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Response to Comments
Application Completeness Determination for Cheniere Corpus Christi Pipeline, L.P.
Greenhouse Gas Prevention of Significant Deterioration Permit
Sinton Compressor Station

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Comment 1

On page 2 of the permit application, it is stated that "The proposed Sinton project has the potential to emit greater than 100,000 tons per year (tpy) CO2e. As such, a concurrent GHG permit is being submitted to EPA Region 6. As the facility is a new major source for PSD purposes, all proposed criteria pollutants emitted in amounts greater than or equal to the PSD significance emission rate (SER) are subject to PSD review.... As a result of the required PSD permitting due to the levels of GHG emissions, the following pollutants are also subject to PSD review: NOx, CO, PM, PM10 and PM2.5." Concurrent with the filing of this application, Corpus Christi Pipeline (CCPL) is filing a PSD and state NSR application with the TCEQ, proposing that the TCEQ perform PSD review for NOx, CO, PM, PM10, and PM2.5."

Since EPA is the permitting agency for GHG PSD permits in Texas, we are of the opinion that EPA is also the permitting authority for those criteria pollutants above the significant level once PSD is triggered solely to GHG emissions. We are in discussions regarding this matter with Texas. However, until the State makes a decision and we reach an alternative approach, EPA expects you to submit the applicability calculations with a five-step top down BACT analyses for the significant criteria pollutant(s) to EPA and you to consult with us on preparation and submission of air quality analyses to satisfy the requirements of 52.21(k), (m), (o), and (p), as may be applicable. We are sending this comment now before our discussions are completed with the State to avoid delay in the processing of your application.

Response

Cheniere Corpus Christi Pipeline, L.P. (CCPL) requests a meeting with the EPA to discuss the issues identified in the comment above and requests additional time to complete the response to this comment following the meeting.

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Comment 2

On page 2 of the permit application and other locations where the turbine is discussed, it is stated that the Sinton Compressor Station proposed "Two (2) 20,794 horsepower (15.5) MW) Solar Titan 134-20502S natural gas-fired turbines or its equivalent will be used to compress the natural gas for onward transport through the Corpus Christi Pipeline. One (1) 1,328 horsepower (0.99 MW) Waukesha VHP5904LTD natural gas-fired standby generator or its equivalent will also be located on-site for backup power supply." Please explain what is meant by "or equivalent". Is CCPL proposing a different Titan 134 and Waukesha or different manufacturer and model? If so, please supplement your BACT analysis with the additional turbine technical data that is being considered by Cheniere.

Response

The design for the Sinton Compressor Station utilizes two (2) 20,794 horsepower (15.5) MW) Solar Titan 134-20502S natural gas-fired turbines and one (1) 1,328 horsepower (0.99 MW) Waukesha VHP5904LTD natural gas-fired standby generator. In the unlikely event these selected units were to prove inappropriate for the specific operation from an engineering standpoint, or if the manufacturers were to develop more efficient units with the same or better emissions prior to contract award, then similar or "equivalent" units may be substituted consistent with permitting requirements.

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<u>Comment 3</u>

Two PSD permit applications for GHG emissions were submitted to the EPA for construction of new units at Cheniere Corpus Christi Liquefaction and Cheniere Corpus Christi Pipeline - Sinton Compressor Station. EPA is seeking supplemental information to assist in understanding your operations, evaluating the source determination for Cheniere's applications, and developing a comprehensive GHG PSD permit for Cheniere Corpus Christi Pipeline, L.P. Sinton Compressor Station. It is also recommended that the information provided be in a form that can be released to the public, in the event we rely upon such information in our source determination. Please provide, at a minimum, the information requested below. However, feel free to provide other information beyond that requested below, if you deem it necessary to describe the stationary source. Please provide a more detailed description of operations at the Sinton Compressor Station facility. Where does the natural gas from the Sinton Compressor Station move to next in the natural gas pipeline? Is the Corpus Christi Liquefaction project solely reliant upon natural gas received from the Sinton Compressor Station? Could the Sinton Compressor Station or Corpus Christi Liquefaction operate without the support of the other facility? Please provide flow diagrams showing how the two facilities are interconnected and why the two projects should not be aggregated for PSD permitting.

