SOAH DOCKET NO. 582-22-0201
TCEQ DOCKET NO. 2021-0942-AIR

APPLICATION OF PORT ARTHUR LNG, LLC FOR NEW STATE AND PREVENTION OF SIGNIFICANT DETERIORATION AIR QUALITY PERMIT NO. 158420, GHGPSDTX198, AND PSDTX1572	**§** **§** **§** **§** **§** **§**	**BEFORE THE STATE OFFICE** **OF** **ADMINISTRATIVE HEARINGS**

APPLICANT PORT ARTHUR LNG, LLC'S
BRIEF AND EXCEPTIONS TO THE PROPOSAL FOR DECISION AND ORDER

TO THE HONORABLE COMMISSIONERS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY:

Applicant Port Arthur LNG, LLC ("Port Arthur LNG") respectfully urges the Texas Commission on Environmental Quality (the "Commission") to adopt the Proposed Order recommended by Administrative Law Judges ("Judges") Heather Hunziker and Meitra Farhadi, subject to those few changes set forth in this brief and exceptions, which are required under applicable law and the record in this Senate Bill 709 permitting matter.

I. INTRODUCTION

Port Arthur LNG currently holds an air quality permit authorizing the construction of a natural gas liquefaction plant and export terminal with two liquefaction trains (Trains 1 and 2) on the Sabine-Neches ship channel in Jefferson County, Texas (the "Base Project"). *See* Applicant's Ex. APP_I (Air Quality Permit Nos. 131769, PSDTX1456, and GHGPSDTX134) (the "Base Project Permit"). On September 12, 2019, Port Arthur LNG submitted an application ("Application") to the Texas Commission on Environmental Quality ("TCEQ" or the "Commission") to obtain Air Quality Permit Nos. 158420, PSDTX1572, and GHGPSDTX198 (Applicant's Ex. APP_D, ("AR") Tab C at 00001-00049, (the "Draft Permit") to authorize the addition of two liquefaction trains (Trains 3 and 4) and refinements to the design of the Base Project (the "Expansion Project" or the "Port Arthur LNG Project"). AR Tab D (Application).

On May 20, 2022, the Judges issued a Proposal for Decision ("PFD") and Proposed Order confirming that the emissions authorized by the Draft Permit are protective of public health and safety and "there is no indication that emissions from the Facility will contravene the intent of the [Texas Clean Air Act]." Finding of Fact ("FOF") 111; Conclusion of Law ("COL") 27. Port Arthur LNG appreciates the careful evaluation of the evidence and law in this case on the protectiveness of the proposed emissions and welcomes the Judges' favorable review and recommendation on those referred issues necessary for the approval of the Application. The Judges correctly determined that the Application complies with all applicable statutory and regulatory requirements and the Draft Permit should be issued.

Port Arthur LNG strongly supports the Judges' recommendation on those referred issues required for approval of the Application and the best available control technology ("BACT")

determinations with respect to the power generation turbines, flares, and fugitive emissions. Port Arthur LNG respectfully files this brief and exceptions to seek Commission review of the unprecedented finding as to affected person status that lead to this hearing, and to identify changes to the Proposed Order that are required because the Judges misapplied applicable law and guidance in recommending changes to the BACT determinations for certain other equipment. The PFD recommends, and the Proposed Order would require, that Port Arthur LNG "match" emissions performance levels that have been proposed, but not yet demonstrated, by other LNG facilities for (1) nitrogen oxides ("NOx") and carbon monoxide ("CO") emissions from the refrigeration compressor turbines; and (2) NOx emissions from the thermal oxidizers.

The Judges recommend that Port Arthur LNG reduce its NOx emissions from the thermal oxidizers from 0.06 to 0.053 lb/MMBtu—such a small decrease of only 0.007 lb/MMBtu, though beyond that required by BACT, is within the operating range of these units and can be accommodated within the current design of the Project. However, the Judges' recommendation with respect to the emissions of NOx and CO from the refrigeration compressor turbines is troubling, given that the record shows that the BACT determinations in the Draft Permit issued by the Executive Director ("ED") are proper, similar sources have not demonstrated compliance with these lower limits, and Port Arthur LNG's equipment suppliers have not guaranteed that level of performance for the current design of the facility, which was developed to satisfy emission requirements of the Base Project Permit. This recommendation would require significant re-engineering the Base Project, for which Port Arthur LNG has already executed an Engineering, Procurement, and Construction ("EPC") agreement in reliance on the Base Project Permit. While Port Arthur LNG expects that the refrigeration compressor turbines will perform better than the

emissions performance levels required by the Draft Permit, it is unable at this time to agree to the "beyond BACT" recommendations of the Judges. Unless corrected by the Commission, the Judges' unjustified recommendation puts Port Arthur LNG in the untenable position of advancing the Base Project under the Base Project Permit while it continues to evaluate the commercial feasibility of the Expansion Project in light of the need to have a performance guarantee for the emission limits recommended by the Judges.

For these reasons, and because Texas law and the record before the Commission does not support the Judges' recommendations, Port Arthur LNG submits these exceptions. Accordingly, Port Arthur LNG excepts to the Judges' recommendations as to (1) affected person status; and (2) NOx and CO emissions limits from the refrigeration compressor turbines. Although Port Arthur LNG maintains that the Judges' recommendation as to the NOx emissions limits for the thermal oxidizers relies on a misapplication of the law and the record, Port Arthur LNG does not except to a NOx emission limit reduction of only 0.007 lb/MMBtu because such a small decrease will not require reengineering of the Base Project or Expansion Project.

II. STANDARD OF REVIEW

The Commission has express authority to amend a proposal for decision, including any finding of fact, provided that such amendment is based solely on the record made before the Judge and is accompanied by an explanation of the basis for the amendment. TEX. GOV'T. CODE § 2003.047(m). The Commission also has the express authority to ask the Judges to reconsider the evidence and make additional findings of fact or conclusions of law. *Id.* Port Arthur LNG respectfully files these exceptions based on evidence provided during the course of this proceeding

to support issuance of the Application and Draft Permit *without* revisions to emissions controls and limits for the refrigeration compression turbines, and thermal oxidizers.

III. REFERRED ISSUE: AFFECTED PERSON STATUS

As a preliminary matter, Port Arthur LNG urges the Commission to review the basis for the Judges' determination that Port Arthur Community Action Network ("PA-CAN") met its burden to demonstrate that Mr. John Beard has a "personal justiciable interest related to a legal right, duty, privilege, power, or economic interest" in this proceeding that is "not common to members of the general public." 30 TEX. ADMIN. CODE § 55.203. This inquiry is fundamental to the foundation of the commission's contested case hearing process because Port Arthur LNG's application was referred to the State Office of Administrative Hearings ("SOAH") to evaluate the threshold issue of whether the hearing requestor's interest was a personal justiciable interest and not common to the members of the general public. *See* Applicant's Ex. APP_D, Administrative Record ("AR"), Tab A (Interim Order). Despite acknowledging that PA-CAN had the burden of proof to show that its member would otherwise have standing to request a hearing in his own right,[1] the PFD and Proposed Order did not so much as mention, let alone offer any substantive analysis of, the extensive evidence offered at both the preliminary hearing and the hearing on the merits, including that by Dr. Jonathan Urban on behalf of Port Arthur LNG and Dr. Stanley Aniagu on behalf of the ED, or the position of the ED opposing party status for PA-CAN.

Rather, the PFD and Proposed Order relied solely on evidence presented at the preliminary hearing, simply stating that "[a]fter considering the applicable law and the evidence offered at the preliminary hearing, the ALJ determined that Mr. Beard has personal justiciable interests unique

[1] *See* COL 14 ("PACAN had the burden of proof to show affected person status. 30 TEX. ADMIN. CODE §§ 80.109(a), (b)(5). 55.203.").

from members of the general public." FOF 33. According to SOAH Order No. 1, the decision was therefore based on a finding that "[b]ecause the Applicant's modeling shows that Mr. Beard will have concentrations *above zero* at his property, he will have increased risks of health effects." SOAH Order No. 1 at 4 (emphasis added). As noted in Port Arthur LNG's Motion for Certified Question, which was summarily denied by the Judges, preventing the Commission from considering this important legal and policy issue before the hearing on the merits occurred, "[a]ll air permits will result in some increase in emissions of certain pollutants." Motion for Certified Question at 9. Under this logic, any one of the 54,000 individuals residing within the modeling domain presented in an application could be considered "affected." As such, "[t]his finding, in a SB 709 case, is unprecedented and reflects a misapplication of laws, rules, and policies of the TCEQ." *Id.* at 5.

The Judges' FOF 32 and COL 15 suggest that standing is conclusively established at a preliminary hearing—thereby depriving the Commissioners from their statutory opportunity to consider the Judges' decision in light of the law and evidence. The Judges' decision was therefore not a recommendation at all. This standard is counter to the fundamental principle that SOAH makes recommendations on disputed issues and that a party's standing can be challenged at any time. *See Tex. Ass'n of Bus. v. Tex. Air Control Bd.*, 852 S.W.2d 440, 443-44(Tex. 1993) (holding that "[s]tanding is implicit in the concept of subject matter jurisdiction [and] [s]ubject matter jurisdiction is never presumed and cannot be waived").

The Judges' "once in, always in" standard is also not supported as a matter of sound policy. Given that judges are reluctant to consider the merits of an application at a preliminary hearing, even though such consideration, along with the analysis and opinions of the ED, are required to be

admitted as part of the record and considered in determining affected person status,[2] the Judges' standard would effectively limit the ability of the statutory parties to challenge standing altogether.

Although the TCEQ's rules allow for a party to move to certify an issue to the Commission during the pendency of a contested case hearing, SOAH appears to have sole discretion to deny such a motion and block the Commission from hearing the issue until after issuance of a PFD.[3] Port Arthur LNG submitted a Motion for Certified Question on the issue of affected party status shortly after the preliminary hearing. *See* FOF 35. Port Arthur LNG had asked SOAH to certify the following question to the Commission:

> Where the administrative record has been admitted under 30 Tex. Admin. Code 80.17(c)(1), establishing a prima facie demonstration that the draft permit meets all state and federal legal and technical requirement and would protect human health and safety, the environment, and physical property, is evidence of a modeled emissions impact of NO_2 and $PM_{2.5}$ above zero, but well below the primary and secondary National Ambient Air Quality Standards for such contaminants, sufficient to support a determination of affected person status under 30 Tex. Admin Code 55.230 for a member of the general public with claimed health issues residing over 5 miles from a proposed facility?

