. 9 (C.D. Cal. 2001), *aff'd*, 35 F. App'x 508 (9th Cir. 2002) (if permit governing a certain piece of equipment expressly limits emissions in a certain way, potential to emit should not be calculated without taking that specific limit into account).

**2. Flare will not achieve 99% DRE**

81.

Permit Condition 15 is the BACT condition that limits VOC emissions by requiring TLNG's flare to achieve a minimum destruction efficiency of 99% for VOCs. *Ex. RA-132, p. 3*. Compliance with the 99% destruction removal efficiency (DRE) condition is effectuated by Condition 28, which requires that the flare operate:

> at or above the average temperature range recorded during the most recent source test which shows compliance with Condition #15. The burner set point temperature of the flare, used to control the temperature within the flare, shall be set such that the temperature of the flare does not drop below the most recent source test temperature.

*Ex. RA-132, p. 5.* The technique of ensuring 99% DRE by way of temperature monitoring was referred to as parametric monitoring by witnesses. Using parametric monitoring is a common

method to ensure VOC DRE in flares. *Van Slyke Testimony at 1988; Smith Testimony at 2159; Kalani Testimony at 2090-92*. The 99% DRE will be determined by testing as specified in conditions 21 and 26.

82.

In context, the Permit requirement of 99% DRE is one of four ways in which TLNG's VOCs emissions are constrained. Dr. Libicki explained in detail how each of these constraints worked to limit the amount of VOCs that could be emitted, set out the evidence and engineering judgment and calculations behind each of those constraints, and explained that the resulting numbers indicate that TLNG's VOC emissions will be below the minor source threshold of 250 tpy and even the major source threshold of 100 tpy. *Ex. PSE-374, pp. 59-80 (Libicki Pre-filed Testimony)*. However, those calculations of hypothetical scenarios all assumed a DRE of 99%. *Id*., *at pp. 70, 73*.

83.

Dr. Smith evaluated the flare design and expected DRE by: 1) analyzing three factors affecting how efficiency of combusting hydrocarbons: time, temperature, and turbulence (the three T's of combustion), 2) running a computational fluid dynamics (CFD) model, and 3) performing a reaction kinetics analysis. *Ex. PSE-649, pp. 28-63 (Smith Pre-filed Testimony); Smith Testimony at 2135-36.*

84.

The result of the three T's of combustion analysis and the CFD modeling show that the flare will exceed a 99% DRE for all TLNG's operating scenarios developed by CB&I. *Ex. PSE* -

*649, PP. 33, 55*. The kinetics analysis, done to determine whether the flare could also destroy heavier hydrocarbons such as benzene, toluene, ethylbenzene, and xylene (BTEX), also show that BTEX should be destroyed at a DRE exceeding 99%. *Exs. PSE-649, p. 61 (Smith Pre-filed Testimony)*, *PSE-58*. The Board does not find any basis to disagree with the flare's expected 99% DRE as Dr. Sahu did not perform any analysis to evaluate the flare's anticipated performance. *Sahu Testimony at 1719-20, 1724*.

85.

However, Appellants challenge the suitability of using parametric monitoring, or maintaining a minimum temperature obtained through testing, as the means to demonstrate continuous compliance with the Permit's 99% DRE condition to limit VOC emissions. The Board does not share Respondents' view that this issue is a future enforcement issue over which the Board lacks jurisdiction. Appellants' challenge goes to how the 99% DRE on a continuous basis will be verified, or the appropriateness of using temperature as a surrogate for DRE as outlined in Permit testing Conditions 28, 26, and 21. Appellants' challenge is well-taken, as PSE's witnesses testified that computational fluid dynamics modeling does not replace testing. *Smith Testimony at 2136, 2159, 2193* (explaining that continuous monitoring of temperature will ensure compliance with 99% DRE because it is based on stack testing and monitoring the temperature derived from testing); *Ex. APTI -558* (flare vendor letter stating that it relies more on field testing data due to difficulty in modeling DRE of heavier non-methane organic compounds); *Ex. PSE-649, p. 38*; *Kalani Testimony at 2081, 2083-85* (LFG flare vendor relies on testing a prototype flare, rather than CFD modeling, to evaluate expected flare performance

when designing flares), *see also PSE-374, p. 77 (Libicki Pre-filed Testimony)* (flare's 99% DRE will be verified by source testing). And both PSE's and PSCAA's witnesses opined on the efficacy of using parametric monitoring. *See, e.g.*, *Ex. PSE-649, p. 65; Van Slyke Testimony at 1988; Smith Testimony at 2159; Kalani Testimony at 2090-92*.

86.

The Board finds and concludes that parametric monitoring does not ensure continuous compliance with the Permit condition of 99% DRE of VOC emissions from the flare. The Board's analysis is based on the uniqueness of the flare with four burners,[21] the wide variability in gas composition and flow rate going to the flare,[22] and Dr. Sahu's persuasive testimony that parametric monitoring of temperature is not appropriate in this case to demonstrate continuous compliance with the 99% VOC DRE requirement in Permit condition 15. *Sahu Testimony at 1696-1706, 2555-56, Ex. APTI-587, p. 17 (Sahu Amended Pre-filed Testimony)*.

87.

Dr. Sahu initially opined that using a continuous emissions monitoring systems (CEMS) at the outlet and inlet of the flare to continuously calculate DRE was more appropriate in this

[21] Although flares with multiple burners are common, Appellants presented ample evidence that TLNG's four burner configuration of two warm burners and two cold burners is unique. Flare designer Kalani testified that he had not designed a flare like the one at issue before, and he had designed over 1,200 flares. *Kalani Testimony at 2103, 2123-24*. Stobart also stated that the flare was fairly complex, and he was not aware of another LNG facility flare that uses multiple burners. *Stobart Testimony at 1519, 2059*. Finally, PSE itself communicated with PSCAA that its flare significantly differed from landfill and digester gas flares. *Ex. RA-33, pp. 1-2*. And Dr. Sahu explained that the flare at issue differs from other flares PSCAA has permitted (landfill and digester gas flares) due to the TLNG's wide variation in gas composition and flow rate. *Sahu Testimony at 2566-69, 2555-56*.

[22] *Ex. RA-33, pp. 1-2* (proposed LNG flare must have a much more complex design with multiple burners to address wide range of operating conditions that includes wide variations in gas composition and flow rate, which differ significantly from landfill and digester gas flares); *Kalani Testimony at 2084* (gas composition affects whether flare DRE is being achieved).

case than using parametric monitoring. *Sahu Testimony at 1705*. However, he later acknowledged during cross examination that he has not ever seen that type of CEMS. *Id. at 1706, 1708-1709*. Dr. Sahu further testified that if TLNG was subject to a mass quantity limit for VOCs, such as 45 TPY, or 244 lbs per day limit (instead of a DRE condition), and that if such condition was verified by a CEMS on the outlet to continuously measure VOC emissions, it would provide very good assurance of TLNG's VOC emissions staying below the major source thresholds. *Sahu Testimony at 1705-06, 1709-10.*[23]

88.

Van Slyke testified that adding CEMS as a Permit condition would not undermine the issuance of the Permit or PSCAA's determination at the time of issuance that the order met all pertinent requirements. He only opined that if CEMS were installed, TLNG would be the most heavily monitored minor source in PSCAA's jurisdiction. *Van Slyke Testimony at 1892-93*.

**3. Fugitive VOC Emissions**

89.

Fugitive emissions are irregular releases of gas or vapor from a source that cannot reasonably be collected and routed to a chimney, vent, stack, or functionally equivalent opening. WAC 173-400-030(41); *Ex. PSE- 374, p. 38 (Libicki Pre-filed Testimony).* For TLNG, small leaks of GHGs, VOCs, and TAPs from hundreds of components in a pipe rack constitute fugitive emissions. *Id.* Landau calculated TLNG's fugitive emissions were 4.2 tpy by estimating the

[23] Similarly, although Dr. Kinner and Van Slyke opined that CEMS to monitor DRE would be novel, *Kinner Testimony at 2399*, there are several reliable VOC CEMS in the market to measure VOC emissions at the flare outlet. *Kinner Testimony at 2405.*

number of TLNG's components such as valves, pumps, and connectors, and then applying emission factors and emission control factors to the estimated components. *Ottersburg Testimony at 2209; Ex. PSE-164*.

90.

Appellants assert that fugitive emissions were miscalculated because: (1) facility component counts were understated; (2) Respondents erroneously used average emissions factors from the South Coast air quality management guidance document (SCAQMD); (3) Respondents wrongfully applied emissions control factors from the Texas Commission on Environmental Quality (TCEQ); and (4) Landau wrongly applied an emissions control efficiency to 100% of estimated components. They relied solely on Dr. Sahu's opinion to support the assertion. *Ex. APTI-587, pp. 22-24 (Sahu Amended Pre-filed Testimony)*.

91.

Landau relied on component counts provided by CB&I, including how many components there were for each type of component and the kind and composition of fluid each component handles, to calculate fugitive emissions. *Ottersburg Testimony at 2260.*

92.

Dr. Sahu opined that Landau should not have relied on CB&I's component counts because the final TLNG design might result in higher components than those initially predicted by CB&I. *Ex. APTI-587, p. 22 (Sahu Amended Pre-filed Testimony)*. However, Dr. Libicki testified that it is standard air permitting practice to rely on a component count estimated by the project engineer. *Ex. PSE-374, p. 40 (Libicki Pre-filed Testimony)*. Van Slyke testified that the

fact that fugitive emissions were calculated by initial estimates of component counts to be finalized in a later Leak Detection and Repair (LDAR) plan did not render the Permit flawed, as all components at TLNG would be included in the final LDAR plan. *Van Slyke Testimony at 1906*. Permit Condition 32 requires PSE to submit and implement an LDAR plan as a BACT for fugitive emissions. *Ex. RA-132, p. 5*. The LDAR plan was submitted to PSCAA on March 11, 2021, and it includes all components that could come into contact with VOCs. *Ex. PSE-9, p. 10; Berner Testimony at 1473-76*.