<u>Response</u>

For the reasons discussed below, the Cheniere Corpus Christi Pipeline, L.P. (CCPL) Sinton Compressor Station should not be aggregated with the Corpus Christi Liquefaction, LLC (CCL) LNG Terminal for PSD permitting purposes.[1]

I. Overview

Federal regulations define a major stationary source for PSD permitting purposes as any building, structure, facility or installation that may emit a regulated NSR pollutant.[2] *The regulations further define "building, structure, facility or installation" for source determination purposes as "all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) . . . ."*[3]

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[1] As discussed on multiple occasions with EPA Region 6 air permitting staff, a second compressor station – the Taft Compressor Station, also operated by CCPL – will be located along the same pipeline between the Sinton Compressor Station and the LNG Terminal. The Taft Compressor Station will be a minor source of all regulated NSR pollutants, including GHGs, and will be authorized, as necessary, under the Texas Minor NSR program.

[2] 40 C.F.R. § 52.21(b)(5).

[3] *Id.* § 52.21(b)(6).

Failure to meet any one of these three factors precludes source aggregation for PSD permitting purposes. Although the Sinton Compressor Station and the LNG Terminal belong to the same industrial grouping – Major SIC Group 49; Electric, Gas and Sanitary Services they are neither located on one or more contiguous or adjacent properties not under common control. Accordingly, the sources should not be aggregated.

II. The Sinton Compressor Station and the LNG Terminal are Not Located on One or More Contiguous or Adjacent Properties

The Sinton Compressor Station will be located approximately 21 miles from the LNG Terminal along an interstate natural gas pipeline. Neither CCPL nor CCL (or any related entity) owns the property between the Sinton Compressor Station and the LNG Terminal. As a result, the sources are not contiguous or adjacent and should not be aggregated for PSD permitting purposes.

A. The Plain Meaning of "Adjacent" is Limited to Consideration of Physical Proximity, Supporting a Separate Source Determination

The U.S. Supreme Court has referred to dictionary definitions to determine the plain meaning of words.[4] *"Adjacent" is defined as "next to or adjoining something else . . ."*[5]*, "immediately preceding or following"*[6]*, "having a common endpoint or border."*[7] *These definitions suggest that the plain meaning of the unambiguous term "adjacent" is limited to consideration of physical proximity. The Sinton Compressor Station is not next to or adjoining the LNG Terminal, nor do these two sources share a common endpoint or border. Instead, they are separated by approximately 21 miles of intervening, unrelated properties. Accordingly, they are not located on one or more contiguous or adjacent properties, and as a result they should not be aggregated for PSD permitting purposes.*

B. The Regulatory History of the PSD Program Strongly Supports Limiting the Adjacency Determination to Consideration of Physical Proximity, Supporting a Separate Source Determination

In addition to a plain meaning that clearly suggests that adjacency is limited to physical proximity, the most significant EPA guidance applicable to the instant issue – the preamble to the 1980 amendments to the PSD rules that actually created the three-factor aggregation test – strongly supports limiting the adjacency determination to consideration of physical proximity. Specifically, in the preamble to the proposed amendments, EPA requested comment on whether another factor – the functional

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[4] *See, e.g., MCI Telecoms Corp. v. AT&T Co.*, 512 U.S. 218, 255 (1994).
[5] Oxford Dictionaries, *available at* www.oxforddictionaries.com (last visited January 6, 2013).
[6] Meriam-Webster Dictionary, *available at* www.meriam-webster.com (last visited January 6, 2013)
[7] *Id.*

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relationship between the sources – should be added to the aggregation test (which as proposed included only common control and adjacency).[8]

Importantly, after considering the comments, in the final rule EPA elected not to add a functional relationship factor to the aggregation test because determining the functional relationship between sources "would be highly subjective" and would make "administration of the [aggregation test] substantially more difficult, since any attempt to ascertain those interrelationships would have embroiled the Agency in numerous, fine-grained analyses."[9] *Instead, EPA added the now familiar industrial grouping factor, creating the three-part test that has governed source aggregation ever since.*[10]

It is rare for regulatory history to shine such a clear light on such a specific issue. EPA's thoughtful analysis based on due consideration of public comment at the exact point in time when the very test at issue here was created strongly suggests that physical proximity should be the only consideration when assessing adjacency. The Sinton Compressor Station is separated from the LNG terminal by approximately 21 miles of intervening properties that are neither owned nor controlled by CCPL or CCL. Accordingly, the Sinton Compressor Station and the LNG Terminal are not located on one or more contiguous or adjacent properties, and as a result they should not be aggregated for PSD permitting purposes.