See Motion for Certified Question at 1. Port Arthur LNG had pointed out that SOAH Order No. 1 (granting party status to PA-CAN) explicitly relied on outdated and superseded legal precedent that pre-dates SB 709 and the additional factors adopted in its implementation.[4] However, the

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[2] TEX. WATER CODE § 5.115(a-1); 30 TEX. ADMIN. CODE 55.203.

[3] 30 TEX. ADMIN. CODE § 80.131(b).

[4] To implement SB 709 changes to the factors to be considered in determining whether a person is "affected," TCEQ adopted the following additional factors:

> (A) the merits of the underlying application, including whether the application meets the requirements for permit issuance;
> (B) the likely impact of [the] regulated activity on the health, safety, and use of the property of the hearing requestor;
> (C) the administrative record, including the permit application and any supporting documentation;
> (D) the analysis and opinions of the executive director; and
> (E) any other expert reports, affidavits, opinions or data submitted on or before any applicable deadline to the commission by the executive director, the applicant, or a hearing requestor[.]

TEX. WATER CODE § 5.115(a-1). SB 709 amended Texas Water Code Section 5.115 by adding Section (a-1) in 2015.

Judge denied that Motion on December 14, 2021, without providing any substantive analysis of the issues raised in relation to the factors required to be considered under 30 TEX. ADMIN. CODE § 55.203. FOF 36. The parties are therefore left without substantive analysis as to (1) how affected person status is to be evaluated, specifically under the new SB 709 factors; and (2) whether SOAH's reliance on outdated and superseded legal precedent influenced the Judges' decision to grant affected person status.

Modeled "concentrations above zero" five miles away from the proposed regulated activity does not rise to a personal justiciable interest. PA-CAN failed to meet its burden to show that Mr. Beard would be adversely affected by emissions from the Port Arthur LNG Project and therefore could not demonstrate that Mr. Beard is an "affected person" sufficient to confer standing. *See* 30 TEX. ADMIN. CODE § 55.203(c) (requiring a showing of a "reasonable relationship . . . between the interest claimed and the activity regulated"). Notwithstanding that this application was referred to SOAH for the threshold issue of affectedness, PA-CAN offered no medical doctor, toxicologist, or licensed professional to support Mr. Beard's health claims or their possible causal connection to air pollution of the nature and concentration to be emitted by Port Arthur LNG. Preliminary Hearing ("PH") at 146:14-147:3 (L. Hopkins). Nor did PA-CAN offer any documentary evidence of Mr. Beard's alleged health conditions. PH at 30:23-25 (J. Beard). Mr. Beard testified that no doctor has told him that his health conditions make him particularly sensitive to air quality, but stated that "it is known and accepted." *Id.* at 31:14-25 (J.Beard). On the other hand, the record contains ample evidence showing that Mr. Beard *will not* be adversely affected by issuance of the Draft Permit—but the Judges made no mention of this evidence in the PFD or Proposed Order whatsoever.

Port Arthur LNG respectfully requests that the Commission strike the Judges' COL 15[5], as it is unsupported by the record. Port Arthur LNG urges the Commission to adopt the following FOF, which were included in its Closing Brief:

> 89. Mr. Beard resides at 501 West 15th St in Port Arthur, Texas. Mr. Beard's residence is over five (5) miles from the closest emissions source proposed by Port Arthur LNG. Ex. APP_N at PAL_001709; Ex. APP_E.
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> 90. Mr. Beard is a resident of Port Arthur but does not hold any elected or appointed position or office for the City of Port Arthur or its boards or commissions. PH Ex. 1 at ¶¶ 21, 53 (Unsworn Declaration of John Beard); Ex. APP_F (City of Port Arthur Resolution).
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> 91. Mr. Beard presented lay testimony at the preliminary hearing on his concerns about the potential for emissions from the Port Arthur LNG to adversely affect his health and enjoyment of property, including public parks and recreational areas nearer to the Port Arthur LNG Project than his residence.
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> 92. PA-CAN did not offer any evidence or expert testimony to confirm the existence or severity of any health conditions of Mr. Beard, or their possible causal connection to air pollution of the nature and concentration to be emitted by Port Arthur LNG. PH at 146:14-147:3.
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> 93. The Administrative Record included evidence regarding the lack of potential for emissions from the Port Arthur LNG Project to adversely impact Mr. Beard health or his use and enjoyment of his property.
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> 94. Potential impacts to human health and welfare or the environment are determined by comparing the proposed air emissions to appropriate state and federal standards and guidelines. These standards and guidelines include the National Ambient Air Quality Standards ("NAAQS"), TCEQ Effects Screening Levels ("ESLs"), and TCEQ rules. Ex. ED-15 at 0622 (Response to Public Comment).
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> 95. The U.S. Environmental Protection Agency (EPA) created and continues to evaluate the NAAQS, which include both primary and secondary standards, for pollutants considered harmful to public health and the environment. Primary standards protect public health, including sensitive members of the population such as children, the elderly, and those individuals with preexisting health conditions. Secondary NAAQS protect public welfare and the environment, including animals, crops, vegetation, visibility, and buildings, from any known or anticipated adverse effects from air contaminants. The EPA has set NAAQS for criteria pollutants, which

[5] "PACAN met the requirements for associational standing. 30 Tex. Admin. Code § 55.205."

include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in aerodynamic diameter (PM_{10}), and PM less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$). Ex. ED-15 at 623 (Response to Public Comments).

96. The NAAQS analysis results are below the standard for each pollutant, will not cause or contribute to violation of the NAAQS, and are protective of human health and the environment. Ex. ED-15 at 0625-0626 (Response to Public Comments); Ex. 200 at 8:30-38 (J. Urban).

97. ESLs are specific guideline concentrations used in TCEQ's evaluation of certain pollutants. These guidelines are derived by the TCEQ's Toxicology Division and are based on a pollutant's potential to cause adverse health effects, odor nuisances, and effects on vegetation. Health-based ESLs are set below levels reported to produce adverse health effects, and are set to protect the general public, including sensitive subgroups such as children, the elderly, or people with existing respiratory conditions. Ex. ED-32 at 8:27-34, 9:9-17, 9:19-22 (S. Aniagu).

98. Adverse health or welfare effects are not expected to occur if the air concentration of a pollutant is below its respective ESL. If an air concentration of a pollutant is above the screening level, it is not necessarily indicative that an adverse effect will occur, but rather that further evaluation is warranted. Ex. ED-32 at 9:9-17 (S. Aniagu).

99. The ESL analysis results are below the ESLs for each pollutant except for diesel fuel. The TCEQ Toxicology Division conducted a further evaluation of diesel fuel concentration evaluated with a 1-hour averaging time. Toxicology evaluated potential exposures and assessed human health risks to the public. The Toxicology Division determined that the described impacts are acceptable given the conservative nature of both the ESLs and the emissions estimates. Ex. APP_N at PAL_001713-01715 (M. Meister); Ex. ED-17 (Health Effects Review Audit); TR-3:728:22-730:22 (S. Aniagu).

100. Because this application has sulfur emissions, the Applicant conducted a state property line analysis to demonstrate compliance with TCEQ rules for net ground-level concentrations for sulfur dioxide (SO_2), hydrogen sulfide (H_2S), and sulfuric acid (H_2SO_4), as applicable. Ex. ED-3 at 0066-67 (Preliminary Determination Summary).

101. This state rule analysis demonstrated that resulting air concentrations will not exceed the applicable state standards. Ex. ED-3 at 0066-67 (Preliminary Determination Summary).

102. The ED concluded that it not expected that existing health conditions will worsen, or that there will be adverse health effects on the general public,

sensitive subgroups, or the public welfare and the environment as a result of proposed emission rates associated with the Port Arthur LNG Project. Ex. ED-15 at 0626 (Response to Public Comments).

103. Port Arthur LNG presented additional evidence and testimony on focused more particularly on the potential impacts to human health and environment at Mr. Beard's residence. Port Arthur LNG's witness Mike Meister and the ED's witness Mr. Davies described that air dispersion modeling was performed in accordance with applicable air quality rules and guidance and included all emission sources required to be modeled and an appropriate selection of inputs. AR Tab D at PAL_001052-001294; Ex. 202 (M. Meister); Ex. ED-18 at 11:11-13, 25:12-16. 27:26-29 (R. Davies).

104. The predicted NAAQS impacts from Port Arthur LNG's NOx emissions at Mr. Beard's residence are 9.3 and 0.51 µg/m3 for NO_2 (1-hour) and $PM_{2.5}$ (24-hour), respectively. When accounting for background air concentrations, the total NO_2 (1-hour) and $PM_{2.5}$ (24-hour) air concentrations are estimated at 65.7 and 20.51 µg/m3, respectively. Given that the applicable NAAQS for these criteria are 188 and 35 $\mu g/m^3$ for their respective time averages, the modeled impacts from the Port Arthur LNG Project at Mr. Beard's residence represents approximately 5% and 1.5% of the NO_2 (1-hour) and $PM_{2.5}$ (24-hour) NAAQS criteria, respectively. Ex. APP_N; Ex. 202 (M. Meister); Ex. 200 at 11:26-12:6 (J. Urban).

105. Based on the Air Quality Analysis Audit performed by TCEQ and an evaluation of health-based exposure standards, there will not be any adverse effects on the health of Mr. Beard or the general public, including sensitive subgroups, as a result of exposure to the maximum possible levels of air contaminants to be emitted from the Port Arthur LNG Facility. Ex. 200 at 18:2-23 (J. Urban); Ex. ED-16 (Air Quality Analysis Audit).

106. When considering the factors and information described in Findings of Fact ("FOF") Nos. 89-105, Mr. Beard does not have a personal justiciable interest in this proceeding and is not affected in accordance with applicable laws.

107. Based on the evidence in the record, Mr. Beard's interests are those common to the general public and Mr. Beard will not be affected by emissions from the Port Arthur LNG Project in any way different than the general public.