93.

The Board finds and concludes that Landau properly relied on CBI's determination of component counts. Appellants fall short of meeting their burden of showing that such reliance resulted in materially underestimating TLNG's VOC emissions.

94.

After obtaining the component counts, Landau next identified average emissions factors for each component using the SCAQMD. *Ottersburg Testimony at 2261; Ex. PSE- 374, p. 41 (Libicki Pre-filed Testimony).* Dr. Sahu opined that Landau should have used the highest emissions factors available for each component. *Ex. APTI-587, p. 23 (Sahu Amended Pre-filed Testimony)*. He also states that Landau should not have relied on the SCAQMD because those factors came from measurements of marine terminals and depots in Southern California, which already utilizes a stringent LDAR program. Instead, Dr. Sahu opined that using SCAQMD's emissions factors for refineries would have been more appropriate. *Id.*; *Sahu Testimony at 1641-1644.*

95.

Dr. Libicki testified that using the highest emission factors available would be contrary to EPA fugitive guidance, which recommends using average emissions factors to estimate process component leaks because components are designed not to leak and not all process equipment will leak at the same rate. *Ex. PSE-374, pp. 45-46 (Libicki Pre-filed Testimony).* Based on Dr. Libicki's testimony, the Board finds and concludes that Landau was not required to rely on the highest emission factor available for each component.

96.

Contrary to Dr. Sahu's opinion that use of SCAQMD emission factors for refineries or oil/gas production plants would have been more appropriate than emission factors for terminals/depots, Dr. Libicki opined that the SCAQMD emissions factors for the two categories are essentially the same. *Ex. PSE-374, p. 41 (Libicki Pre-filed Testimony)*. Moreover, Ottersburg testified that the SCAQMD emission factors are the highest found in the literature and using them would generate the highest fugitive emissions in their calculations. *Ottersburg Testimony at 2261; Ex. RA-93*. Dr. Libicki testified that the SCAQMD emissions factors used here are substantially higher than the EPA emission factors for terminals and depots. *Ex. PSE-374, p. 41 (Libicki Pre-filed Testimony)*; *Libicki Testimony at 2442-43*. The SCAQMD factors are also based on the 1995 EPA Fugitive Guidance, which includes ethane and methane as emissions factors. *Ex. PSE-374, p. 42 (Libicki Pre-filed Testimony).* Neither ethane nor methane is considered a VOC because they are not photochemically reactive. Thus, choosing the SCAQMD emission factors that include ethane and methane is an example of Landau's

conservative approach in estimating fugitive VOC emissions at TLNG because it overestimates emissions. *Id*., *pp. 42-43.*

97.

Considering the reasons Dr. Libicki and Ottersburg identified, the SCAQMD factors likely overestimated anticipated fugitive emissions from process components and are therefore a conservative estimate. The Board finds and concludes that using the SCAQMD emission factors was appropriate. Appellants fail in their burden to prove how using SCAQMD factors for terminals/depots resulted in underestimating fugitive emissions.

98.

Having identified emissions factors for each component from the SCAQMD, Landau next determined what control factor applied for each kind of component. *Ottersburg Testimony at 2261*. A control factor is the reduction in emissions that can be anticipated by implementing a LDAR program. *Id.*

99.

Appellants presented Dr. Sahu's opinion that Landau should not have relied on the 28 M TCEQ control factors because the LDAR plan was not yet finalized at the time control factors were selected. *Sahu Testimony at 1643-44*. In response, Ottersburg testified that Landau used the 28 M factors because they were the lowest factors found in guidance documents, meaning that they would produce the highest emission. *Ottersburg Testimony at 2263-2264, 2267*; *Ex. PSE -243.* Ottersburg also testified that PSE's final LDAR plan is more stringent than what the 28 M program requires. *Ottersburg Testimony at 2267.* For example, the 28 M control factors

are consistent with an LDAR program that tolerates leaks up to 10,000 parts per million volume (ppmv), whereas the LDAR plan and permit only allow up to 500 ppmv leaks before the component must be repaired. *Id*.; *Ex. RA-143, p. 6*. The final LDAR plan also relies on a directed repair program that requires TLNG to remonitor as it repairs components rather than waiting until the next period. *Ottersburg Testimony at 2267*. Further, the final plan utilizes a more frequent monitoring system than under the 28 M program. *Id*. at 2267-68.

100.

The Board finds and concludes that it was appropriate to adopt control factors from the 28 M program because they yielded the highest emission for purposes of estimating potential to emit VOCs. It is uncontroverted that the final LDAR plan was more stringent than what the 28 M control factors required.

101.

Finally, Appellants argue that Landau wrongly applied an emissions control efficiency to 100% of estimated components, even though PSE testified at its deposition that the LDAR plan would only apply to 20%. *Ex. APTI-587, p. 24 (Sahu Amended Pre-filed Testimony)*. Respondents testified that under condition 32 of the Permit, PSE must operate in compliance with an LDAR plan for fugitive emissions submitted to PSCAA. *Ex. PSE-374, p. 50 (Libicki Pre-filed Testimony)*. The condition does not distinguish between different types of fugitive emissions, so all components are covered. *Id.* The Board finds and concludes that, because all components are covered in the final plan, it was reasonable for Landau to apply an emissions control factor to 100% of the components.

102.

Landau determined that based on the estimated component count, SCAQMD emission factors, and TCEQ 28 M control factors, fugitive emissions will contribute a maximum of 4.2 tpy of VOCs, which is less than 10% of the facility total. *Ex. PSE-374, p. 51 (Libicki Pre-filed Testimony).* Respondents further testified that calculations based on the final plan submitted to PSCAA, would result in 3.8 tpy of fugitive emissions. *Ottersburg Testimony at 2275.* They stated that the estimate based on the final plan also relied on conservative assumptions, such as that fluids would contain 10% VOC, when in reality most fluids are between 4-6% VOC, and relied on the Texas 28 M program, which relies on less frequent monitoring than the final plan. *Id. at 2276.*

**4. Not All Emissions Units Counted**

103.

Dr. Sahu opined that VOC emissions from small heaters at TLNG should have been included in the emission calculations. *Ex. APTI-587, p. 26 (Sahu Amended Pre-filed Testimony)*. However, Ottersburg, who performed the potential to emit analysis, explained that there are two small heaters and an emergency generator at TLNG that are categorically exempt from Permit review because they are very small emitting units and thus need not be included in the emissions estimates. Nonetheless, Ottersburg provided their calculations. *Ottersburg Testimony at 2222*; *Ex. RA-61(c).* Van Slyke testified similarly and added that even if the emissions from the two small heaters were counted, it would not change TLNG into a major source. *Van Slyke Testimony at 1850, 1933-34*.

104.

The Board finds and concludes that VOC emissions from exempt small heaters were properly excluded in the emission calculations.

105.

In sum, the Board concludes that Appellants did not meet their burden of proving in Issue 4d that PSCAA erroneously concluded that TLNG is not a major source of one or more pollutants, VOCs. The Board concludes that TLNG is not a fuel conversion facility under the more recent EPA guidance. ¶¶ *65-75*. Even if TLNG is a major source of emissions, it would not emit 100 or more TPY of VOCs. The Board further concludes that TLNG's potential to emit VOCs were properly estimated, factoring in the limitations on emissions set out in the Permit. ¶¶ *76-104*. Respondents presented reliable and convincing evidence that the calculations and analysis showed that TLNG would not be a major source either under either the 100 TPY or 250 TPY thresholds of PSD and Title V programs. Appellants fail in their burden to show that "bypass" emissions from the flare should have been counted, that fugitive emissions were underestimated, that process heaters should have been counted as emitting units, and that the flare cannot achieve 99% DRE. ¶¶ *76-104*.

106.

As stated in ¶¶ 81-84, the evidence shows that the flare can be expected to destroy VOCs with a 99% DRE. However, the Board concludes that using a VOC CEMS installed at the flare outlet, instead of using parametric monitoring, is necessary to ensure the 99% DRE Permit condition. ¶¶ *85-88*. This is so given the wide variation in gas composition going to the flare

and testimony stressing the importance of stack testing, instead of modeling, to ascertain whether a specific DRE will be achieved. *Id*. In PSE's Prehearing Brief and during hearing, counsel for PSE stated that if necessary, PSE would commit to installing a CEMS at the flare outlet to continuously monitor compliance with the applicable limits set forth in the Permit of 244 lbs VOC/day. *See Puget Sound Energy, Inc.'s Prehearing Brief, p. 7, n. 15*. The Tribe agreed to such VOC CEMS. *See The Puyallup Tribe of Indians' Closing Statement, p. 52*. The Board directs the parties to work together to modify the Permit to install a VOC CEMS at the flare outlet to continuously monitor compliance with the VOC limits of 244 lbs/day and/or other applicable VOC limit.

**D. Criteria Air Pollutants (Issues 4e, 4f)**

107.

Issue 4e asks whether PSCAA erroneously concluded that TLNG's emissions are below the Clean Air Act's regulatory thresholds, emission and air quality standards. Issue 4f asks whether PSCAA erroneously concluded that the emissions from TLNG will not violate WAC 173-400-113 (i.e., not cause or contribute to a violation of any ambient air quality standard).

108.

TLNG will emit criteria air pollutants, which are pollutants regulated by National Ambient Air Quality Standard (NAAQS) set by the EPA to protect public health and the environment. WAC 173-400-030 (21); *Exs. RA-17, p. 1, RA-38, p. 97*.[24] Washington Ambient

[24] NAAQs are implemented by establishing Air Quality Control Regions (AQCRs). Each AQCR then receives a designation of either "attainment" or "non-attainment" for each criteria pollutant. For those areas of "non-

Air Quality Standards (WAAQS) are the same as NAAQS. Relevant here are pollutants particulate matter, nitrogen dioxide, and sulfur dioxide. *Ex. PSE-374, p. 105 (Libicki Pre-filed Testimony)*.