C. EPA Has Historically Not Aggregated Compressor Stations Along Interstate Pipelines

Although EPA was clear in the preamble to the 1980 PSD amendments that the functional relationship between sources should not be considered when making aggregation decisions, EPA did not indicate a precise distance between facilities that would qualify those facilities for separate treatment. Specifically, the preamble to the 1980 amendments provides:

> *EPA has stated in the past and now confirms that it does not intend "source" to encompass activities that would be many miles apart along a long-line operation. For instance, EPA would not treat all of the pumping stations along a multistate pipeline as one "source." EPA is unable to say precisely at this point how far apart activities must be in order to be treated separately. The agency can answer that question only through case-by-case determinations.*[11]

[8] 45 *Fed. Reg.* 52,676, 52,694 (Aug. 7, 1980).
[9] *Id.* at 52,695.
[10] *Id.*
[11] 45 Fed. Reg. at 52,695.

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Although EPA was not willing at the time to indicate a precise distance, EPA did note that activities separated by 20 miles are likely too far apart to be considered a single source.

The Sinton Compressor Station, which is separated from the LNG Terminal by 21 miles, will be one of many such stations located along an interstate natural gas pipeline. Consistent with EPA's historical approach to aggregation along interstate pipelines, as well as the fact that the Sinton Compressor Station will be sited further from the LNG Terminal than EPA's outer limit of 20 miles, the sources should not be aggregated for PSD permitting purposes.

D. U.S. Supreme Court Precedent Supports Limiting the Adjacency Determination to Consideration of Physical Proximity, Supporting a Separate Source Determination

The U.S. Supreme Court addressed the meaning of the term "adjacent" in Rapanos v. United States.[12] *In Rapanos, the Court addressed regulations that included within the statutory term navigable waters (further defined by statute as "waters of the United States"), wetlands "adjacent" to such waters. Specifically at issue was whether an arguable wetland located 11 to 20 miles from the nearest navigable water could be considered "adjacent" to that navigable water by the U.S. Army Corps of Engineers.*[13] *In concluding that the wetland could not be considered "adjacent" to such a distant body of water, the Court stated that the Corps had extended the definition of adjacent "beyond reason."*[14]

Here, aggregation of the Sinton Compressor Station and the LNG Terminal would extend the definition of adjacent even further beyond reason. The Sinton Compressor Station is separated from the LNG terminal by approximately 21 miles of intervening properties that are neither owned nor controlled by CCPL or CCL. Accordingly, the Sinton Compressor Station and the LNG Terminal are not located on one or more contiguous or adjacent properties, and as a result they should not be aggregated for PSD permitting purposes.

E. Recent EPA Guidance on Aggregation in the Oil and Gas Sector Limits the Adjacency Determination to Consideration of Physical Proximity, Supporting a Separate Source Determination

Consistent with EPA's original guidance on the aggregation test as set forth in the preamble to the 1980 PSD amendments, more recent guidance on source aggregation in the oil and gas sector further supports limiting the adjacency determination to consideration of physical proximity. Specifically, in 2009, EPA issued a memorandum on source determinations in the oil and gas industry. Known as the "McCarthy Memorandum" after its author, Gina McCarthy, Assistant Administrator, Office of Air and

[12] 547 U.S. 715 (2006).
[13] *Id.* at 720.
[14] *Id.* at 746.