Port Arthur LNG also urges that the Commission adopt the following proposed Conclusions of Law to replace COL 15, which were included in its Closing Brief:

23. A group or association may request party status only if the group or association meets all of the following requirements: (1) one or more

members of the group or association would otherwise have standing to request a hearing in their own right; (2) the interests the group or association seeks to protect are germane to the organization's purpose; and (3) neither the claim asserted nor the relief requested requires the participation of the individual members in the case. 30 TAC § 55.205.

24. Pursuant to 30 TAC § 55.203, affected person status is a prerequisite to participating in a contested case hearing. Associations must base their standing upon an affected member. Affected person status requires a personal justiciable interest in the controversy. 30 TAC § 55.203(a). "An interest common to members of the general public does not qualify as a personal justiciable interest." Id. When considering affected person status, the Commission considers all factors, including the reasonable relationship between the interest claimed and the activity regulated and the likely impact of the regulated activity on the health and safety of the person, and on the use of property of the person. 30 TAC § 55.203(c).

25. Pursuant to 30 TAC § 55.203, the Commission should consider the following factors: (1) the merits of the underlying application and supporting documentation in the commission's administrative record, including whether the application meets the requirements for permit issuance; (2) the analysis and opinions of the executive director; and (3) any other expert reports, affidavits, opinions, or data submitted by the executive director, the applicant, or hearing requestor. 30 TAC § 55.203(d).

26. In *Sierra Club v. Tex. Comm'n on Envtl. Quality and Waste Control Specialists*, the Austin Court of Appeals found that "operation of the facility as licensed is not likely to adversely affect the environment in amounts that are prohibited under the law," and concluded that "[f]or that reason, it would have been reasonable, and thus within TCEQ's discretion, to conclude that [the requestors] are not affected persons because the licensed activity will have minimal effect on their health, safety, use of property, and use of natural resources." 455 S.W.3d 214 (Tex. App.—Austin 2014, pet. denied).

27. Based on Finding of Fact Nos. 89-107, PA-CAN failed to meet its burden of proof to show that Mr. Beard will be adversely affected by the Port Arthur LNG Project in a manner that is not "common to members of the general public." 30 TAC § 55.203(a).

28. Because PA-CAN failed to prove that Mr. Beard was an affected person, Mr. Beard lacks standing to challenge Port Arthur LNG's permit. See 30 TAC § 55.203(a). Further, because PA-CAN's standing depends upon proof of an affected member, PA-CAN also lacks standing. The preliminary determination that John Beard is an affected person is not supported by the evidence in the record.

29. Port Arthur LNG and the ED objected to the party status of PA-CAN as recommended by SOAH. Further, whether a person has standing is an issue

> that may be raised by any party at any time. Tex. Ass'n of Bus. v. Tex. Air Control Bd., 852 S.W.2d 440, 445-46 (Tex. 1993).

The Texas legislature has granted the Commission explicit authority to amend the PFD and Proposed Order in the manner described herein. TEX. GOV'T. CODE § 2003.047(m). This issue of affectedness was referred to SOAH for an assessment based on the evidence in the record, and SOAH has failed to provide that assessment or otherwise acknowledge Port Arthur LNG's Motion to Certify. As such, Port Arthur LNG urges the Commission to review the record and provide an assessment that properly applying the law, including the information required to be considered under SB 709, to the evidence in the record.

IV. CERTIFIED ISSUE F: BEST AVAILABLE CONTROL TECHNOLOGY

Given the SB 709 presumption and the overwhelming evidence in the record on the other certified issues, PA-CAN focused its challenge to the Draft Permit to one issue: whether Port Arthur LNG and the ED properly applied Best Available Control Technology, or "BACT" requirements. The Judges concluded that the Application and the ED's Draft Permit failed to adequately assess BACT for: (1) NOx and CO emissions from the refrigeration compressor turbines; and (2) NOx emissions from the thermal oxidizers. The PFD and Proposed Order thus recommend that the emissions limits for the refrigeration compressor turbines and thermal oxidizers be reduced to match those reflected in recent air quality permits for three facilities—Golden Pass LNG, Rio Grande LNG, and Lake Charles LNG—that have not been constructed nor demonstrated compliance with these limits. The Judges' simplistic approach to BACT that requires an applicant to meet the lowest permitted level for a source, regardless of the results of its case-by-case BACT analysis, renders the Judges' recommendations flawed.

A. BACT Generally

The PFD and Proposed Order are based on a misunderstanding of the nature of a case-by-case BACT determination and the importance that an emission performance level be "demonstrated in practice" before requiring other sources to meet emission performance levels that are "beyond BACT." As the PFD notes, Port Arthur LNG argued in closing that "Rio Grande LNG and Lake Charles LNG have not yet been constructed, so their NOx limits are not demonstrated in practice."[6] PFD at 58. The PFD also notes that Mr. Powers cites to *no* authority to support his position that *proposed* emissions limits are sufficient to dictate BACT and need not be "demonstrated in practice." *Id.* Quoting the expert testimony of the ED's witness, Dr. Ben Hansen, a level V engineer responsible for reviewing the Draft Permit, the PFD notes that "it does matter if it's been used in practice, and it's not enough that it's been proposed," adding Dr. Hansen's statement that:

> [A] particular applicant **may in their permit have a limitation** which they have proposed, which is lower than that BACT limit. And . . . that doesn't change what BACT is. The fact that a particular applicant is able to achieve—or represents that they will be able to achieve a lower emission than established BACT, that doesn't make that BACT.

PFD at 59 (emphasis added). But in the same breath, the Judges concluded that "[w]hile the ED and Applicant experts opined on the difference between *proposed* and *permitted* limits, they did not specify or even imply that *actually permitted* limits are insufficient." PFD at 61 (emphasis in original). This conclusion contradicts the Judges' recitation of Dr. Hansen's testimony that permitted limits are insufficient to dictate BACT. Furthermore, as demonstrated by evidence in the record, this statement is plainly false—three expert witnesses testified that permitted emissions

[6] Port Arthur LNG had also argued that Golden Pass LNG was not yet constructed, and therefore not demonstrated in practice. Port Arthur LNG Closing Brief at 18.

limits are not "demonstrated in practice" until they have been proven to be workable through continuous operation. As such, facilities that have not yet been constructed do not define BACT.

In Dr. Hansen's direct testimony, he recites the TCEQ's definition of BACT, stating that "30 TAC § 116.10(1) defines BACT as 'an air pollution control method for a new or modified facility that through experience and research, has proven to be **operational,** obtainable, and capable of reducing or eliminating emissions from the facility, and is considered technically practical and economically reasonable for the facility.'" Ex. ED-1 at 0019:17-23 (emphasis added). Dr. Hansen's direct testimony then concluded in one example that "Golden Pass, Driftwood, and Lake Charles, are not yet operational, and we cannot require a technology on a trial basis. It needs to be an established technology, and [selective catalytic reduction ("SCR")] on these types of turbines is not yet an established technology." *Id.* at 0029:24-27. At the hearing on the merits, Dr. Hansen explained that "while [the RACT/BACT/LAER Clearinghouse ("RBLC")] lists BACT determinations or emissions levels that are reported in different applications, until those are actually implemented in practice and we see that we are actually getting that level of control, it wouldn't be reasonable, and I think common sense would dictate it wouldn't be fair to require people to meet those levels until it's actually been demonstrated that that's achievable." Hearing on the Merits ("HOTM") TR-3 at 601:7-24 (B. Hansen).

Furthermore, Mr. Hearn's direct testimony responds to the question of "what does it mean to be demonstrated in practice" with the following explanation:

> In the context of determining whether an emissions limitation is achievable as a practical matter under all reasonably foreseeable worst-case operating conditions for the life of the facility, a particularly useful indicator of achievability is whether compliance with that same limit has been demonstrated continuously, in practice, by a similar facility. Looking over an extended period, can we be reasonably certain that the similar facility has, in fact, experienced a range of worse-case

> operating conditions and has demonstrated that the limit can be met on a long-term, continuous basis? Without this data, the permitting authority can do no more than determine that a proposed emission limit is likely to be achievable.

Applicant's Ex. 400 (Direct Testimony of D. Hearn) at 23:16-23.

Mr. Higgins also noted in his direct testimony that Lake Charles LNG had not yet been constructed, meaning that "the proposed NOx emission rates for the Lake Charles LNG facility have not been demonstrated as achievable." Applicant's Ex. 500 (Direct Testimony of K. Higgins) at 43:16-18. At the hearing on the merits, Mr. Higgins testified that although Rio Grande LNG has been "authorized" to emit NOx from its refrigeration compressor turbines at a rate of 5 ppm, "[t]hat hasn't been demonstrated in practice." HOTM TR-3 at 571:23-572:8. To further prove this point Mr. Higgins sponsored an exhibit depicting each LNG facility's "Start of Operation" date, separating those that had been *permitted* versus those that had been *constructed*. *See* Applicant's Amened Ex. 502 (BACT Chart).

Port Arthur LNG's closing arguments rely heavily on the above evidence, repeatedly making the argument that lower NOx emission levels have only been required and demonstrated once, in an ozone nonattainment area, for a turbine that operates differently and with different control technology from the turbines proposed here: "Cove Point is **the only LNG facility in the United States** that is currently operating under a permit that limits its NOx emissions from refrigeration compressor turbines to less than 9 ppmvd." Port Arthur LNG's Response in Support of Closing Arguments ("Response Brief") at 5-6 (emphasis in original); *see* Port Arthur LNG's Closing Brief at 29 (citing HOTM TR-1 at 256:9-12 (W. Powers)). Even PA-CAN acknowledged Port Arthur LNG's argument that non-operational facilities do not dictate BACT. PA-CAN's Closing Brief at 23.

Accordingly, Port Arthur LNG urges the Commission, based on a thorough review the record, to correct the Judges' underlying rationale that Port Arthur LNG must match the emissions limits proposed in permits for yet-to-be-constructed facilities, including Rio Grande LNG, Lake Charles LNG, and Golden Pass LNG. With this in mind, each of the Judges' recommendations are evaluated in more detail below.