109.

Appellants broadly argue in Issue 4e that PSCAA erroneously concluded that TNLG emissions are below Clean Air Act's regulatory thresholds, emission, and air quality standards. In Issue 4f, Appellants more specifically argue that PSCAA erroneously concluded that TLNG emissions will not violate WAC 173-400-113 (i.e., not cause or contribute to a violation of any ambient air quality standard). These two issues mainly concern whether TLNG's emissions of criteria air pollutants $PM_{2.5}$, sulfur dioxide, and nitrogen dioxide comply with WAC 173-400-113.

110.

Under WAC 173-400-113, PSCAA shall issue a permit for a new source application if the proposed new source satisfies three requirements: 1) comply with all applicable new source performance standards, and national and state emission standards for hazardous air pollutants; 2) employ BACT for all pollutants not previously emitted; and 3) allowable emissions from the proposed new source "will not cause or contribute to a violation of any ambient air quality standard. If the modeled concentrations of allowable emissions from the proposed new source . . . are below the levels in Table 4a, the proposed source does not cause or contribute to a violation

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attainment," the state with authority is obligated to develop a State Implementation Plan (SIP) to bring the ACQR within "attainment" levels. The site for TLNG is in attainment for all criteria air pollutants besides particulate matter. *Ex. RA-38, pp. 98-99.*

of an ambient air quality standard." WAC 173-400-113(3); *Van Slyke Testimony at 1828-30; Ex. PSE-374, p. 82 (Libicki Pre-filed Testimony)*.

111.

Table 4a in WAC 173-400-113(3) sets out average annual, 24-hour, 8-hour, 3-hour, and 1-hour threshold values for six pollutants to determine whether a project will cause or contribute to a violation of ambient air quality standards. WAC 173-400-113(4)(a). If the modeled emissions are equal to or exceed the threshold value in Table 4a, additional analysis is done by adding the background value to the source's modeled emissions and comparing the sum to the relevant ambient air quality standard. If the sum is below the NAAQS, then the source does not cause or contribute to a violation of an ambient air quality standard. *Ex. PSE-374, pp. 82-83 (Libicki Pre-filed Testimony)*. In other words, the threshold values are not limits; therefore, exceedances of thresholds are not violations of WAC 173-400-113.

112.

Ottersburg explained the steps taken to calculate TLNG emissions for compliance with NAAQS. She also thoroughly explained the air dispersion modeling that she oversaw to determine compliance with NAAQS, even though such modeling was not required. *Ex. RA-68, p. 56; Ottersburg Testimony at 2237-39; Ex. PSE-374, pp. 105-07 (Libicki Pre-filed Testimony)*. Dr. Libicki also explained in detail the steps Landau used in its air dispersion modeling, consistent with Department of Ecology's protocol: identify pollutants that would be emitted by each emitting unit at TLNG, calculate each unit's potential to emit individual pollutants, model

those emissions, and compare modeled ambient concentrations to WAC 173-400-113, Table 4a threshold values. *Id*.

113.

Dr. Libicki prepared a table comparing the results of the modeling for each criteria pollutant with the NAAQS threshold values and NAAQS ambient air quality standards. The table shows that the modeled concentrations of criteria pollutants from TLNG are below the threshold values for all pollutants except for $PM_{2.5}$, which equaled the threshold value of 1.2 $\mu g/m^3$.[25] *Ex. PSE-374, p. 107 (Libicki Pre-filed Testimony)*; *Ottersburg Testimony at 2239; Ex. RA-68, p. 57*.

114.

As stated, if the modeled concentration of any criteria pollutant does not exceed thresholds, then it does not contribute to NAAQS violation. If modeled concentrations equal or exceed the threshold, then additional analysis must be done to determine if a NAAQS violation will occur. ¶¶ *110-11*. Consistent with this requirement, PSCAA then performed a background analysis for $PM_{2.5}$, which showed that no emissions would exceed the NAAQS. This was done by adding the modeled $PM_{2.5}$ emissions from TLNG to the background air quality concentrations of $PM_{2.5}$ (which reflects emissions from other sources)[26] and then comparing the result to the

[25] The concentration of an air pollutant is given in micrograms per cubic meter air, or $\mu g/m^3$.

[26] PSCAA explained how it obtained its background value. It used $PM_{2.5}$ background data as measured from a PSCAA Tacoma Tideflats 24-hour $PM_{2.5}$ monitor, located within one mile of the TLNG site. The $PM_{2.5}$ 24-hour NAAQS is measured as the 98th percentile value averaged over 3 years per EPA criteria. The monitored ambient value that is calculated and used to compare to the NAAQS is referred to as the design value. The most recent 3-year average (2016-2018) design value at the Tideflats monitor is 25.4 ug/m3. Adding the modeled 1.2 ug/m3 from

ambient air quality standard. *Munoz Testimony at 1301-04; Van Slyke Testimony at 1875-76; Ex. RA-68, pp. 56-57; Ex. PSE-374, pp. 80-82, 107-108 (Libicki Pre-filed Testimony)*. This background analysis to evaluate compliance of $PM_{2.5}$ emissions with NAAQS is used by air engineers throughout Washington, contrary to Dr. Sahu's testimony. *Van Slyke Testimony at 2617-18*.

115.

Dr. Libicki also added TLNG's modeled $PM_{2.5}$ concentration to background to determine whether it violates NAAQS, and concluded that it did not. *Ex. PSE-374, p. 105 (Libicki Pre-filed Testimony); Libicki Testimony at 2510-11*. Instead of the Tideflats $PM_{2.5}$ monitor that PSCAA used, Dr. Libicki obtained the background data available online from a collaboration between environmental agencies in Idaho, Washington, and Oregon. The data in turn is obtained from a combination of model (AIRPACT) and monitoring data from 2014 – 2017 that can be used to support minor source applications in consultation with the permitting authority. *Ex. PSE-374, pp. 83-87 (Libicki Pre-filed Testimony)*. Dr. Libicki opined that the modeling system, AIRPACT, is based on a reliable EPA model. *Id*. She also opined that PSCAA's background analysis to evaluate whether a minor source's criteria pollutant emissions would cause or

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TLNG to the most recent design value results in 26.6 ug/m3, which is well under the 35 ug/m3 NAAQS. *Ex. RA-68, p. 57*. Dr. Libicki testified that PSCAA did not exclude "exceptional events" from this background data, such as the wildfires from 2017, which increased the background $PM_{2.5}$ levels. *Ex. PSE-360, p. 24*. Dr. Libicki opined that this meant that the background value used by PSCAA are likely higher than are actually present under typical conditions, which further supports the determination that predicted concentrations of TLNG's PM 2.5 emissions will not exceed NAAQS. *Ex. PSE-374, p. 108, n. 133 (Libicki Pre-filed Testimony)*.

contribute to an exceedance of ambient air quality standards is consistent with how Washington air agencies evaluate emissions. *Ex. PSE-374, pp. 7, 14-15, 81-82 (Libicki Pre-filed Testimony)*.

116.

Appellants presented Dr. Sahu's testimony to support their contention that the data PSCAA and Dr. Libicki used for their background analysis do not capture all background sources of $PM_{2.5}$ and other criteria air pollutants. *Sahu Testimony at 1653-54, 1658; Ex. APTI-587, p. 44 (Sahu Amended Pre-filed Testimony)*. They also rely on a selected sentence from a FAQs guidance document on the use of the background data (design values) that Dr. Libicki used. *Ex. APTI-602* (NW-Airquest Regional Background Design Values). Reading the guidance document, and considering PSCAA's and Dr. Libicki's background analysis against Dr. Sahu's critiques, the Board finds that Respondents' background analysis was reasonable, appropriate, and consistent with how such background data are used in the context of minor source permitting in Washington. *See, e.g., MYTAPN v. Dep't of Ecology*, PCHB No. 10-162, FOF 7 (July 25, 2012). That Dr. Libicki could not specifically confirm that the background data she used from AIRPACT includes daily marine traffic emissions does not undercut her testimony or otherwise make her testimony on this issue less credible. *See The Puyallup Tribe of Indians' Closing Statement, p. 35; Libicki Testimony at 2513*.

117.

To further support Landau's analysis that TLNG criteria pollutant emissions will not violate NAAQS, PSE also presented Dr. Libicki's additional "sensitivity analysis" to respond to Dr. Sahu's concerns that Landau's use of uniform flare stack temperature (1600 F) and exit

velocities results in underestimating ambient concentrations of criteria pollutants. The sensitivity analysis examined impacts of worst case, unrealistic, flare stack temperatures and exhaust velocities on Landau's air dispersion modeling results. The resulting analysis showed that TLNG's emission will not cause or contribute to a violation of NAAQS, consistent with Landau's modeling and PSCAA's conclusions from Landau's modeling. *Ex. PSE-374, pp. 109-118 (Libicki Pre-filed Testimony)*.

118.

Finally, Dr. Libicki also re-ran the air dispersion modeling with the same flare stack exit temperature and exit velocity from Dr. Smith's CFD modeling. The results also refuted Dr. Sahu's concerns about Landau's use of same exit gas temperature when the composition of waste gas, flow rate, and other factors changes. *Ex. APTI-587, pp. 40-41 (Sahu Amended Pre-filed Testimony)*. Instead, Dr. Libicki's results were highly consistent with Landau's results and showed no NAAQS violation. *Ex. PSE-374, pp. 119-20 (Libicki Pre-filed Testimony)*.

119.

Appellants argue that using non-representative meteorological data also contributed to flawed dispersion modeling. *See* Issue 4a, discussion above. But as explained in ¶¶ 34-53, the meteorological data used in dispersion modeling was representative and reliable. Even assuming that the meteorological data was not representative, Appellants failed to present any analysis, much less dispersion modeling, showing that such data materially affected the modeling and resulted in exceedances of screening thresholds or a violation of NAAQS. *Sahu Testimony at 1711-13, 1715*. As concluded in ¶ 54, the meteorological data inputs used to conduct dispersion

modeling were representative, and Appellants did not meet their burden of proving that the modeling was flawed on this basis.