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Radiation, the guidance directed permitting authorities to focus on the three-factor aggregation test when making case-by-case source determinations, rather than simply defaulting to physical proximity without considering all three-factors (although the memorandum went on to note that in some cases, proximity "may serve as the overwhelming factor").[15]

Far from supporting the use of supplemental factors, such as EPA's rejected functional relationship factor, discussed above, the McCarthy Memorandum cautions against such an approach, focusing permitting authorities instead on the three-factor test – same industrial grouping, contiguous or adjacent, and common control. As noted previously, if any one of these three factors is not met, aggregation is not appropriate. Here, not only is one of the three factors – contiguous or adjacent – not met, but the sources are separated by a significant distance, suggesting that even if the adjacency determination was not limited to consideration of physical proximity, proximity should serve as the overwhelming factor in this instance. Accordingly, the McCarthy Memorandum supports not aggregating the Sinton Compressor Station and the LNG Terminal for PSD permitting purposes.

F. State Guidelines on Source Determinations Under the SIP-Approved PSD Permitting Program Support a Separate Source Determination

As evidenced by its decision to treat the Sinton Compressor Station and the LNG Terminal separately for air permitting purposes, the TCEQ, which retained permitting authority for non-GHG pollutants under the SIP-approved portion of the Texas PSD program, has determined that the sources should be treated separately for PSD permitting purposes. That decision is supported by the TCEQ's key aggregation guidance, entitled "Definition of a Site Guidance Document," ("TCEQ Guidance") which is consistent with the State's approved SIP, current federal regulations and policy, court decisions and EPA petition orders.[16]

In comments on one of the first GHG PSD permits issued in the country (and the first issued in Region 6), EPA Region 6 made clear that aggregation decisions made by state permitting authorities under SIP-approved PSD programs should "comport with the State's approved SIP, current Federal regulations and policy, court decisions, and EPA petition orders."[17] *As discussed in detail above, a separate source determination here is consistent with longstanding EPA guidance, dating back to the*

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[15] Memorandum from Gina McCarthy, Assistant Adm'r, to Reg'l Admr's Regions I-X (Sept. 22, 2009), *available at* http://www.epa.gov/region7/air/nsr/nsrmemos/oilgaswithdrawal.pdf (last visited January 7, 2013).

[16] "Definition of a Site Guidance Document," Air Permits Division, TCEQ, August 2010, *available at* http://www.tceq.texas.gov/assets/public/permitting/air/Guidance/Title_V/site.pdf (last visited January 7, 2013).

[17] Letter from Jeffrey Robinson, Chief, Air Permits Section, EPA Region 6 to Ms. Tegan Treadaway, Administrator, Office of Environmental Services, Louisiana Department of Environmental Quality, regarding LDEQ Proposed Title V Operating Permit Numbers 2560-00281-V1 and 3086-V0; and PSD Permit Number PSD-LA-751; Consolidated Environmental Management Inc., Nucor Steel Louisiana; Covenant St. James Parish, Louisiana, dated January 7, 2011, *available at* http://www.epa.gov/region07/air/nsr/nsrmemos/nucor.pdf (last visited January 7, 2013.

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creation of the three-factor aggregation test, the plain meaning of adjacent, Supreme Court precedent, and more recent EPA guidance stressing the importance of the three-factor test in source determinations in the oil and gas sector.

Importantly, the TCEQ Guidance is consistent not only with the key considerations Region 6 outlined in the comments discussed directly above, but also with another line of EPA source determinations (discussed in the following section) that veer from both EPA's decision not to consider the functional relationship between sources in the preamble to the 1980 PSD amendments, and the 2009 McCarthy Memorandum's clear direction not to consider supplemental factors beyond the original three-factor test. Specifically, the TCEQ Guidance makes clear oil and gas sources located beyond a quarter mile from each other may still be considered adjacent, on a case-by-case basis, where they are "interdependent", a concept analogous to functional relationship.

Accordingly, because TCEQ's decision not to aggregate the sources was based on an approach consistent with two lines of EPA guidance, federal regulations and court decisions, the Sinton Compressor Station and the LNG Terminal should not be aggregated for PSD permitting purposes.