B. Refrigeration Compressor Turbines

1. Control of NOx

The Judges' recommendation that "the Draft Permit be revised to require the Facility to match the limit imposed on both Rio Grande LNG and Golden Pass LNG," which are "permitted to limit NOx emissions to 5 ppmvd at 15% O2 for the refrigeration compression turbines," appears to be based on their belief that these permitted facilities establish BACT, as well as the following supposed flaws in Port Arthur LNG and the ED's respective direct cases: (1) Port Arthur LNG did not evaluate the estimated costs of reaching a NOx emissions limit of 5 ppmvd *without* SCR (comparing to Rio Grande LNG)*;* and (2) Port Arthur LNG's conclusion that use of SCR to reach 5 ppmvd is not economically reasonable is flawed (comparing to Golden Pass LNG). Accordingly, the PFD and Proposed Order do not require Port Arthur LNG to use SCR to reach a NOx emissions limit of 5 ppmvd because Rio Grande LNG represented it can do so without SCR. However, each of these bases were formed in reliance on mischaracterized expert testimony, or otherwise overlooks evidence in the record.

First it is undisputed that **no LNG facility has demonstrated that a NOx limit of 5 ppmvd can be achieved on a continuous basis for the life of the facility without the use of SCR because Rio Grande LNG has not yet been constructed**. *See* Applicant's Ex. 400 (Direct Testimony of D. Hearn) at 23:16-23. The Judges' recommendation (as based on Rio Grande

LNG), thus requires Port Arthur LNG to experiment with a BACT limitation that has not been proven to be technically practicable, or in other words, is not "demonstrated in practice." The Judges' recommendation that Port Arthur LNG "match" this limit, without any consideration of the technical practicability or the costs involved, misapplies state and federal BACT methodology. *See* Applicant's Ex. 508 (Texas Brownsville PFD) at POWERS 6149 ("the availability of a new technology (or an existing control that the applicant did not choose), does not mean it will be Tier I BACT for that applicant, because *both* feasibility and economic reasonableness must be considered.").

The BACT determination for NOx from the refrigeration compression turbines supported by Port Arthur LNG and the ED included detailed evaluations demonstrating technical concerns about the use of SCR in the proposed liquefaction process and the unreasonable costs Port Arthur LNG would incur should such technology be required. Golden Pass LNG is permitted to reach a NOx emissions limit of 5 ppmvd, but this emission performance level requires the use of SCR. Port Arthur LNG included cost effectiveness calculations showing that it would cost $22,510 to $23,633 per ton to reduce NOx emissions with use of SCR on its proposed turbines, even if its substantial technical concerns could be resolved. Those calculations, which were reviewed and approved by the ED's witnesses, showed what all other similar cost effectiveness calculations have shown for similar LNG export facilities in attainment areas—that the use of SCR to control NOx is not economically reasonable. HOTM TR-3 at 618:9-17 (B. Hansen); HOTM TR-2 at 549:15-554:3 (K. Higgins) (explaining that Cameron LNG, Corpus Christi LNG, and Rio Grande LNG found use of SCR to be economically unreasonable and were therefore not required to use it to control NOx emissions).

In recommending that Port Arthur LNG "match" Golden Pass LNG's limit, the Judges rejected the cost effectiveness calculations presented by Port Arthur LNG based on their view of the baseline emission rate used in those calculations. Rather than Port Arthur LNG's "baseline" NOx emission rate of 9 ppmvd, the Judges were of the opinion that 15 ppmvd should have been used. PFD at 36-37. There is no dispute in the record that the turbines proposed by Port Arthur LNG will achieve at least 9 ppmvd NOx based on their inherent design. *Id.* at 15-16. Yet, the Judges believe that the use of this value was somehow an attempt to manipulate the calculation.

The PFD states that "[t]he acknowledged effect of using a lower inlet value is that it substantially inflates the cost of SCR, making SCR appear less cost effective because it is removing less NOx, and thus giving the appearance than SCR is more expensive per ton of NOx removed." *Id.* at 36. Neither Port Arthur LNG nor the ED "acknowledged" that using a lower baseline value makes SCR "appear less cost effective." Rather, both parties argued at length as to why reducing the inlet concentration ***is not a manipulation of the evaluation—it reflects the reality that over time, SCR is becoming less and less cost-effective because the amount of NOx it can remove is reduced as turbine combustion technology advances.***[7] None of this testimony appears to have been considered by the Judges, and the evidence that was considered was misconstrued.

Without addressing each piece of testimony that the PFD misstates, a cursory review of the hearing transcripts reveals several inconsistencies that warrant the Commission's review. As one example, the PFD states that "Mr. Higgins agreed however, that reducing the inlet concentration of NOx into the SCR will **dramatically** increase the total cost per ton of NOx removed." *Id.* at 29

[7] The PFD does mention Dr. Hansen's opinion that "[b]ecause the technology is better today, there is less the SCR is able to accomplish; therefore, a cost analysis will show SCR as less cost effective over time," but the Judges' statement that use of a lower inlet value "substantially inflates the cost of SCR, making SCR appear less cost effective" indicates that the Judges view this as a manipulation, and not a reality. *See* PFD at 32-33, 36.

(emphasis added). The HOTM transcript actually reads: "Q: I just want to be clear that…reducing the inlet from 15 to 9 makes SCR significantly more expensive per ton of NOx removed," to which Mr. Higgins replied, "[i]t makes it more expensive." HOTM TR-2 at 489:14-8. Adding the word "dramatically" or "significantly" to Mr. Higgins testimony inappropriately mischaracterizes it by importing the question into the answer. This is important because the Findings of Fact and Order are based on these same mischaracterizations.[8] Several more examples like this indicate that the Judges' recommendations may have been based on an inaccurate depiction of the evidence.

The Judges note that Mr. Higgins "agreed that 9 ppm reflects the controlled NOx emissions" from the refrigeration compressor turbines." PFD at 29. Again, this is not what Mr. Higgins stated in his testimony. Mr. Higgins' cross-examination testimony reads as follows:

> Q: [BY MR. COX] And so 9 ppm reflects the controlled emissions from the turbines, correct?
>
> **A: 9 ppm is the NOx emissions that [it] will get with the inherent combustion system for the authorized 7EA combustion turbines.**
>
> Q: And that reflects the controlled emissions in Permit 131769. Is that correct?
>
> **A: Again, you say control, that's the inherent combustion system, yes. It's the—there is no post-combustion controls, but dry low NOx technology would be considered a control technology. But, again, that's the inherent combustion system in those machines.**

HOTM TR-2 at 484:25-485:11 (K. Higgins). Mr. Cox did not give Mr. Higgins an opportunity to explain the importance of an "inherent" control, and how it differs from a "post process" control, which Mr. Higgins addressed in his re-direct examination. When shown the NSR Workshop Manual, Mr. Higgins recited the portion that PA-CAN declined to mention:

> **A:** [RECITING NSR MANUAL at POWERS 148] **When calculating the cost-effectiveness of adding post process emissions controls to certain inherently**

[8] Finding of Fact 62 states that "[u]sing a lower baseline emissions inlet value has the effect of **substantially** inflating the cost of a control option, making the control option appear less cost effective." PFD at 8 (emphasis added).

lower polluting process emissions controls to certain inherently lower polluting processes, baseline emissions may be assumed to be the emissions from the lower polluting process itself. In other words, emission reduction credit can be taken for use of the inherently lower polluting processes.

Q: [BY MR. MCDONALD]: Okay. And what I want to ask you: What is your interpretation of that phrase and how it applies to the cost-effectiveness calculations that you have performed for the GE 7EAs that are equipped with this DLN1.0+ technology?

A: Right. So my opinion…is that the baseline emissions, just as it says there, they—they're to take into account the inherently lower polluting process and…the inherently lower polluting process is the inherent combustion system in the proposed refrigeration compressor combustion turbines, so the 9 ppm DLN1.0+ combustion system.

Q: Okay. And so would you agree that kind of combustion system and the way those particular units are manufactured and provided by GE to Port Arthur LNG is essentially an operational constraint on the—kind of sourced to operate higher than that? I mean, that's what the source produces?

A: No, that's correct. And, in fact, in the following paragraph, the second sentence says that, for example, in developing a realistic upper boundary case, baseline emission calculations could also consider inherent physical or operational constraints on the source.

So we could consider the 9 ppm to be the operational constraint on the source based on, you know, the vendor guarantees that Port Arthur LNG is going to receive from Baker Hughes upon purchasing those combustion systems.

HOTM TR-2 at 543:9-544:22 (K. Higgins). The PFD does not mention this testimony. The PFD also does not mention similar testimony by Dr. Hansen:

Q: [BY MR. MCDONALD]: …there's been a lot of testimony in this case about this--GE's proprietary dry low NOx, you know, combustion systems and this DLN1.0+ technology that's proposed by Port Arthur LNG

Do you consider that a process control that reduces emissions?

A: I think, yea, it's maybe a subtle distinction that it's—it's a technology that's built into these units that they are designed to—essentially it's not an add-on control. It's kind of like…quality engineering where you try to build quality in instead of catching it all at the tail end.

What you want to do is—here you want to avoid the production of NOx in the first place rather than build a big piece of machinery, which the SCR

units are very, very big, you'd have to actually go and stand under one to appreciate how massive they are.

HOTM TR-3 at 603:20-604:12 (B. Hansen). Dr. Hansen then confirmed that the DLN1.0+ technology is inherent to the process. *Id.* at 604:13-15. Dr. Hansen also confirmed that DLN1.0+ technology is a "refined" version of the prior technology, DLN1, achieving a lower NOx emission rate. *Id.* at 648:13-649:1.

The PFD cites to Dr. Hansen's testimony to support the statement that "for a DLN burner, a realistic scenario now is either 15 ppm on the upper limit and down to 9 ppm using the state of the art DLN 1.0+ version." PFD at 33. This also mischaracterizes Dr. Hansen's testimony, especially in light of the testimony recited above. When asked "[w]hat is the realistic upper boundary uncontrolled emissions for a dry low NOx burner," Dr. Hansen confirmed that it would be "the emissions coming out of the turbine." HOTM TR-3 at 659:3-66:10. When asked about the upper boundary "for a dry low NOx burner," Dr. Hansen replied:

A: …I discussed earlier the notion that the state of the art on these types of equipment has been advancing, and so it's gone through a stage where a realistic upper limit might have been 25 ppm. It very commonly these combustors have an upper limit of 15 ppm, and now the newer ones can achieve 9 ppm or better. So I think a realistic scenario would—you could either say 15 or 9.