120.

Appellants also present additional bases to support their claim of underestimated criteria pollutant emissions that were specific to $PM_{2.5}$, nitrogen dioxide, and sulfur dioxide. Each criteria pollutant is discussed in turn.

**1. $PM_{2.5}$**

121.

The parties agree that new air dispersion modeling with the correct wind direction for $PM_{2.5}$ shows that TLNG's $PM_{2.5}$ emissions of 1.3 ug/$m^3$ exceed WAC 173-400-113, Table 4a's *threshold* of 1.2 ug/m3. *Ex. RA-143*. But as stated in ¶¶ 113-115, PSCAA's and Dr. Libicki's background analysis did not show that the $PM_{2.5}$ NAAQS were exceeded. Appellants only point out that $PM_{2.5}$ emissions were still underestimated by using AP-42 emissions factors because they only represent an average range of emission rates.

122.

Landau used AP-42 emission factors from the EPA to calculate $PM_{2.5}$ emissions (among others) from gas combustion in the flare and vaporizer, as well as in its air dispersion modeling. *Ex. PSE-374, p. 27 (Libicki Pre-filed Testimony)*. AP-42 contains EPA's compilation of emission factors for carbon monoxide, nitrogen oxides, and VOCs that are used by industry based on emissions test data from various industrial facilities and sources. They are continually

updated and undergo public review and comment. *Id*., *pp. 28-29*; *Ex. RA-71; Van Slyke Testimony at 1909*.

123.

Appellants presented Dr. Sahu's opinion that average emission factors in AP-42 and other sources should not have been used because it underestimates flare emissions. *Ex.-APTI 587, pp. 23, 45 (Sahu Amended Pre-filed Testimony)*. Appellants also presented an EPA enforcement alert document on inappropriate use of AP-42 emission factors. *Ex. APTI-423*. Regulatory agencies and industries use AP-42 emission values to prepare emission inventories for permitting purposes, and to estimate a future facility's potential to emit pollutants. *Ex. PSE-374, pp. 25, 29-30 (Libicki Pre-filed Testimony)*.

124.

Respondents presented evidence that it is an accepted, standard, and reasonable practice for air Permit applications to use emissions factors to estimate a yet to be built facility's potential to emit because site specific emissions data will not be available before an air Permit is issued. *Ex. PSE-374, pp. 25-26 (Libicki Pre-filed Testimony); Libicki Testimony at 2428; Van Slyke Testimony at 1908-12*. The choice to use AP-42 emission factors entails engineering judgment weighing the risks of using them in a particular situation against the costs of further testing and analysis. *Id*. at 1910-11. Here, Landau used emissions factors in calculating TLNG's potential to emit certain air pollutants as well as in the air dispersion modeling. *Ex. PSE-374, p. 27 (Libicki Pre-filed Testimony)*.

125.

The Board relies on Respondents' persuasive expert testimony to find that using AP-42 emissions factors to estimate $PM_{2.5}$ emissions in this case was appropriate and consistent with PSCAA practice. This Board has also approved use of AP-42 emission factors. *See, Mazdak Int'l, Inc. v. Northwest Clean Air Agency*, PCHB No. 13-008, pp. 10-11, 14 (Oct. 8, 2013). The Board defers to PSCAA's choice of methodology in estimating certain criteria pollutant emissions using AP-42 factors as a proper exercise of engineering judgment. *MYTAPN v. Dep't of Ecology*, PCHB No. 17-022, p. 12 (July 19, 2018); *Port of Seattle*, 151 Wn.2d at 594-95.

126.

Appellants also contend that even if using AP-42 factor was appropriate, using a constant heating value of 1,020 Btu/scf for natural gas to convert the AP-42 emission factor of 7.6 pounds per million standard cubic feet of gas (lb/MMscf) to units of lb/MMBtu (pounds per British thermal unit) underestimated emissions from worst case *flaring* scenarios because TLNG's flaring cases will be flaring natural waste gas instead of natural gas.

127.

The Board disagrees. Dr. Sahu's "algebraic calculations" to explain why this results in underestimating PM emissions and modeled impacts were not in his pre-filed testimony or in any other exhibit; rather, Dr. Sahu testified that he calculated them the day after listening to Mr. Munoz's testimony. *Sahu Testimony at 1620-21; The Puyallup Tribe of Indians' Closing Statement, p. 26, n. 37*. What scant evidence Appellants presented on the use of a constant heating value falls short of demonstrating that the $PM_{2.5}$ worst case emissions *from flaring cases*

ultimately violated the NAAQS. That is in part because the maximum modeled impacts from $PM_{2.5}$ occurs when TLNG is vaporizing (and when the flare is not operating), not when TLNG is liquefying, and the flare is operating. *See Puget Sound Energy, Inc.'s Post-Hearing Brief, p. 41, fn. 335 (citing Ex. PSE-370); Ex. RA-68, p. 34* (liquefaction cannot occur while vaporization is occurring and vice versa; emissions would be highest for all pollutants except $PM_{10}/PM_{2.5}$ when the facility is liquefying).

128.

In sum, the Board concludes that because the modeled $PM_{2.5}$ value was the same as the threshold value, additional analysis was conducted, which showed no violation of ambient air quality standard. ¶ *121*. Without evidence demonstrating that using a different emission value would increase $PM_{2.5}$ emissions to the point of violating NAAQS, Appellants did not meet their burden in Issue 4f, with respect to $PM_{2.5}$. ¶¶ *122-127*.

**2. Nitrogen Dioxides ($NO_2$)[27]**

129.

Permit Condition 17 prohibits the discharge of nitrogen oxides in excess of the following limits: 0.066 lbs/MMBtu when the small warm burner is operating, 0.060 lbs/MMBtu when the small cold burner is operating, and 0.023 lbs/MMBtu whenever exclusively one or both of the large burners are operating. *Ex. RA-132, p. 4*.

[27] In briefing, exhibits, and at hearing the parties have referred to nitrogen dioxide as NOx (nitrogen oxide). Nitrogen dioxide is one of a group of highly reactive gases known as oxides of nitrogen or nitrogen oxides (NOx). *See*, https://www.epa.gov/no2-pollution/basic-information-about-no2#What%20is%20NO2. For consistency, the Board will refer to this criteria air pollutant as nitrogen dioxide ($NO_2$).

130.

Permit Condition 22 provides that the compliance with the $NO_2$ limits in Condition 17 must be demonstrated by initial testing the flare at the specified times and manner and through recurring testing. *Ex. RA-132, p. 4*.

131.

Appellants argue that Respondents underestimated TLNG's potential to emit $NO_2$ in Landau's air dispersion modeling by using only the Permit's limit of 0.023 lbs/MMBtu when one or both of the large burners are operating. They argue that Respondents' calculations fail to consider $NO_2$ emissions when the large warm burner and the small cold burner are used simultaneously. *Sahu Testimony at 1633-34*.

132.

However, Landau clearly demonstrated through detailed air modeling spreadsheets that all scenarios of $NO_2$ emissions (all the combinations of different burners operating and combinations of facility operating scenarios), and the emissions value that Appellants claim was not considered, were indeed considered in both in the modeling and PSCAA's Permit worksheet. *Ottersburg Testimony at 2290-93*. PSCAA also presented testimony that the 0.023 lbs/MMBtu emission rate that applies to the large warm burner continues to apply to that burner even when a small burner is operating. *Munoz Testimony at 1336*.

133.

Appellants have presented no evidence that TLNG's 1-hour $NO_2$ emissions violate the NAAQS. *Ex. APTI-587, pp. 46-48 (Sahu Amended Pre-filed Testimony)*. In contrast, PSE

presented Dr. Libicki's sensitivity analysis (including adding background concentration values to the 1-hour $NO_2$ value that exceeded the threshold value), and her re-run modeling using Dr. Smith's flare stack parameters showing that NAAQS for 1-hour $NO_2$ were not violated. *Ex. PSE- 374, pp. 106-120 (Libicki Pre-filed Testimony)*.

134.

The Board concludes that Respondents did not underestimate TLNG's potential to emit $NO_2$ from flare burner combustion. ¶¶ *131-33*. All combinations of flare burner operation and facility operation scenarios were evaluated to obtain maximum (worst case) $NO_2$ emission values. ¶ *132*. The findings support the conclusion that TLNG's modeled concentrations of $NO_2$ do not cause or contribute to NAAQS violation.

**3. Sulfur Dioxide ($SO_2$)**

135.

The amount of sulfur in TLNG's feed gas affects its $SO_2$ emissions from the flare. $SO_2$ has four threshold values depending on averaging times: 1-hour, 3-hour, 24-hour, and annual. *Ex. APTI-581, p. 41*. Permit Condition 16 limits $SO_2$ emissions to 165 lb/MMcf, and provides that PSE may perform either an $SO_2$ performance test at the flare outlet or test the inlet concentration to the flare once every 12 months for all sulfur containing compounds and then assume all sulfur converts to $SO_2$ in the stack. *Ex. RA-132, p. 3*.

136.

Dr. Libicki and Ottersburg explained how the 165 lb/MMcf emissions rate (incorporated as a Permit limit) was calculated. *Ex. PSE-374, p. 156 (Libicki Pre-filed Testimony)*; *Ottersburg*

*Testimony at 2230-31*. There are two major forms of sulfur in the pipeline feed gas coming to TLNG**:** hydrogen sulfide ($H_2S$) and non-$H_2S$ sulfur compounds. *Exs. PSE-374, p. 156 (Libicki Pre-filed Testimony)*, *RA-68, pp. 42-43, RA-57*. PSE adds non-$H_2S$ sulfur-based odorants to the natural gas it receives from the pipeline, which was accounted for in Landau's calculations. *Id*.

137.