G. In the Alternative, the Sources are Not Functionally Related Under EPA Applicability Determinations, Supporting a Separate Source Determination

As noted above, EPA clearly rejected, after taking public comment on the issue, the functional relationship between sources as a factor to be considered in making aggregation determinations when the current test was originally developed as part of the 1980 amendments to the PSD rules. In addition, EPA reiterated this general position in the 2009 McCarthy Memorandum when it cautioned against looking beyond the three aggregation factors. However, despite this clear direction, the plain meaning of adjacent, and Supreme Court precedent, a separate line of EPA aggregation decisions suggests that the functional relationship between sources should be considered when determining whether sources are contiguous or adjacent. Assuming for the sake of argument that it is proper to consider the functional relationship between sources when making aggregation decisions (which, as the preceding discussion makes clear, it is not), because the Sinton Compressor Station and the LNG Terminal are not functionally related as that term has been defined by EPA, a single source determination still is not proper here.

The separate line of source determinations that address functional relationship when making the adjacency determination focuses on the following questions (limited to those that are applicable to the oil and gas sector):

> *Was the location of the new facility chosen primarily because of its proximity to the existing facility, to enable the operation of the two facilities to be integrated?*

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> *Will managers or other workers (e.g., production line staff, maintenance or repair crews, security or administrative personnel) shuttle back and forth to be involved actively in both facilities?*
>
> *Will the production process itself be split in any way between the facilities (i.e., will one facility produce an intermediate product that requires further processing at the other facility, with associated air pollutant emission)?*[18]

Applying the following detailed description of operations at the Sinton Compressor Station[19] *to these questions and the questions included in Comment 3, above, makes clear that even if it is proper to consider functional relationship as part of the adjacency determination, the Sinton Compressor Station and the LNG Terminal would be considered separate sources.*

First, the location of the Sinton Compressor Station was chosen as much for its proximity to a series of existing interstate natural gas pipelines as it was to the location of the LNG Terminal. Specifically, as depicted in the flow diagram (included in ***Attachment 3****) showing how the two facilities are interconnected, the Tennessee, Transco, NGPL, and KM Tejas natural gas pipelines are all located in the immediate vicinity of the proposed Sinton Compressor Station. This location is important because during periods where the LNG Terminal is not exporting or importing natural gas, the Sinton Compressor Station will be available to provide a third function in the form of transportation services between the various interconnected pipelines. This service will be completely unrelated to operations at the LNG Terminal.*

Second, the Sinton Compressor Station and the LNG Terminal will have completely separate operating organizations. As a result, managers and workers at one facility will not be involved in operations or maintenance at the other facility. In fact, under Federal Energy Regulatory Commission requirements, day-to-day operations of the pipeline (including the Sinton Compressor Station) and any shipper (e.g., the LNG terminal) are required to be separated and the pipeline is not allowed to give preferential treatment to one shipper over another.

Third, the production process will not be split in any way between the facilities. Unlike some LNG export facilities where certain pretreatment (removal of liquid hydrocarbons, water, carbon dioxide and sulfur compounds) is performed at a separate site, no treatment will be performed at the Sinton

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[18] *See* Letter from Richard R. Long, Director, Air Program, Region 8, to Lyn Menlove, Manager, New Source Review Section, Utah Division of Air Quality (May 21 1998) (responding to a request for guidance in defining "adjacent" for Title V and NSR source aggregation purposes).

[19] See Appendix C to the Sinton Compressor Station GHG PSD application for a separate description of operations.

Compressor Station because all such equipment and liquefaction/regasification operations will be located at the LNG Terminal.

Fourth, where natural gas from the Sinton Compressor Station moves to next in the natural gas pipeline depends on which function the station is performing. In export mode, if gas was flowing from some combination of the Tennessee, Transco, NGPL and KM Tejas interconnects, it would pass through the Sinton Compressor Station and into the LNG Terminal or the TETCO interconnect. Importantly, operation of the Sinton Compressor Station (and its associated emissions) might or might not be necessary to enable these flows, depending on the compression capacity provided by the combination of interconnects pushing gas at any given point in time. In export mode, gas may divert to the TETCO interconnect and never reach the LNG Terminal. In import mode, although gas would flow through the Sinton Compressor Station and into some combination of the Tennessee, Transco, NGPL and KM Tejas interconnects, the Sinton Compressor Station's compression capacity (and associated emissions) would not be necessary. In other words, the gas will merely pass through the station on its way to the four pipelines located in the vicinity of the station, without the need for any compression (or associated emissions) to be provided by the Sinton Compressor Station. In fact, when gas is moving only into the TETCO interconnect during import, it would not even pass through the Sinton Compressor Station, let alone require the station to provide compression capacity. Finally, if functioning to transport gas between interconnected pipelines, gas could flow through the Sinton Compressor Station in either direction and into some combination of the various interconnects, but it will never reach the LNG Terminal.