Q: Uh-huh. And 9 is what you said, state of the art. Right?

A: Yeah

Id. at 660:14-661:1. **Dr. Hansen was asked about the realistic upper boundary for "a dry low NOx burner"—not for DLN1.0+, the "state of the art" technology proposed by Port Arthur LNG.** Dr. Hansen responded in kind, with a generalized answer: "either 15 or 9." *See id.* When read in the context of the immediately preceding testimony, *i.e.*, that DLN1.0+ technology is a "refined" version of the prior technology, DLN1, achieving a lower NOx emission rate than DLN1,

it follows that the realistic upper boundary could be 15 or 9 ppmvd. Dr. Hansen's testimony regarding the advancement of this technology further places his testimony in the appropriate context: the realistic upper boundary for DLN1 would be 15 ppmvd, but it would be lower for "state of the art" DLN1.0+, i.e., 9 ppmvd.

Taking all of this evidence into consideration in its proper context, the Judges' finding that the inlet concentration for DLN1.0+ technology should be 15 ppmvd is incorrect; a baseline concentration of 9 ppmvd more accurately depicts the "baseline" amount of NOx that an SCR could eliminate from the DLN1.0+ turbines. Accordingly, Port Arthur LNG urges the Commission to strike FOF 62,[9] 65,[10] 70,[11] 71,[12] 72,[13] 73,[14] and 74.[15] In replacement, Port Arthur LNG urges the Commission to adopt the following proposed FOF:

> 86. The use of Selective Catalytic Reduction ("SCR") technology on gas-fired refrigeration compressor turbines at LNG export facilities is not well-proven, and only one LNG export facility has installed and operated SCR technology on gas-fired refrigeration compressor turbines. TR-1 at 256:9-12 (W. Powers).
>
> 87. While Port Arthur LNG considered the use of SCR technology on its gas-fired refrigeration compressor turbines as technically feasible in its BACT analyses in the Application, the use of such control technology would be difficult to successfully incorporate into the Port Arthur LNG Process due

[9] "Using a lower baseline emissions inlet value has the effect of substantially inflating the cost of a control option, making the control option appear less cost effective."

[10] "The use of Selective Catalytic Reduction (SCR) technology on gas-fired refrigeration compressor turbines at LNG export facilities is proven. Other permitted LNG terminals demonstrate that the use of SCR in combination with DLN technology achieves much lower NOx emission limits than those proposed by PALNG. Permitted facilities with lower NOx emission limits than those proposed by PALNG include Cove Point LNG, Lake Charles LNG, Golden Pass LNG, Driftwood LNG, and Rio Grande LNG."

[11] "Frame 7Ea turbines equipped with DLN now have an upper NOx emissions limit of 15 ppmv."

[12] "The estimated costs to reduce NOx emissions with use of SCR range from $7,381 to $10,265 per ton. This cost effectiveness range does not exceed the TCEQ's NOx threshold for economic reasonableness used with BACT determinations for NOx."

[13] "The use of SCR control technology to reduce NOx emissions on the refrigeration compression turbines is cost effective."

[14] "SCR is available, demonstrated in practice, technically feasible, and economically reasonable."

[15] "To meet BACT, the Draft Permit should be revised so that the refrigeration compressor turbines are permitted with a NOx emission limit of 5 ppmv at 15% O2 on a 24-rolling hour average, except during periods of maintenance, startup, and shutdown (MSS)."

to lack of available operating data, varying demands and loads on the turbines, exhaust temperatures, and space considerations. Ex. 500 at 14:21-15:11 (K. Higgins); Ex. 300 at 18:18-26 (S. Majeed).

88. Using the EPA's various published control cost estimating methodologies, Port Arthur LNG concluded that applying SCR would not be economically reasonable and therefore an emission limit that could only be achieved with use of that technology would not be required as BACT. AR Tab D at PAL_000208-212; id. at PAL_001576-1578.

89. DLN1+ is a control technology inherent to Frame 7EA turbines that reduces NOx emissions during the combustion process by increasing the air to fuel ratio in the combustion chamber and staging the introduction of the air to the combustion zone. AR Tab D at PAL_000202; TR-2 at 532:18-533:17 (K. Higgins); Ex. 300 at 17:16-26 (S. Majeed). DLN1+ technology for the control of NOx is an inherently lower emitting process, not an add-on control technology. TR-3 at 604:2-22, 13-15 (B. Hansen).

90. Turbines equipped with DLN1+ can achieve 9 ppmvd NOx. TR-3 at 660:11-23 (B. Hansen).

91. Port Arthur LNG presented cost effectiveness calculations following approved methodologies and reasonable assumptions that estimated costs in the range of $22,510 to $23,633 per ton to reduce NOx emissions with use of SCR. AR Tab D at PAL_001574-1578; Ex. ED-15 at 0632 (Response to Public Comments). It was appropriate to use an inlet NOx concentration of 9 ppmvd NOx and an outlet NOx concentration of 5 ppmvd NOx as the inlet and outlet NOx emission rates, respectively, in conducting a cost effectiveness calculation for the installation of SCR on the proposed refrigeration compressor turbines. AR Tab D at PAL_001577-1578; TR-3 at 624:8-11 (B. Hansen).

92. This cost-effectiveness range exceeded the TCEQ's NOx threshold for economic reasonableness used with BACT determinations for NOx. Ex. ED-15 at 0631-632 (Response to Public Comments); TR-3 at 624:13-625:6 (B. Hansen).

93. The use of SCR for NOx to achieve a lower BACT emission limitation is not economically reasonable. Ex. ED-15 at 0631-632 (Response to Public Comments); TR-3 at 624:13-625:6 (B. Hansen).

94. BACT is the use of good combustion practices to reach a NO_x emission limit of 9 ppmv at 15% O_2 on a 24-rolling hour average, except during periods of maintenance, startup, and shutdown (MSS).

Port Arthur LNG's Closing Brief at 74-75. Port Arthur LNG urges the Commission to add the following Conclusion of Law, which was included in its Closing Brief and also applies to the BACT determination for emissions of CO from the refrigeration compressor turbines:

> 48: Based on the Findings of Fact, BACT for the proposed refrigeration compressors is use of Frame 7EA natural gas-fired simple-cycle turbines equipped with Dry-Low NOx ("DLN") technology, resulting in a NOx emissions limit of 9 ppmvd at 15% O2 (24-hour rolling) and a CO emissions limit of 25 ppmvd at 15% O_2 (3-hour rolling). AR Tab C at 00073-00074, 00089 (Preliminary Determination Summary); AR Tab C at 00007-8, 00033-36 (Draft Permit).

Port Arthur LNG's Closing Brief at 90. Port Arthur LNG urges the Commission to amend COL 26 as follows:

> 26: Consistent with Texas Health and Safety Code § 382.0518 and 30 Texas Administrative Code § 116.111(a)(2)(C), and with the addition of amendments requiring that~~: (1) the refrigeration compressor turbines be permitted with a NOx emission limit of 5 ppmv at 15% O2 on a 24-rolling hour average, and a CO emission limit of 15 ppmv at 15% O2, except during periods of MSS; and (2)~~ the thermal oxidizers achieve NOx emission limits of 0.053 lb/MMBtu, the Facility will use BACT, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating emissions from the Facility.

PFD at 17.

a. Control of CO

The PFD states that "the ALJs find that PACAN failed to rebut the Prima Facie Demonstration that use of an oxidation catalyst to control CO emissions is not cost effective." PFD at 39. This should be the end of the analysis. *See* Port Arthur LNG Closing Brief at 31-32 (citing Proposal for Decision, *In Re: Application by The City of Dripping Springs for New TPDES Permit No. WQ0014488003* (SOAH Docket No. 582-18-3000) (Nov. 2018) (hereinafter, "Dripping Springs PFD") at 30 ("Given the lack of controverting evidence on this issue, the ALJ

concludes that the prima facie demonstration from the Administrative Record has not been rebutted. Thus, the Administrative Record demonstrates that the draft permit is protective.")). But, in apparent contradiction to the clear requirements of the SB 709 presumption, recommends that:

> However, PACAN has presented enough controverting evidence to rebut the Prima Facie Demonstration as to Applicant's proposed CO emission limit of 25 ppmvd at 15% O2 for its refrigeration compressor turbines, and Applicant and the ED have not presented evidence sufficient to overcome PACAN's rebuttal. Specifically, because Applicant's proposed emission reduction level of 25 ppmvd for CO is not "at least" equivalent to Rio Grande LNG, which is also located in an attainment area and recently permitted with a BACT CO emission limit of 15 ppmvd through the use of good combustion practices, the third step of the Tier I analysis has not been demonstrated.
> …
> Accordingly, the ALJs recommend the Draft Permit be revised to require the Facility to match the limit imposed on Rio Grande LNG—15 ppmvd at 15% O2 through the use of good combustion practices.

PFD at 39. Notably, PA-CAN never made this argument—as the PFD notes, "PACAN argued that Applicant should have evaluated the cost of installing a CO oxidation catalyst integrated with SCR." PFD at 39; *see* PA-CAN Closing Brief at 38-39. The Judges' *sua sponte* recommendation disregards the case-by-case nature of BACT analyses and results in a fundamental misapplication of state and federal guidelines.

The Judges' ultimate recommendation that "because Applicant's proposed emission reduction level of 25 ppmvd for CO is not 'at least' equivalent to Rio Grande LNG…the third step of the Tier I analysis has not been demonstrated" suggests that Port Arthur LNG should have matched Rio Grande LNG's CO limit without performing a cost analysis, given that Tier I does not involve evaluation of costs. *See* PFD at 11-12; *see also* Applicant's Ex. 402 (APDG 6110) at PAL_007717-18. However, "the availability of a new technology (or an existing control that the

applicant did not choose), does not mean it will be Tier I BACT for that applicant, because *both* feasibility and economic reasonableness must be considered. Applicant's Ex. 508 (Texas Brownsville PFD) at POWERS 6149. As the PFD notes, BACT is determined "on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs." PFD at 9 (citing Ex. ED-6 (NSR Workshop Manual) at B.1). Although another facility may propose a certain emission threshold as BACT, that does not make it "presumptively cost effective" for Port Arthur LNG. Applicant's Ex. 400 at 18:20-27, 19:26-35 (D. Hearn). BACT is a case-by-case analysis that specifically endorses elimination of technologies from consideration where they are demonstrated to be economically unreasonable for a particular facility. *Id.* The Judges' recommendation thus misapplies the BACT methodology.