Landau used the following challenged inputs for its $SO_2$ emissions calculations:

1. 80% of non-$H_2S$ sulfur is removed and sent to the flare, based on information from CB&I,[28] *Ex. PSE-68, Stobart Testimony at 2055-58*;
2. Pipeline tariff limit of 0.25 grains/100 SCF for $H_2S$; and
3. 0.603 grains/100 SCF for total sulfur.

*Ex. RA-68, p. 43; Ottersburg Testimony at 2230, 2232-33*.

138.

Landau selected the 0.603 grain value at the time of its calculation from the most recent 12 months of available total sulfur data in the pipeline (July 2016 – June 2017) because it believed sulfur was decreasing over the years and expected it to continue decreasing. *Ottersburg Testimony at 2232-33*. However, on cross-examination, Ottersburg acknowledged that there were total sulfur values higher than 0.603 in the 12-month period that it had selected, including 1.019 grains. *Ottersburg Testimony at 2299-2303*.

[28] The 80% of non-$H_2S$ sulfur means the mass of sulfur sent to the flare for combustion that Landau determined for each operating scenario. Landau then used the percentage to calculate the concentration of sulfur in each of the flared gas cases and proposed an emission limit for the facility based on those calculations. *Ottersburg Testimony at 2230*.

139.

To support their claim that $SO_2$ emissions exceed thresholds, Appellants presented Dr. Sahu's calculations of $SO_2$ emissions by using different inputs than Landau used: 1) using higher total sulfur concentration in TLNG's feed gas than that used by Landau; and 2) assuming 100% of non-$H_2S$ sulfur compounds will go to the flare for combustion instead of 80%. *Ex. RA-68, p. 43*.

140.

Specifically, Dr. Sahu ran two calculations. In one calculation, he used 1.019 grains/100 SCF of total sulfur instead of Landau's 0.603 grains/100 SCF. In the second calculation, Dr. Sahu used 5 grains/100 SCF of total sulfur, which is the pipeline tariff limit. The Board finds these inputs reasonable and supported by the evidence. In both calculations, Dr. Sahu assumed 100% of the non-$H_2S$ sulfur would go to the flare instead of Landau's assumption of 80%. *Exs. APTI-581, pp. 41-43, PSE-374, p. 159 (Libicki Pre-filed Testimony)*. This assumption was also reasonable and appropriate given that the 80% figure would not be verified during facility operations and could fluctuate depending on the amount of $CO_2$ in the feed gas. *Stobart Testimony at 2057-58*.

141.

Dr. Sahu demonstrated that the 1-hour, 3-hour, and 24-hour $SO_2$ thresholds would be exceeded if his inputs had been used. Appellants thus met their burden on Issue 4e. In response, Respondents emphasize that TLNG must comply with the 165 lbs/MMScf $SO_2$ emission limit in Permit Condition 16, which is a lower Permit limit. Although Dr. Sahu's calculated a higher

$SO_2$ emissions of 285.45 lbs/MMScf using his reasonable inputs (thus representing a less stringent Permit emissions limit than 165 lbs/MMScf), Dr. Libicki *agreed* with Dr. Sahu's analysis that had the higher 285.45 lbs/MMScf emission been used in the calculations, it would have resulted in a modeled concentration exceeding the threshold for 1-hour $SO_2$ (55.7 ug/m3 greater than screening threshold of 30 ug/m3). *Sahu Testimony at 1726-27; Ex. PSE-374, pp. 159-160 (Libicki Pre-filed Testimony)*.

142.

Dr. Libicki went on to add background concentration to the 1-hour $SO_2$ value that exceeded the threshold (55.7 ug/m3 + 18 ug/m3 (background) = 73.7 ug/m3), as was done with $PM_{2.5}$, and the result showed no violation of the NAAQS value of 196 ug/m3. *Ex. PSE-374, pp. 160-161 (Libicki Pre-filed Testimony)*. However, there is no evidence that such background analysis was done for 3-hour $SO_2$, 24-hour $SO_2$, and annual $SO_2$ to demonstrate compliance with NAAQS for those averaging times. Dr. Libicki did not analyze whether TLNG will violate NAAQS if the 5 grains/100 SCF tariff limit for total sulfur was used. *Libicki Testimony at 2526-57*. Without the background analysis, review to determine whether TLNG's modeled concentrations of $SO_2$ violate NAAQS is incomplete.

143.

Respondents mainly emphasized that the $SO_2$ limit in Permit Condition 16, among other conditions, will ensure compliance with NAAQS. *Ottersburg Testimony at 2234-36; Ex. PSE-374, p. 161 (Libicki Pre-filed Testimony)*; *Van Slyke Testimony at 1949-50*. The Board finds that Permit Condition 16 does not protect against $SO_2$ emissions that either exceed threshold and/or

violate NAAQS because determining compliance with the $SO_2$ emissions limit in Condition 16 occurs only once a year. *Van Slyke Testimony at 1385-90; Sahu Testimony at 2593-94.*

144.

The Board finds that Appellants have met their burden of demonstrating that TLNG's $SO_2$ emission will exceed multiple thresholds if using Dr. Sahu's inputs. The Board further finds and concludes that similar to its analysis of parametric monitoring VOC emissions, the once yearly testing specified in Permit Condition 16 and other $SO_2$ conditions are insufficient to ensure that $SO_2$ emissions will not cause or contribute to NAAQS violation, given the variable composition of sulfur in feed gas from month to month. Dr. Sahu pointed out that the Permit does not require continuous measurement of the flare's actual $SO_2$ emissions, and that an $SO_2$ CEMS, which is widely available, would confirm compliance with the Permit's $SO_2$ limit. *Ex. APTI-581, p. 43; Sahu Testimony at 1727.*

145.

In sum, the Board concludes that evidence showed that TLNG's impacts from $SO_2$ emissions will exceed multiple *thresholds* when using the reasonable inputs that Dr. Sahu did for his calculations. ¶ *141*. Appellants thus have met their burden as to Issue 4e. The Board concludes that the once yearly testing specified in Permit Condition 16, and the other conditions related to $SO_2$ emissions, do not sufficiently ensure that $SO_2$ emissions will not cause or contribute to NAAQS violation -- Respondents did not present background analysis demonstrating that the threshold exceedances calculated by Dr. Sahu (particularly using the tariff limit 5 grains/hundred cubic feet as a different input to calculate the amount of non-H2S sulfur in

TLNG's feed gas) will not cause or contribute to violation of NAAQS. ¶¶ *142-143*. Since adhering to the Permit's $SO_2$ limit is crucial to ensuring compliance with NAAQS established to protect the public health and environment,[29] CEMS is necessary and appropriate under the facts to verify that the $SO_2$ limit is met at all times, and not solely during one testing day per year. ¶¶ *143-144*.

146.

PSE stated that if the Board disagreed that the Permit's $SO_2$ limit could be enforced through the once yearly testing in Condition 16, and "concludes additional testing is necessary," PSE would be willing to install an $SO_2$ CEMS. *Puget Sound Energy, Inc.'s Prehearing Brief, p. 7, Puget Sound Energy, Inc.'s Post-Hearing Brief, p. 46, n. 329; Puget Sound Energy's Inc.'s Opening Statement During Hearing, Transcript at 1789*. PSCAA generally agreed. *See Van Slyke Testimony at 1962* (PSCAA would continue to discuss installing CEMS on flare with Tribe as it had done with other matters). The Tribe also stated that the Board should amend the Permit to require CEMS for certain pollutants. *The Puyallup Tribe of Indians' Closing Statement, pp. 52-53*.

147.

Because the parties agree that installing CEMS would remedy the Board's finding that the Permit does not assure that $SO_2$ emissions will not cause or contribute to NAAQS violation,

[29] The limits and conditions placed in an NOC order of approval are also critical to protecting human health because, unlike air operating permits that are subject to periodic review and renewal (and therefore offer the opportunity to employ newer and more robust BACT to control emissions), an NOC approval allows a facility to operate under the terms and conditions of the approval for the life of the project. *Five Corners family Farmers v. Dep't of Ecology*, PCHB No. 09-106 (2010).

the Board directs that a $SO_2$ CEMS be installed to continuously monitor compliance with the Permit's limit of 165 lb SO2/MMscf at the flare. *PSE Prehearing Brief, p. 7, n. 15*. As PSE and Appellants have pointed out, the Board has affirmed Permits by requiring additional Permit conditions after a hearing and integrating the conditions in the Board's final order. *See, e.g.*, *MYTAPN v. Dep't of Ecology*, PCHB No. 10-162 (July 25, 2012); *Ostrom Co. Inc. v. Olympic Region Clean Air Agency*, PCHB Nos. 04-105, 04-140 (Sept. 9, 2005). After hearing, Appellants prepared a proposed redline to the Permit presenting their extensive proposed changes, including adding CEMS. *See App. A to The Puyallup Tribe of Indians' Closing Statement*. Although the Board is not adopting the proposed CEMS addition language offered by Appellants, nor opining on other proposed changes, this Order does not preclude the parties from considering and agreeing to the other proposed changes. The parties are directed to work together expeditiously and efficiently to modify the Permit to add the conditions of installing a CEMS to monitor $SO_2$ emissions and VOC emissions (at the flare outlet) consistent with this decision.

**E. Toxic Air Pollutants/Hazardous Air Pollutants (Issues 4e, 4g, 4h, 4i)**

148.

Issues 4e, 4g, 4h, and 4i encompass whether TLNG's emissions of toxic air pollutants (TAPs) and hazardous air pollutants (HAPs) comply with applicable limits.

149.

A new or modified source that emits any quantity of TAPs in excess of de minimis values[30] is subject to TAPs rules. WAC 173-460-080(1). The TAP rules in turn provide that a new or modified source of TAPs[31] must employ the BACT for toxics (referred to as tBACT), and must conduct a source impact analysis on ambient air for each TAP based on the employed tBACT. WAC 173-460-040(3); WAC 173-460-070; *see also, MYTAPN v Dep't of Ecology*, PCHB No. 10-162, FF 18 (July 25, 2012).