Fifth, the LNG Terminal is not solely reliant upon natural gas received from the Sinton Compressor Station. In export mode, natural gas received by the LNG Terminal would originate from some combination of the five pipelines that are planned to be interconnected to the Corpus Christi Pipeline; as discussed above, operation of the Sinton Compressor Station might or might not be needed to enable these flows. In import mode, natural gas received by the LNG Terminal would originate in the form of LNG from overseas markets and then flow into some combination of the five pipelines; operation (and associated emissions) of the Sinton Compressor Station would not be needed to enable these flows. And, if transporting gas between the interconnected pipelines, it is possible that no gas would flow into or out of the LNG Terminal but would flow between some combination of the five pipelines; operation of the Sinton Compressor Station might or might not be needed to enable these flows, but again, such flows would never reach the LNG Terminal.

Finally, both the Sinton Compressor Station and the LNG Terminal can operate without the other's support. In export mode, the LNG Terminal can operate on natural gas from the TETCO interconnect without support from the Sinton Compressor Station, and depending on the compression capacity provided by the combination of the four other interconnects pushing gas at any given point in time, operation of the Sinton Compressor Station might or might not be needed to enable these flows. In

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import mode, the LNG Terminal can operate without the support of the Sinton Compressor Station. And if transporting gas between interconnected pipelines, the Sinton Compressor Station can operate without the support of the LNG Terminal.

For all of these reasons, even assuming that the functional relationship between sources is properly considered in making the adjacency determination, the functional relationship between the Sinton Compressor Station and the LNG Terminal is not sufficient to support aggregation.

The Sinton Compressor Station and LNG Terminal Are Not Under Common Control

As noted above, federal regulations define "building, structure, facility or installation" for source determination purposes as "all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) . . . ."[20] Because control is not a defined term under the regulations, EPA has historically relied on the common meaning, citing Webster's Dictionary to define control as "to exercise restraining or directing influence over," "to have power over," "power of authority to guide or manage," and "the regulation of economic activity."[21]

EPA has identified three methods for establishing common control for purposes of source aggregation under NSR and Title V permitting rules (1) common ownership; (2) operations control; and (3) control relationship.[22] Regarding common ownership, according to EPA, common control can be established where one company is the parent company to the other, or one company owns part of the other company.[23] In the absence of common ownership, common control can be established if one entity has the power to direct the management and policies of a second entity through contractual agreement or a voting interest.[24] Finally, common control may exist in the absence of common ownership if there is a contract for service relationship or a support/dependency relationship between the two.[25]

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[20] *Id.* § 52.21(b)(6).
[21] *See* Letter from William Spratlin, Air, RCRA and Toxics Division Director, EPA Region 7, to State and Local Air Directors (September 18, 1995) ("Spratlin Letter"), available at http://www.epa.gov/region7/air/nsr/nsrmemos/control.pdf (last visited, January 14, 2013).
[22] *See* Letter from Richard R. Long, Director, Air Program, Region 8, to Julie Wrend, Air Pollution and Control Division, Colorado Department of Public Health and Environment (November 12, 1998), available at http://www.epa.gov/region7/air/nsr/nsrmemos/coorstri.pdf (last visited January 14, 2013).
[23] *See* Letter from Gregg M. Worley, Chief, Air Permits Section, EPA Region 4 to James Capp, Chief, Air Protection Branch, Environmental Protection Divison, Georgia Department of Natural Resources (December 16, 2011), available at http://www.epa.gov/region7/air/nsr/nsrmemos/ps2011.pdf (last visited January 14, 2013); *see also* Letter from Kathleen Cox, Associate Director, Office of Permits and Toxics, Air Protection Division, EPA Region 3 to Troy Breathwaite, Air Permits Manager, Virginia Dept. of Environmental Quality, Tidewater Regional Office (January 10, 2012), available at http://www.epa.gov/region7/air/nsr/nsrmemos/gpc2012.pdf (last visited January 14, 2013).
[24] Long Letter at 1.
[25] *Id.*