As with NOx, the record here includes a cost effectiveness calculation showing that the use of oxidation catalysts to control CO would cost approximately $5,005 per ton of CO removed, which is not economically reasonable. *See* AR Tab D at PAL_000216-217; *see* HOTM TR-1 at 129:13-16 (W. Powers) (confirming that the cost-effectiveness thresholds for control of CO are lower than for control of NOx).

Furthermore, the Judges' recommendation faults Port Arthur LNG for failing to consider a permit amendment that was not issued until after Port Arthur LNG submitted its Application. The PFD states that "Applicant failed to identify Rio Grande LNG in its BACT analysis; and failed to demonstrate why a CO emission limit of 15 ppmvd is not BACT for the Facility." PFD at 38. But Rio Grande LNG did not submit its amendment application to TCEQ until July 2020—***almost a full year after Port Arthur LNG submitted the Application***. PA-CAN's Exhibit 72, the Rio Grande LNG Permit Amendment Source Analysis & Technical Review, was not issued until

November 2020.[16] The amended Rio Grande LNG permit is not even part of the record in this proceeding. Accordingly, when Port Arthur LNG submitted its Application (and even its BACT Supplement in October 2020), Rio Grande LNG had been permitted to emit CO at a rate of 25 ppmvd—the same BACT limit that Port Arthur LNG proposed. *See* PA-CAN's Ex. 72 at POWERS 9083. Furthermore, Port Arthur LNG *did* perform a cost evaluation for control of CO emissions—and as the Judges noted, PA-CAN did not identify any errors therein. PFD at 39; *see* HOTM TR-1 at 129:6-12 (W. Powers).

The Judges' recommendation that Port Arthur LNG should "match the limit imposed on Rio Grande LNG," despite the fact that Rio Grande LNG's permit amendment was not even issued until more than a year after Port Arthur LNG submitted its Application, and despite the Judges' finding that PA-CAN did not identify any errors in Port Arthur LNG's cost evaluation for control of CO emissions, requires the Commission's attention. Port Arthur LNG respectfully requests that the Commission strike FOF 78-79 because PA-CAN failed to rebut Port Arthur LNG's Prima Facie Demonstration. Dripping Springs PFD at 30 ("Given the lack of controverting evidence on this issue, the ALJ concludes that the prima facie demonstration from the Administrative Record has not been rebutted. Thus, the Administrative Record demonstrates that the draft permit is

[16] Exhibit 72 (Rio Grande LNG Permit Amendment Source Analysis & Technical Review) notes that the amendment application was *received* On July 1, 2020. Exhibit 72, which is undated on its face, was not issued until November 16, 2020—this date can only be derived from a review of the TCEQ's online Central File Room. It should also be noted that PA-CAN did not make this exhibit available to the parties until the eve of the hearing on the merits. *See* TR-1 at 176:7-11 ("we reviewed [the exhibits] last night around 5 p.m.").

protective."). Port Arthur LNG urges the Commission to strike the Judges' FOF 76,[17] 77,[18] 78,[19] and 79[20] and adopt the following proposed FOF in replacement, which were included in its Closing Brief:

> X. PACAN failed to rebut the Prima Facie Demonstration that use of an oxidation catalyst to control CO emissions is not cost effective.
>
> 63. Port Arthur LNG presented cost effectiveness calculations following approved methodologies and reasonable assumptions that estimated costs of $5,005 per ton to reduce CO emissions with use of oxidization catalysts. AR Tab D at PAL_000213-219. This cost-effectiveness range exceeded the TCEQ's CO threshold for economic reasonableness.
>
> 65. The use of oxidation catalyst for CO to achieve a lower BACT emission limitation is not economically reasonable. Ex. 500 at 26:5-11 (K. Higgins).
>
> 97. BACT for CO emissions from the Frame 7EA gas-fired refrigeration compressor turbines is the use of good combustion practices to achieve an emissions limitation of 25 ppmv at 15% oxygen ("O2") on a 3-hour average.

Port Arthur LNG's Closing Brief at 75. Port Arthur LNG also urges the Commission to adopt COL 48 and amend COL 26, as recited in the previous section for control of NOx emissions.

C. Thermal Oxidizers

The PFD and Proposed Order recommend that "the Draft Permit be revised to require the Facility to "match" the thermal oxidizer NOx emission limit imposed on Lake Charles LNG—0.053 lb/MMBtu." PFD at 62. As discussed herein, Lake Charles LNG has not yet been constructed, and its proposed NOx emission limit of 0.053 has therefore not yet been demonstrated

[17] "Without the use of SCR, the use of oxidation catalyst to control CO emissions would cost an estimated $5,005 per ton of CO controlled"

[18] "CO emissions have been controlled to 15 ppmv at 15% O_2 for gas-fired refrigeration compressor combustion turbines using good combustion practices at Rio Grande LNG."

[19] "The most effective control for gas-fired refrigeration compressor combustion turbines that was not eliminated as technically infeasible or economically unreasonable is the use of good combustion practices to control CO emissions to 15 ppmv at 15% O_2."

[20] "To meet BACT, the Draft Permit should be revised so that the refrigeration compressor turbines are permitted with a CO emission limit of 15 ppmv at 15% O_2."

to be achievable. Furthermore, in reaching this conclusion, the Judges disregarded recent precedent based on the same testimony from the same expert witness,[21] without providing sufficient explanation as to why this precedent does not control. *See id.* at 61-62. However, a reduction of only 0.007 lb/MMBtu NOx is within the operating range of these units and can be accommodated within the current design of the Project. Accordingly, even though the Judges' underlying rationale that Port Arthur LNG must "match" emissions limits proposed in permits for yet-to-be-constructed facilities misapplies state and federal law and disregards the case-by-case nature of BACT determinations, Port Arthur LNG does not except to the Judges' recommendation.

V. BASE PROJECT

The most important point that was left out of the PFD and Proposed Order is the fact that, while Port Arthur LNG has not yet made a final investment decision for the Base Project, advanced engineering for the Base Project is already underway under the valid Base Project Permit. The Base Project has been subject to a signed EPC agreement with its contractor, Bechtel, since December 2020. Ongoing work with that contractor, along with commercial negotiations for the Base Project have proceeded based upon these valid, and in effect permits. Port Arthur LNG urges the Commission to amend FOF 3 to recognize that the Base Project Permit is still valid and in effect, as follows:

> 3. On February 17, 2016, TCEQ issued PALNG Permit No. 131769, PSDTX1456, and GHGPSDTX134 (Base Project Permit), authorizing the construction and operation of two liquefaction trains, Trains 1 and 2, and

[21] In the Texas LNG (Brownsville) contested case hearing, the ALJs (and subsequently the Commission) found no merit in Mr. Powers' arguments, which also relied on Lake Charles LNG; the ALJs upheld the NOx emissions limit of 0.06 lb/MMBtu for the thermal oxidizers. Ex. 508 at POWERS 6169-6172 (Texas LNG Brownsville PFD). The ALJs in that case reasoned "there is no basis to interpret '0.06 lb/MMBtu or less' as Mr. Powers does, reading it to be 'less than 0.06 lb/MMBtu unless there's no burner out there' than can perform better. The plain language indicates that a thermal oxidizer meeting the 0.06 lb/MMBtu limit can be BACT." *Id.* at POWERS 6171-6172.

> associated facilities for the PALNG Project. The Base Project Permit is valid and in effect.

Proposed Order at 2.

The PFD and Proposed Order do not explain how Port Arthur LNG would be expected to now comply with two separate permits covering the same facilities, but with differing emissions limitations. This is especially concerning, given that Port Arthur LNG has secured EPC guarantees and finalized the design for the Base Project. Port Arthur LNG respectfully urges the Commission to consider the practical difficulties presented by the Judges' recommendations, which do not clearly delineate how Port Arthur LNG is to proceed.

To be clear, Port Arthur LNG is committed to advancing cost-effective lower emissions technology where technically feasible. Unfortunately, at this time, Port Arthur LNG cannot say with any degree of certainty that its equipment manufacturers can guarantee that the refrigeration compressor turbines can operate in conformance with the unproven "beyond BACT" emission limits recommended by the Judges. This is not surprising, given the fundamental misunderstanding of the case-by-case BACT methodology embodied in the PFD and the importance that an emission performance level be "demonstrated in practice."

VI. CONCLUSION

The Judges correctly determined by their proposed findings and conclusions of law that the Application complies with all applicable statutory and regulatory requirements and the Draft Permit should be issued. While Port Arthur LNG commits to continue its discussions with equipment vendors and engineers to determine if the as-built operation of the plant can meet the unproven beyond BACT emission limit reductions for the refrigeration compressor turbines recommended by the Judges, those recommended limits are not BACT and should not be reflected

in the Commission's Final Order or the Draft Permit for the reasons stated herein. Attached to this Brief is a summary of the changes to the Judges' Proposed Order (see Attachment A), which Port Arthur LNG respectfully requests the Commission adopt.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have e-filed and served a true and correct copy of the foregoing Applicant Port Arthur LNG, LLC's Brief and Exceptions to the Proposal for Decision and Order by e-mail on this 9th day of June 2022.