150.

The source impact analysis requirement can be satisfied for any TAP using either small quantity emission rates (SQERs) or dispersion modeling. If an emitting source can demonstrate that its TAPs emission rate does not exceed the SQER listed in WAC 173-460-150 for a given TAP, then the source impact analysis requirement has been satisfied and no further analysis is required. WAC 173-460-080(2)(b). But if TAP emission rates exceed SQER values, the emitting source must use dispersion modeling to determine whether those rates exceed acceptable source impact levels (ASILs). WAC 173-460-080(2)(a). If dispersion modeling demonstrates that the measured TAPs do not exceed ASILs, then no further analysis is required and PSCAA may approve the Permit application. WAC 173-460-080(4)(a). For those TAPs that exceed ASIL values after dispersion modeling, an applicant may submit an application for

[30] De minimis emissions are defined as trivial levels of emissions that do not pose a threat to human health or the environment and its threshold values are listed in WAC 173-460-150. *See* WAC 173-460-020(4).

[31] "New or modified toxic air pollutant source" means the construction or modification of a stationary source that increases the amount of any toxic air pollutant emitted by such source or that results in the emission of any toxic air pollutant not previously emitted. WAC 173-460-020 (6).

second tier review. WAC 173-460-080(4)(b); WAC 173-460-090*; see also, Five Corners Family Farmers v Dep't of Ecology*, PCHB No. 09-106 (Nov. 3, 2010).

151.

TLNG will emit HAPs and TAPs during flare combustion. PSCAA reviewed Landau's dispersion modeling and determined that TLNG's emissions of HAPs and TAPs will not exceed ASILs and/or SQERs. Appellants argue it was an erroneous determination based on flawed ambient toxics impact analysis.

152.

A new source emitting TAPs must demonstrate in its Permit application that the emission rate for each TAP is lower than the SQER, or that the modeled ambient impact is less than the ASIL. *Exs. RA-68, pp. 50-51, PSE-118, p. 7, PSE-374, pp. 121-22 (Libicki Pre-filed Testimony)*. PSCAA first compared TLNG's TAP emissions to the SQERs and found that seven TAPs exceeded the SQER, which were then modeled for comparison to the ASILs. *Ottersburg Testimony at 2237-39; Ex. PSE-374, pp. 121-124 (Libicki Pre-filed Testimony)*; *Ex. RA-68, p. 54*. None of the seven TAPs exceeded an ASIL, obviating the need for further TAP analysis. *Ex. RA-68, pp. 55-56; Ex. PSE-374, p. 123 (Libicki Pre-filed Testimony)*; *Van Slyke Testimony at 1869, 1913*. In fact, the modeled concentrations for the TAPs were significantly below ASIL values. *Ottersburg Testimony at 2238*. The air dispersion modeling for TAPs/HAPs done by Landau used the highest ambient impact from worst case TLNG operating scenarios and worst case set of meteorological data. *Ottersburg Testimony at 2216-2221, 2237-38, 2246, 2257-58; Ex. PSE-374, p. 135 (Libicki Pre-filed Testimony)*.

153.

Appellants challenge the TAPs/HAPs analysis based on Dr. Sahu's opinion that: 1) the analysis only considered four TAPs – benzene, ethylbenzene, toluene, and xylene (BTEX), and for those four compounds, it relied on 2014 pre-Permit issuance data that understated concentrations for some BTEX compounds, thus resulting in materially underestimating TLNG's HAPs/TAPs emissions. *Ex. APTI-587, pp. 60-6, Ex. RA-68, p. 42 (Sahu Amended Pre-filed Testimony)*;[32] 2) the analysis did not evaluate all TAPs that the flare will generate, such as products of incomplete combustions (PICs). *Ex. APTI 587, pp. 50-51 (Sahu Amended Pre-filed Testimony)*; and 3) the toxics analysis should not have used AP-42 emission factors, among others, to determine TLNG's potential to emit HAPs/TAPs, and had higher emissions factor been used for acrolein and formaldehyde, it could have increased their emissions impacts above SQERs. *Sahu Testimony at 1713; Ex. APTI- 581, pp. 51-54*.

154.

Respondents countered Dr. Sahu's generalized concerns with analyses performed by Dr. Libicki and Van Slyke's testimony. First, Dr. Libicki's analysis of whether higher levels of BTEX obtained from the 2019 incoming feed gas sample would result in concentrations exceeding SQER and ASILs showed that they would not. Indeed, Dr. Libicki's modeling results revealed that benzene concentrations from flaring would have to increase by a factor of more than 7,000 times to approach ASIL, and toluene concentrations would have to increase by 8

[32] *Compare* PSCAA's NOC worksheet "Flared Waste Gas Table" results for concentrations of benzene (2,980 ug/m3) and toluene (2,570 ug/m3), *Ex. RA-68, p. 42*, *with* October 2019 concentrations from Fremont Analytical sampling showing concentrations of benzene (4,060 ug/m3) and toluene (3,160 ug/m3). *Ex. APTI-514, p. 5*.

million times. *Ex. PSE-374, pp. 127-131 (Libicki Pre-filed Testimony)*. Dr. Sahu acknowledged these results, and candidly testified that he did not have a basis to opine that TAPs emissions will exceed ASILs. *Sahu Testimony at 1728-29*.

155.

Dr. Libicki also opined that it was reasonable for Landau's analysis to assume that flare gas concentrations of BTEX were the same as incoming feed gas in the 2014 gas pipeline sample given that much of the BTEX, being a heavier hydrocarbon, would go the heavy storage vessel instead of the flare. *Ex. PSE-374, pp. 133-34 (Libicki Pre-filed Testimony)*; *see also Van Slyke Testimony at 1931-32*.

156.

As stated in ¶¶ 117-118, Dr. Libicki also performed a sensitivity analysis using worst case flare exhaust temperature and velocity values and ran the air dispersion modeling using Dr. Smith's predicted flare temperature and velocities to account for a wider range of flare stack parameters. Results from both analyses demonstrated that none of the modeled TAP concentrations will exceed ASILs. *Ex. PSE-374, pp. 128-33, 135-38 (Libicki Pre-filed Testimony)*.

157.

The Board has already found and concluded that using AP-42 emission factors was appropriate and deference is accorded to PSCAA's decision on which emission factors to apply. *See ¶ 125*. Moreover, PSCAA presented Van Slyke's testimony that flare emissions estimated in part by using AP-42 emissions factors included products of incomplete combustion. *Van Slyke*

*Testimony at 1930-32*. Finally, based on Dr. Libicki's unrebutted analysis, the Board finds that even if a higher emissions factor had been used for acrolein and formaldehyde, it would not have resulted in exceedances of their respective ASIL values. *Ex. PSE-374, pp. 139-142 (Libicki Pre-filed Testimony)*.

158.

Appellants also argue that PSCAA's conclusion that TLNG's emissions will not exceed applicable SQERs and ASILs is unreasonable because it relied on the air dispersion modeling using alleged non-representative meteorological data and the erroneous wind direction data. But as explained in the analysis of Issue 4a, the meteorological data used in dispersion modeling was representative and constituted a reliable basis for dispersion modeling. Moreover, Dr. Libicki undertook additional air dispersal modeling using the correct wind direction. The results demonstrated that concentrations of BTEX, acrolein, formaldehyde, and the seven TAPs that exceeded the SQERs are all below their respective ASIL values. *Ex. PSE-373, pp. 15-18 (Libicki Pre-filed Testimony Addendum)*. Appellants fail to present any evidence showing that Dr. Libicki's additional modeling results were erroneous. The Board agrees with Dr. Libicki's opinion, fully supported by quantitative analysis, that even changing meteorological data could not cause an ASIL exceedance. *Ex. PSE-374, p. 139 (Libicki Pre-filed Testimony)*.

159.

In sum, without performing air dispersion modeling or at least some calculations to challenge Respondents' modeling results on TAPs/HAPs, Appellants have not met their burden

to prove that the Permit erroneously concluded that TAPs/HAPs emissions will not exceed applicable SQERs and ASILs.

160.

Based on ¶¶ 148-159, the Permit's analysis and review for TLNG's TAPs/HAPs emissions was appropriate and did not underestimate emissions and/or impacts. The Board concludes Appellants did not meet their burden to show that any TAPs/HAPs exceed ASIL.

**F. BACT/tBACT Determinations (Issues 4j, 4u)**

161.

Issue 4j asks whether PSCAA violated WAC 173-460-060 by failing to require tBACT for all TAPS that exceed emission values in WAC 173-460-150. Issue 4u asks whether PSCAA violated the Clean Air Act (CAA) by allowing TLNG to achieve BACT through "good combustion practices."

162.

Both BACT and toxic BACT (tBACT) refer to emission limitations placed on an emitting source by the permitting agency with the purpose of reducing the amount of emitted air pollutants which are subject to regulation. All new or modified sources of TAPs,[33] must employ BACT for toxic air pollutants, referred to as tBACT. WAC 173-460-040(3)(b); WAC 173-460-060. Both BACT and tBACT rely on the same statutory definition of BACT, *see* WAC 173-400-030(13), and the processes for determining BACT and tBACT for given emission units are

[33] TAPs are any toxic air pollutant listed in WAC 173-460-150. WAC 173-460-020(8).

completed at the same time by a reviewing engineer. *Van Slyke Testimony at 1898-99.* In other words, tBACT is BACT as applied to TAPs. WAC 173-460-020(3).

163.

The determination of what emission control limitations constitute BACT/tBACT for a proposed project or facility is made by agency engineers reviewing the Permit application. *Van Slyke Testimony at 1847.* BACT/tBACT is determined on a case-by-case basis and the reviewing engineer balances many factors, such as available control technologies, energy considerations, environmental considerations, and economic considerations. *MYTAPN v. Dep't of Ecology,* PCHB No. 10-162, pp. 26-27 (July 25, 2012); WAC 173-400-030(13). [34]

164.