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SOAH DOCKET NO. 582-22-0201
TCEQ DOCKET NO. 2021-0942-AIR

APPLICATION OF PORT ARTHUR LNG, LLC FOR NEW STATE AND PREVENTION OF SIGNIFICANT DETERIORATION AIR QUALITY PERMIT NO. 158420, GHGPSDTX198, AND PSDTX1572	§ § § § § § §	**BEFORE THE STATE OFFICE** **OF** **ADMINISTRATIVE HEARINGS**

APPLICANT PORT ARTHUR LNG, LLC'S
BRIEF AND EXCEPTIONS TO THE PROPOSAL FOR DECISION AND ORDER

ATTACHMENT A

SOAH DOCKET NO. 582-22-0201
TCEQ DOCKET NO. 2021-0942-AIR

APPLICATION OF PORT ARTHUR LNG, LLC FOR NEW STATE AND PREVENTION OF SIGNIFICANT DETERIORATION AIR QUALITY PERMIT NO. 158420, GHGPSDTX198, AND PSDTX1572	§ § § § § § §	**BEFORE THE STATE OFFICE** **OF** **ADMINISTRATIVE HEARINGS**

PORT ARTHUR LNG'S SUMMARY OF REQUESTED CHANGES TO THE JUDGES' PROPOSED ORDER

Affected Person Status

Add the following Findings of Fact:

89. Mr. Beard resides at 501 West 15th St in Port Arthur, Texas. Mr. Beard's residence is over five (5) miles from the closest emissions source proposed by Port Arthur LNG. Ex. APP_N at PAL_001709; Ex. APP_E.

90. Mr. Beard is a resident of Port Arthur but does not hold any elected or appointed position or office for the City of Port Arthur or its boards or commissions. PH Ex. 1 at ¶¶ 21, 53 (Unsworn Declaration of John Beard); Ex. APP_F (City of Port Arthur Resolution).

91. Mr. Beard presented lay testimony at the preliminary hearing on his concerns about the potential for emissions from the Port Arthur LNG to adversely affect his health and enjoyment of property, including public parks and recreational areas nearer to the Port Arthur LNG Project than his residence.

92. PA-CAN did not offer any evidence or expert testimony to confirm the existence or severity of any health conditions of Mr. Beard, or their possible causal connection to air pollution of the nature and concentration to be emitted by Port Arthur LNG. PH at 146:14-147:3.

93. The Administrative Record included evidence regarding the lack of potential for emissions from the Port Arthur LNG Project to adversely impact Mr. Beard health or his use and enjoyment of his property.

94. Potential impacts to human health and welfare or the environment are determined by comparing the proposed air emissions to appropriate state and federal standards and guidelines. These standards and guidelines include the National Ambient Air Quality Standards ("NAAQS"), TCEQ Effects Screening Levels ("ESLs"), and TCEQ rules. Ex. ED-15 at 0622 (Response to Public Comment).

95. The U.S. Environmental Protection Agency (EPA) created and continues to evaluate the NAAQS, which include both primary and secondary standards, for pollutants considered harmful to public health and the environment. Primary standards protect public health, including sensitive members of the population such as children, the elderly, and those individuals with preexisting health conditions. Secondary NAAQS protect public welfare and the environment, including animals, crops, vegetation, visibility, and buildings, from any known or anticipated adverse effects from air contaminants. The EPA has set NAAQS for criteria pollutants, which include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in aerodynamic diameter (PM_{10}), and PM less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$). Ex. ED-15 at 623 (Response to Public Comments).

96. The NAAQS analysis results are below the standard for each pollutant, will not cause or contribute to violation of the NAAQS, and are protective of human health and the environment. Ex. ED-15 at 0625-0626 (Response to Public Comments); Ex. 200 at 8:30-38 (J. Urban).

97. ESLs are specific guideline concentrations used in TCEQ's evaluation of certain pollutants. These guidelines are derived by the TCEQ's Toxicology Division and are based on a pollutant's potential to cause adverse health effects, odor nuisances, and effects on vegetation. Health-based ESLs are set below levels reported to produce adverse health effects, and are set to protect the general public, including sensitive subgroups such as children, the elderly, or people with existing respiratory conditions. Ex. ED-32 at 8:27-34, 9:9-17, 9:19-22 (S. Aniagu).

98. Adverse health or welfare effects are not expected to occur if the air concentration of a pollutant is below its respective ESL. If an air concentration of a pollutant is above the screening level, it is not necessarily indicative that an adverse effect will occur, but rather that further evaluation is warranted. Ex. ED-32 at 9:9-17 (S. Aniagu).

99. The ESL analysis results are below the ESLs for each pollutant except for diesel fuel. The TCEQ Toxicology Division conducted a further evaluation of diesel fuel concentration evaluated with a 1-hour averaging time. Toxicology evaluated potential exposures and assessed human health risks to the public. The Toxicology Division determined that the described impacts are acceptable given the conservative nature of both the ESLs and the emissions estimates. Ex. APP_N at PAL_001713-01715 (M. Meister); Ex. ED-17 (Health Effects Review Audit); TR-3:728:22-730:22 (S. Aniagu).

100. Because this application has sulfur emissions, the Applicant conducted a state property line analysis to demonstrate compliance with TCEQ rules for net ground-level concentrations for sulfur dioxide (SO_2), hydrogen sulfide (H_2S), and sulfuric acid (H_2SO_4), as applicable. Ex. ED-3 at 0066-67 (Preliminary Determination Summary).

101. This state rule analysis demonstrated that resulting air concentrations will not exceed the applicable state standards. Ex. ED-3 at 0066-67 (Preliminary Determination Summary).

102. The ED concluded that it not expected that existing health conditions will worsen, or that there will be adverse health effects on the general public, sensitive subgroups, or the public welfare and the environment as a result of proposed emission rates associated with the Port Arthur LNG Project. Ex. ED-15 at 0626 (Response to Public Comments).

103. Port Arthur LNG presented additional evidence and testimony on focused more particularly on the potential impacts to human health and environment at Mr. Beard's residence. Port Arthur LNG's witness Mike Meister and the ED's witness Mr. Davies described that air dispersion modeling was performed in accordance with applicable air quality rules and guidance and included all emission sources required to be modeled and an appropriate selection of inputs. AR Tab D at PAL_001052-001294; Ex. 202 (M. Meister); Ex. ED-18 at 11:11-13, 25:12-16. 27:26-29 (R. Davies).

104. The predicted NAAQS impacts from Port Arthur LNG's NOx emissions at Mr. Beard's residence are 9.3 and 0.51 µg/m3 for NO_2 (1-hour) and $PM_{2.5}$ (24-hour), respectively. When accounting for background air concentrations, the total NO_2 (1-hour) and $PM_{2.5}$ (24-hour) air concentrations are estimated at 65.7 and 20.51 µg/m3, respectively. Given that the applicable NAAQS for these criteria are 188 and 35 $\mu g/m^3$ for their respective time averages, the modeled impacts from the Port Arthur LNG Project at Mr. Beard's residence represents approximately 5% and 1.5% of the NO_2 (1-hour) and $PM_{2.5}$ (24-hour) NAAQS criteria, respectively. Ex. APP_N; Ex. 202 (M. Meister); Ex. 200 at 11:26-12:6 (J. Urban).

105. Based on the Air Quality Analysis Audit performed by TCEQ and an evaluation of health-based exposure standards, there will not be any adverse effects on the health of Mr. Beard or the general public, including sensitive subgroups, as a result of exposure to the maximum possible levels of air contaminants to be emitted from the Port Arthur LNG Facility. Ex. 200 at 18:2-23 (J. Urban); Ex. ED-16 (Air Quality Analysis Audit).

106. When considering the factors and information described in Findings of Fact ("FOF") Nos. 89-105, Mr. Beard does not have a personal justiciable interest in this proceeding and is not affected in accordance with applicable laws.

107. Based on the evidence in the record, Mr. Beard's interests are those common to the general public and Mr. Beard will not be affected by emissions from the Port Arthur LNG Project in any way different than the general public.

Strike the following Conclusion of Law:

15. PACAN met the requirements for associational standing. 30 Tex. Admin. Code § 55.205.

Replace with the following Conclusions of Law:

23. A group or association may request party status only if the group or association meets all of the following requirements: (1) one or more members of the group or association would otherwise have standing to request a hearing in their own right; (2) the interests the group or association seeks to protect are germane to the organization's purpose; and (3) neither the claim asserted nor the relief requested requires the participation of the individual members in the case. 30 TAC § 55.205.

24. Pursuant to 30 TAC § 55.203, affected person status is a prerequisite to participating in a contested case hearing. Associations must base their standing upon an affected member. Affected person status requires a personal justiciable interest in the controversy. 30 TAC § 55.203(a). "An interest common to members of the general public does not qualify as a personal justiciable interest." Id. When considering affected person status, the Commission considers all factors, including the reasonable relationship between the interest claimed and the activity regulated and the likely impact of the regulated activity on the health and safety of the person, and on the use of property of the person. 30 TAC § 55.203(c).

25. Pursuant to 30 TAC § 55.203, the Commission should consider the following factors: (1) the merits of the underlying application and supporting documentation in the commission's administrative record, including whether the application meets the requirements for permit issuance; (2) the analysis and opinions of the executive director; and (3) any other expert reports, affidavits, opinions, or data submitted by the executive director, the applicant, or hearing requestor. 30 TAC § 55.203(d).

26. In *Sierra Club v. Tex. Comm'n on Envtl. Quality and Waste Control Specialists*, the Austin Court of Appeals found that "operation of the facility as licensed is not likely to adversely affect the environment in amounts that are prohibited under the law," and concluded that "[f]or that reason, it would have been reasonable, and thus within TCEQ's discretion, to conclude that [the requestors] are not affected persons because the licensed activity will have minimal effect on their health, safety, use of property, and use of natural resources." 455 S.W.3d 214 (Tex. App.—Austin 2014, pet. denied).

27. Based on Finding of Fact Nos. 89-107, PA-CAN failed to meet its burden of proof to show that Mr. Beard will be adversely affected by the Port Arthur LNG Project in a manner that is not "common to members of the general public." 30 TAC § 55.203(a).

28. Because PA-CAN failed to prove that Mr. Beard was an affected person, Mr. Beard lacks standing to challenge Port Arthur LNG's permit. See 30 TAC § 55.203(a). Further, because PA-CAN's standing depends upon proof of an affected member, PA-CAN also lacks standing. The preliminary determination that John Beard is an affected person is not supported by the evidence in the record.

29. Port Arthur LNG and the ED objected to the party status of PA-CAN as recommended by SOAH. Further, whether a person has standing is an issue that may be raised by any party at any time. Tex. Ass'n of Bus. v. Tex. Air Control Bd., 852 S.W.2d 440, 445-46 (Tex. 1993).

Control of NOx from Refrigeration Compressor Turbines

Strike the following Findings of Fact:

62. Using a lower baseline emissions inlet value has the effect of substantially inflating the cost of a control option, making the control option appear less cost effective.

65. The use of Selective Catalytic Reduction (SCR) technology on gas-fired refrigeration compressor turbines at LNG export facilities is proven. Other permitted LNG terminals demonstrate that the use of SCR in combination with DLN technology achieves much lower NOx emission limits than those proposed by PALNG. Permitted facilities with lower NOx emission limits than those proposed by PALNG include Cove Point LNG, Lake Charles LNG, Golden Pass LNG, Driftwood LNG, and Rio Grande LNG.

70. Frame 7Ea turbines equipped with DLN now have an upper NOx emissions limit of 15 ppmv.

71. The estimated costs to reduce NOx emissions with use of SCR range from $7,381 to $10,265 per ton. This cost effectiveness range does not exceed the TCEQ's NOx threshold for economic reasonableness used with BACT determinations for NOx

72. The use of SCR control technology to reduce NOx emissions on the refrigeration compression turbines is cost effective.

73. SCR is available, demonstrated in practice, technically feasible, and economically reasonable.

74. To meet BACT, the Draft Permit should be revised so that the refrigeration compressor turbines are permitted with a NOx emission limit of 5 ppmv at 15% O2 on a 24-rolling hour average, except during periods of maintenance, startup, and shutdown (MSS).

Replace with the following Findings of Fact:

86. The use of Selective Catalytic Reduction ("SCR") technology on gas-fired refrigeration compressor turbines at LNG export facilities is not well-proven, and only one LNG export facility has installed and operated SCR technology on gas-fired refrigeration compressor turbines. TR-1 at 256:9-12 (W. Powers).

87. While Port Arthur LNG considered the use of SCR technology on its gas-fired refrigeration compressor turbines as technically feasible in its BACT analyses in the Application, the use of such control technology would be difficult to successfully incorporate into the Port Arthur LNG Process due to lack of available operating data, varying demands and loads on the turbines, exhaust temperatures, and space considerations. Ex. 500 at 14:21-15:11 (K. Higgins); Ex. 300 at 18:18-26 (S. Majeed).

88. Using the EPA's various published control cost estimating methodologies, Port Arthur LNG concluded that applying SCR would not be economically reasonable and therefore an emission limit that could only be achieved with use of that

technology would not be required as BACT. AR Tab D at PAL_000208-212; id. at PAL_001576-1578.

89. DLN1+ is a control technology inherent to Frame 7EA turbines that reduces NOx emissions during the combustion process by increasing the air to fuel ratio in the combustion chamber and staging the introduction of the air to the combustion zone. AR Tab D at PAL_000202; TR-2 at 532:18-533:17 (K. Higgins); Ex. 300 at 17:16-26 (S. Majeed). DLN1+ technology for the control of NOx is an inherently lower emitting process, not an add-on control technology. TR-3 at 604:2-22, 13-15 (B. Hansen).

90. Turbines equipped with DLN1+ can achieve 9 ppmvd NOx. TR-3 at 660:11-23 (B. Hansen).

91. Port Arthur LNG presented cost effectiveness calculations following approved methodologies and reasonable assumptions that estimated costs in the range of $22,510 to $23,633 per ton to reduce NOx emissions with use of SCR. AR Tab D at PAL_001574-1578; Ex. ED-15 at 0632 (Response to Public Comments). It was appropriate to use an inlet NOx concentration of 9 ppmvd NOx and an outlet NOx concentration of 5 ppmvd NOx as the inlet and outlet NOx emission rates, respectively, in conducting a cost effectiveness calculation for the installation of SCR on the proposed refrigeration compressor turbines. AR Tab D at PAL_001577-1578; TR-3 at 624:8-11 (B. Hansen).

92. This cost-effectiveness range exceeded the TCEQ's NOx threshold for economic reasonableness used with BACT determinations for NOx. Ex. ED-15 at 0631-632 (Response to Public Comments); TR-3 at 624:13-625:6 (B. Hansen).

93. The use of SCR for NOx to achieve a lower BACT emission limitation is not economically reasonable. Ex. ED-15 at 0631-632 (Response to Public Comments); TR-3 at 624:13-625:6 (B. Hansen).

94. BACT is the use of good combustion practices to reach a NO_x emission limit of 9 ppmv at 15% O_2 on a 24-rolling hour average, except during periods of maintenance, startup, and shutdown (MSS).

Add the following Conclusion of Law:

48: Based on the Findings of Fact, BACT for the proposed refrigeration compressors is use of Frame 7EA natural gas-fired simple-cycle turbines equipped with Dry-Low NOx ("DLN") technology, resulting in a NOx emissions limit of 9 ppmvd at 15% O2 (24-hour rolling) and a CO emissions limit of 25 ppmvd at 15% O_2 (3-hour rolling). AR Tab C at 00073-00074, 00089 (Preliminary Determination Summary); AR Tab C at 00007-8, 00033-36 (Draft Permit).

Amend the following Conclusion of Law:

26: Consistent with Texas Health and Safety Code § 382.0518 and 30 Texas Administrative Code § 116.111(a)(2)(C), and with the addition of amendments requiring that: ~~(1) the refrigeration compressor turbines be permitted with a NOx~~

~~emission limit of 5 ppmv at 15% O2 on a 24-rolling hour average, and a CO emission limit of 15 ppmv at 15% O2, except during periods of MSS; and (2)~~ the thermal oxidizers achieve NOx emission limits of 0.053 lb/MMBtu, the Facility will use BACT, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating emissions from the Facility.

Control of CO from Refrigeration Compressor Turbines

Strike the following Findings of Fact:

76: Without the use of SCR, the use of oxidation catalyst to control CO emissions would cost an estimated $5,005 per ton of CO controlled.

77. CO emissions have been controlled to 15 ppmv at 15% O_2 for gas-fired refrigeration compressor combustion turbines using good combustion practices at Rio Grande LNG.

78. The most effective control for gas-fired refrigeration compressor combustion turbines that was not eliminated as technically infeasible or economically unreasonable is the use of good combustion practices to control CO emissions to 15 ppmv at 15% O_2.

79. To meet BACT, the Draft Permit should be revised so that the refrigeration compressor turbines are permitted with a CO emission limit of 15 ppmv at 15% O_2.

Replace with the following Finding of Fact:

X. PACAN failed to rebut the Prima Facie Demonstration that use of an oxidation catalyst to control CO emissions is not cost effective.

63. Port Arthur LNG presented cost effectiveness calculations following approved methodologies and reasonable assumptions that estimated costs of $5,005 per ton to reduce CO emissions with use of oxidization catalysts. AR Tab D at PAL_000213-219. This cost-effectiveness range exceeded the TCEQ's CO threshold for economic reasonableness.

65. The use of oxidation catalyst for CO to achieve a lower BACT emission limitation is not economically reasonable. Ex. 500 at 26:5-11 (K. Higgins).

97. BACT for CO emissions from the Frame 7EA gas-fired refrigeration compressor turbines is the use of good combustion practices to achieve an emissions limitation of 25 ppmv at 15% oxygen ("O_2") on a 3-hour average.

Add the following Conclusion of Law (repeated):

48: Based on the Findings of Fact, BACT for the proposed refrigeration compressors is use of Frame 7EA natural gas-fired simple-cycle turbines equipped with Dry-Low NOx ("DLN") technology, resulting in a NOx emissions limit of 9 ppmvd at 15% O2 (24-hour rolling) and a CO emissions limit of 25 ppmvd at 15% O_2 (3-hour rolling). AR Tab C at 00073-00074, 00089 (Preliminary Determination Summary); AR Tab C at 00007-8, 00033-36 (Draft Permit).

Amend the following Conclusion of Law (repeated):

26: Consistent with Texas Health and Safety Code § 382.0518 and 30 Texas Administrative Code § 116.111(a)(2)(C), and with the addition of amendments requiring that: ~~(1) the refrigeration compressor turbines be permitted with a NOx emission limit of 5 ppmv at 15% O2 on a 24-rolling hour average, and a CO emission limit of 15 ppmv at 15% O2, except during periods of MSS; and (2)~~ the thermal oxidizers achieve NOx emission limits of 0.053 lb/MMBtu, the Facility will use BACT, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating emissions from the Facility.

Recognition of Base Project Permit

Amend the following Finding of Fact:

3. On February 17, 2016, TCEQ issued PALNG Permit No. 131769, PSDTX1456, and GHGPSDTX134 (Base Project Permit), authorizing the construction and operation of two liquefaction trains, Trains 1 and 2, and associated facilities for the PALNG Project. **[ADD THE FOLLOWING]: The Base Project Permit by the extended deadline and the Base Project Permit is valid and in effect.**

Final Order and COnclusions

Amend the Following Order:

30. The application by PALNG for Air Quality Permit Nos. 158420, PSDTX1572, and GHGPSDTX198 is approved and the attached permit is issued with the following modifications:

- ~~an amendment that requires the refrigeration compressor turbines be permitted with a NOx emission limit of 5 ppmv at 15% O_2 on a 24-rolling hour average, except during periods of MSS;~~
- ~~an amendment that requires the refrigeration compressor turbines be permitted with a CO emission limit of 15 ppmv at 15% O_2; and~~
- an amendment that requires the thermal oxidizers to achieve NOx emission limits of 0.053 lb/MMBtu.

1. The application by PALNG for Air Quality Permit Nos. 158420, PSDTX1572, and GHGPSDTX198 is approved and the attached permit is issued with the following modifications:

   - ~~an amendment that requires the refrigeration compressor turbines be permitted with a NOx emission limit of 5 ppmv at 15% O_2 on a 24-rolling hour average, except during periods of MSS;~~

   - ~~an amendment that requires the refrigeration compressor turbines be permitted with a CO emission limit of 15 ppmv at 15% O_2; and~~

   - an amendment that requires the thermal oxidizers to achieve NOx emission limits of 0.053 lb/MMBtu.