In the context of a Permit application, BACT/tBACT determinations are required for all emission units that are subject to review. *Van Slyke Testimony at 1846.* In making a BACT/tBACT determination for a given emission unit, reviewing engineers may review other comparable projects or technologies and then apply their engineering judgment to discern whether the selected controls will be sufficient to meet all regulatory requirements. *Van Slyke Testimony at 1846 –55.*

[34] "Best available control technology (BACT)" is defined as emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. WAC 173-400-030(13).

165.

BACT and an agency's Permit application review does not authorize or require PSCAA to redesign the project. *Van Slyke Testimony at 1944-46.*

166.

The conditions imposed by PSCAA in the Permit apply BACT requirements on TLNG. *Van Slyke Testimony at 1889-91; Ex. RA-16.* Any failure of the operator to adhere to the Permit conditions will result in the operator being out of compliance and subject to fine and/or punishment. PSCAA Regulation I, Article 3, §§ 3.09, 3.11, 3.13. In other words, TLNG must comply with its Permitted conditions at all times.

167.

PSCAA made BACT recommendations for TLNG's emission units; specifically, emissions from the flare, the vaporizer, and the fugitive emissions. *Van Slyke Testimony at 1887.* To develop those recommendations, staff reviewed recently issued BACT determinations from EPA's BACT Clearinghouse, California's Air Resources Board BACT Clearinghouse, Sacramento Metropolitan Air Quality Management District, Bay Area Air Quality Management District, South Coast Air Quality Management District, and Texas Commission on Environmental Quality. *Ex. RA-68, pp. 10-14.* PSCAA compared the various BACT requirements for VOCs, $NO_2$, CO, particulate matter, and $SO_2$. *Id.*

168.

PSCAA also considered BACT that was required for other facilities with similar emission units, such as a U.S. Oil Refinery, the Chambers Creek Wastewater Treatment Plant, a company

called "Belmont Cabinets," and Seattle's West Point wastewater treatment plant. *Van Slyke Testimony at 1900-03; Exs. RA-123, RA-124, RA-125, RA-126.*

169.

PSCAA concluded that PSE's proposed BACT for the flare exhaust remained consistent with the most restrictive determinations for enclosed ground flares. The agency determined that the proposed BACT was acceptable, taking into consideration energy, environmental, economic impacts and a comparison to other BACT analyses. *Ex. RA-68*, *p. 17.*

170.

PSCAA determined that BACT for the enclosed ground flare was a minimum destruction efficiency of 99% for VOCs, and set emission limits for $SO_2$, $NO_2$, CO, and particulate matter. *Ex. RA-68, p. 27.* Permit Conditions 10-30 include BACT for the flare. *Ex. RA-132, pp. 2-5.*

171.

PSCAA reviewed other BACT determinations for vaporizers and determined emission limitations for $SO_2$, VOCs, CO, $NO_2$, and particulate matter. *RA-68, pp. 10-14.* PSCAA determined that BACT for $SO_2$ was good combustion practices. *Id., p. 26.* Good combustion practices are a well-known and industry-accepted term that is used regularly by air agencies. This term is shorthand for using design in equipment to maintain an efficient combustion operation in a device that is burning fuel or waste. *Van Slyke Testimony at 1943-44.* Conditions 3-9 of the Permit govern the regulation of the vaporizer and include the BACT determinations. *Ex. RA-132, pp. 1-2.*

172.

PSCAA also reviewed other agency websites for similar facilities like natural gas processing plants and/or oil refineries to determine BACT for fugitive emissions from equipment leaks. The agency found that typical BACT determinations for significant fugitive emissions included the use of a LDAR. LDAR programs are used to inspect facility components to identify leaks either by using instruments or physical inspections. Identified leaks are repaired within a specified time period to minimize emissions. *Ex. RA-68, pp. 19-21.*

173.

As stated in ¶ 92 Permit Condition 32 requires PSE to submit and implement an approved LDAR plan as BACT for fugitive equipment leaks. *Ex. RA- 132, p. 5*. The LDAR plan was submitted to PSCAA on March 11, 2021. ¶ *92.* The program would initially include monthly monitoring, repair of any detected leaks, and recordkeeping. *Ex. RA-68, p. 25.*

174.

The Tribe argued that, during its BACT analysis, PSCAA should have considered a thermal oxidizer such as the system used at the Freeport LNG facility in Texas instead of the flare. The Tribe also argued that PSCAA should have considered leakless components, and alternatives such as gas recovery, which would minimize flaring. *The Puyallup Tribe of Indians' Closing Statement, pp. 20-23; The Puyallup Tribe of Indians' Prehearing Brief, pp. 11-15.* The Tribe further argued that PSCAA's tBACT analysis was inadequate. *Sahu Testimony at 1647-49.*

175.

PSCAA responded as follows: since tBACT equals BACT, tBACT requirements are covered by the BACT conditions for the flare, vaporizer, and fugitive emissions (listed in *Ex. RA-16*). For example, the flare is required to have a destruction rate efficiency of 99%. As Van Slyke testified, PSCAA is not authorized to redesign the project as part of its BACT determination. And with the flare achieving 99% destruction efficiency for VOCs as conditioned, there is no need to consider alternatives. Leakless components are not the industry standard and are seldom used. *Stobart Testimony at 2045-46.* "Good combustion practices" is a common BACT term and is often used as a requirement. *Respondent Puget Sound Clean Air Agency's Closing Argument, pp. 42-45; Respondent Puget Sound Clean Air Agency's Prehearing Brief, pp. 17-22*.

176.

PSE also argued that tBACT requirements are included in the BACT conditions. PSE further argued "good combustion practices" is a standard requirement, and PSCAA imposed specific emission limits for particulate matter, nitrogen oxide, sulfur dioxide and carbon monoxide. *Puget Sound Energy, Inc.'s Post-hearing Brief, p. 45; Puget Sound Energy's Inc.'s Prehearing Brief, pp. 21-23*.

177.

The Board concludes that tBACT requirements may be satisfied by proper BACT conditions. According to Ecology's regulations, tBACT is merely BACT applied to toxic air pollutants. As stated earlier, BACT/tBACT is determined on a case-by-case basis and the

reviewing PSCAA engineer balances many factors, such as available control technologies, energy considerations, environmental considerations, and economic considerations. ¶ *163*.

178.

The Permit contains BACT emission limits and conditions for each of the emission units in the facility: the flare, vaporizer, and fugitive emissions. The Permit requires a minimum of 99% destruction of all VOCs for the flare, and the flare is also subject to emission limits for SO2, CO, $NO_2$, and particulate matter. The vaporizer has emission limits for VOCs, SO2, CO, $NO_2$, and particulate matter. Fugitive emissions are addressed by a LDAR plan. ¶ *172*; *Exs. RA-16, RA- 68, RA-132.*

179.

Respondents generally argued that when the Board is presented with conflicting expert opinion on an issue, it is PSCAA's task, rather than the Board's, to resolve those differences. This contention is too broad as the Board often resolves conflicting expert opinions. The Board defers to PSCAA's engineering judgment and expertise in making this BACT determination and concludes the agency's BACT determination is reasonable.

180.

The Board also rejects the Tribe's argument that BACT requires alternatives to flaring such as gas recovery. With the flare's 99% DRE for VOCs as conditioned, there is no need to consider alternatives, such as the system used at Freeport LNG. In any event, the Board agrees with Dr. Smith's and Van Slyke's testimony that TLNG's flare is a type of thermal oxider. Leakless components are not the industry standard and are seldom used. Stobart, from his

extensive experience with LNG facilities, testified that he had never seen leakless components on cryogenic valves. *Stobart Testimony at 2045-46.* "Good combustion practices" is a commonly used BACT. While the Tribe would have preferred other BACT, PSCAA considered reasonable alternatives, and the Board finds both the BACT and tBACT analysis and conditions sufficient.

**G. Condition 41 (Legal Issue 4k)**

181.

Legal Issue 4k. asks whether the Order of Approval's requirement that "the sole source of natural gas supply used in all operations at the TLNG facility comes from British Columbia or Alberta, Canada" is enforceable.

182.

Condition 41 requires that the "sole source of natural gas supply used in all operations at the TLNG facility comes from British Columbia or Alberta, Canada." The Permit states that compliance shall be verified by maintaining a detailed list of records, including monthly records on the purchase of natural gas, requests for gas from the Northwest Pipeline and the PSE system, the volume of gas received at TLNG, and proof that the flow of natural gas received was from north to south through the Fredrickson Gate Station.[35] If the flow is not from north to south, the facility shall immediately cease accepting natural gas from the pipeline. TLNG shall submit regular reports to PSCAA summarizing the data in the records. *Ex. RA-132, pp. 6-7.*

[35] The Frederickson Gate Station is where natural gas is delivered from the Northwest pipeline gas to PSE. *Ex. RA-38, p. 126*.

183.

Donahue, PSE's manager of natural gas resources, testified about the operation of the Northwest pipeline system that delivers natural gas to TLNG and other utilities or end users. In order to guarantee that natural gas delivered to TLNG originates in British Columbia, PSE collects data from a publicly available report from the pipeline that indicates what amounts of natural gas will be delivered at what location based upon orders placed by customers the day before. The pipeline report includes the total volume delivered to the pipeline at the B.C.-U.S. border at Sumas, WA. PSE will produce monthly records to PSCAA itemizing each day's delivery and demonstrating that the flow was north to south by showing that the volume in the pipeline remained positive after delivery to TLNG at the Frederickson Gate. Only on extremely cold days when customers north of the Frederickson Gate order more gas than usual (approximately six days per year) does Donahue expect the flow at the Frederickson Gate to be negative showing the movement of natural gas from south to north. On those days, TLNG will shut down until the flow resumes from the north. *Donahue Testimony at 1790-1821; Ex. PSE-27; Ex. RA-132, pp. 6-7.*

184.

PSCAA included this condition because the GHG Life Cycle Analysis (LCA) Report indicated that GHG factors for natural gas produced in the United States may be as much as five times higher than those for Canada. *Van Slyke Testimony at 524-5*. Thus, the source of the natural gas is an important factor in the LCA conclusion. *Id.*

185.

The Tribe argued that TLNG has access to multiple sources of natural gas and that the origins of the gas cannot be distinguished or traced. Therefore, the Tribe's expert concluded that Condition 41 is unenforceable. *Ex. APTI-587, pp. 76-77* (*Sahu Amended Pre-filed Testimony).,*

186.

PSCAA argued that Condition 41 is specific, measurable, and enforceable, and that all of the Permit's conditions are enforceable. PSCAA contended that Appellants have provided no evidence to the contrary. Also, PSCAA alleged that the Board has no jurisdiction over future violations or PSCAA's potential failure to enforce the conditions in the Permit. PSCAA claimed Dr. Sahu's testimony on the subject contains theoretical opinions only and presents no data or evidence. Finally, PSCAA noted that this issue was not included in the Board's Prehearing Order and should not be considered. *Puget Sound Clean Air Agency's Closing Argument, pp. 45-47; Puget Sound Clean Air Agency's Prehearing Brief, pp. 24-25*.

187.

PSE relied on Donohue's testimony to argue that Dr. Sahu's testimony was unfounded. PSE also stated that the detailed monitoring records are all that is needed to enforce Condition 41. *Puget Sound Energy, Inc.'s Post-hearing Brief, pp. 45-47; Puget Sound Energy, Inc.'s Prehearing Brief, pp. 23-24*.

188.

The Tribe has offered no evidence that the gas TLNG will be using cannot be distinguished from other sources. The Tribe also failed to produce any evidence, other than Dr.

Sahu's opinion, that Condition 41 is unenforceable. Considering the Donahue testimony, the detailed requirements of Condition 41, including the specific monitoring and reporting provisions, the Board concludes that this condition is enforceable.

189.

If the Tribe's concern is future enforcement, the Board lacks jurisdiction over this area unless a future PSCAA enforcement action is appealed to the Board. *Dixon v. Dep't of Ecology,* PCHB No. 05-059, p. 13 (October 21, 2005).

**H. Applicability of 40 C.F.R. § 60.5430a (subpart OOOOa) (Legal Issues 4o, 4p)**

190.

Issue 4o asks whether PSCAA should have included the requirements of 40 C.F.R § 60.5430a (subpart OOOOa) relating to handling of acid gas. Issue 4p asks whether subpart OOOOa requirements for fugitive GHG and VOC emissions should have been applied in the Permit.

191.

Subpart OOOOa applies to certain natural gas equipment that is constructed after September 18, 2015. 40 C.F.R. §60.5430a (subpart OOOOa); *Ex. RA-68, p. 61*. According to the Board's Order on Motion to Dismiss and for Partial Summary Judgment, the remaining material facts related to this issue are whether TLNG is downstream of the custody transfer station, and whether it is part of the natural gas distribution system. *Advocates for a Cleaner Tacoma,* PCHB No. 19-087c, p. 39 (Mar. 26, 2021).

192.

The custody transfer stations for PSE are at the points where they take custody of the natural gas from the high-pressure transmission line. For TLNG, the custody transfer station is the Fredrickson Gate. As stated above, TLNG receives its feed gas from the Northwest Pipeline, which can operate in a north-flow or a south-flow mode. *Donahue Testimony at 1790-1821*.

193.

TLNG is downstream of the local distribution company custody transfer station and is not included in the "natural gas source category" for the purposes of subpart OOOOa. *Donohue Testimony at 1800-1801; Cenci Testimony at 1254-55, 2371-73.*

194.

PSCAA argued TLNG is downstream of the Frederickson gate and so the federal regulation does not apply. *Puget Sound Clean Air Agency's Closing Argument, pp. 48-49; Puget Sound Clean Air Agency's Prehearing Brief, p. 24*. PSE stated that the 2020 rulemaking preamble makes it very clear that Subpart OOOOa never applied to the TLNG. *Puget Sound Energy, Inc.'s Post-hearing Brief, pp. 47-48; Puget Sound Energy, Inc.'s Prehearing Brief, p. 25*.

195.

The Tribe argued that the Tacoma facility is a natural gas processing plant, as the gas is vaporized and liquified at the plant, changing the state of the product. Also, the Tribe contended the plant is a custody transfer station, and the location in the distribution system is irrelevant. The Tribe states that the facility generates greenhouse gases, volatile organic compounds and

sulfur dioxide and the purpose of subpart OOOOa was to control these emissions. *The Puyallup Tribe of Indians' Closing Statement, p. 47; The Puyallup Tribe of Indians' Prehearing Brief, p. 24*.

196.

The Board agrees with PSCAA's and PSE's interpretation of subpart OOOOa and the evidence support PSCAA's and PSE's position. The custody transfer stations for PSE are at the points where they take custody of the natural gas from the high-pressure transmission line. For TLNG, the custody transfer station is the Fredrickson gate. The plant receives its feed gas from the Northwest Pipeline. ¶¶ *182-183*.This pipeline is a bidirectional line and can operate in a north-flow or a south-flow mode. The plant is downstream of the local distribution company custody transfer station and is not included in the "natural gas source category" for the purposes of subpart OOOOa. *Donohue Testimony at 1800-1801; Cenci Testimony at 1254-55, 2371-73. Ex. RA-68, p. 61.* Changing the state of the LNG does not make TLNG a natural gas processing plant. Therefore, the Board concludes that the TLNG facility is not subject to subpart OOOOa.

**I. Tribal Consultation (Legal Issue 6)**

197.

Issue 6 asks whether the Permit is invalid because PSCAA failed to engage in formal consultation with the Tribe.

198.

PSCAA did not engage in formal consultation with the Tribe. However, PSCAA responded to all requests for information from the Tribe, provided notice of any developments

related to PSE's Permit application, considered all the Tribe's comments and engaged in meetings and exchanged correspondence with the Tribe. *Cenci Testimony at 1241-42; Van Slyke Testimony at 1955-60; Exs. RA-30, RA-51, p. 206, RA-133, RA-134.*

199.

For the first time in its Post-Hearing Brief, the Tribe argued that since PSCAA's authority is derived from EPA under the CAA, the federal duty to consult with the Tribe comes with the delegation of this authority. Also, the Tribe contended that PSCAA is acting as a state agency and is required to comply with RCW 43.376.020, which provides, in part, that state agencies must "develop a consultation process that is used by the agency for issues involving specific Indian tribes." RCW 43.376.020(1). The Tribe cited *Lauterbach v. City of Centralia,* 49 Wn.2d 550, 304 P.2d 656 (1956), as authority for the claim that PSCAA is a state agency and subject to RCW 43.376.020. *The Puyallup Tribe of Indians' Closing Statement, pp. 6-10.*

200.

PSCAA argued that the Board lacks jurisdiction over any treaty issues. Even if the Board did have jurisdiction, PSCAA states that it had engaged with the Tribe in the Permit process as described in ¶ 198. Also, PSCAA argues it is a municipal corporation and not a state agency, and therefore, is not subject to the same consultation process as a state agency. *Puget Sound Clean Air Agency's Closing Argument, pp. 49-50; Puget Sound Clean Air Agency's Prehearing Brief, p. 25.*

201.

The Tribe did not cite any relevant authority supporting its claim that PSCAA had a delegated duty to consult. The cases cited by the Tribe address what activities constitute proper government to government consultation between federal agencies, on one hand, and tribes and/or states, on the other. The cases do not address whether CAA delegation includes the duty to conduct government to government consultation. Therefore, the Board concludes that the CAA delegated authority does not include the federal duty to consult. With respect to the Tribe's claim that PSCAA had a duty to consult with the Tribe under RCW 43.376.020, the Board concludes that the Tribe's sole authority supporting the claim, *Lauterbach*, was decided before PSCAA was even created, and only contains a general statement regarding municipalities. *Lauterbach,* 49 Wn.2d at 554. On the other hand, *Inland Foundry v. Spokane Cnty Air Pollution Control Auth,* 98 Wn. App. 121, 124, 989 P.2d 102 (1999), specifically states that an air authority such as PSCAA is a municipal corporation, and not a state agency. *Inland Foundry*, 98 Wn. App. at 124 (citing former RCW 70.94.081).[36] Therefore, the Board concludes that RCW 43.376.020 does not apply to PSCAA, and therefore the Permit is not invalid because PSCAA failed to engage in formal consultation with the Tribe.

[36] Recodified to RCW 70A.15.1560 in 2021.

**J. Board Jurisdiction (Legal Issue 8)**

202.

Issue 8 is a collection of sub-issues related to the Board's subject matter jurisdiction. The issue was raised by Respondents, but the parties did not address this issue in their Prehearing or Posthearing Briefs or during the hearing. Therefore, the Board considers this issue abandoned and will not rule on it.

203.

Any Finding of Fact deemed to be a Conclusion of Law is hereby adopted as such. Any Conclusion of Law deemed to be a Finding of Fact is hereby adopted as such. Based upon the foregoing Findings of Fact and Conclusions of Law, the Board enters the following:

## IV. ORDER

The Pollution Control Hearings Board **AFFIRMS** Notice of Construction Order of Approval No. 11386 and associated supplemental environmental impact statement with the following additional requirement:

The parties are directed to work together expeditiously and efficiently to modify the Order of Approval to add conditions requiring the installation of a $SO_2$ and VOC Continuous Emission Monitoring System consistent with this decision.

SO ORDERED this 19th day of November, 2021.

**POLLUTION CONTROL HEARINGS BOARD**

NEIL L. WISE, Board Chair

CAROLINA SUN-WIDROW, Member

MICHELLE GONZALEZ, Member

HEATHER C. FRANCKS, Presiding
Administrative Appeals Judge