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In cases where common control is not obvious from common ownership or clear operational control, EPA refers to a series of factors used to establish whether common control exists between the two sources. Often referred to as the "Spratlin" factors after a 1995 letter authored by William Spratlin, then Director of the Air, RCRA and Toxics Division at EPA Region 7, this non-exhaustive list serves as a screening tool.[26] *If the source meets one or more of the following indicators of control, then one source is likely under the control of the other source or under common control by both companies and the sources will not be considered separate for permitting purposes.*

> *Do the facilities share common workforces, plant managers, security forces, corporate executive officers, or board of executives?*
>
> *Do the facilities share equipment, other property or pollution control equipment? What does the contract specify with regard to pollution control responsibilities of the contractee? Can the managing entity of facility make decisions that affect pollution control at the other facility?*
>
> *Do the facilities share common payroll activities, employee beneifts, health plans, retirement funds, insurance coverage, or other administrative functions?*
>
> *Do the facilities share intermediates, products, byproducts, or other manufacturing equipment? Can the new source purchase raw materials from a sell products or byproducts to other customers? What are the contractual arrangements for producing goods and services?*
>
> *Who accepts responsibility for compliance with air quality control requirements? What about violations of the requirements?*
>
> *What is the dependency of one facility on the other? If one shuts down, what are the limitations on the other to purse outside business interests?*
>
> *Does one operation support the operation of the other? What are the financial arrangements between the two entities?*[27]

Here, the plain meaning of the undefined and unambiguous term "control" as applied to the facts, as well as application of the Spratlin Factors supports a separate source determination.

[26] Spratlin Letter at 1-2.
[27] *Id.*

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As noted above, in assessing common control for source determination purposes, EPA has historically relied on the common meaning, citing Webster's Dictionary to define control as "to exercise restraining or directing influence over," "to have power over," "power of authority to guide or manage," and "the regulation of economic activity."[28] *Here, for the same reasons that support lack of a functional relationship between the two sources, discussed above, and based on the facts applied below to the Spratlin factors, neither source has the ability to exercise restraining or directing influence over the other source, holds power over the other source, or has the authority to guide or manage the other source.*

Although CCPL and CCL share an ultimate parent corporation – Cheniere Energy, Inc., – neither CCPL nor CCL is the parent of the other, and neither CCPL nor CCL owns any part of the other. More importantly, as noted above, because FERC requires all shippers on an open access pipeline to be treated equally, in order to meet FERC requirements, control of the Sinton Compressor Station must be kept separate from control of the LNG Terminal. As a result, even if it wanted to, the corporate parent would be unable to influence any operational or control decisions.

Accordingly, based on the plain meaning of "control" and the FERC requirements mandating separate control for the two sources, common control does not exist, and the Sinton Compressor Station and the LNG Terminal should not be aggregated for PSD permitting purposes.

In addition, application of the Spratlin factors to the sources at issue here strongly supports a separate source determination. First, the facilities do not share common workforces, plant managers, security forces or board of directors. Although there is some overlap in corporate officers, the open access status of the pipeline and the underlying FERC mandate for separate control and operation of the two facilities prevent an officer common to both entities from inappropriately influencing control over one entity by virtue of his or her position, in the same way that the common parent corporation would be unable to influence control or operation at one facility in a way that would benefit the other.

Second, the facilities do not share equipment, other property or pollution control equipment and one source has no ability to make decisions that affect pollution control at the other source. Third, the sources do not share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage or other administrative functions. Fourth, as discussed in detail above, the Sinton Compressor Station is free to enter into arrangements with other pipelines for transportation services and the LNG Terminal cannot influence the Sinton Compressor Station's ability to enter into any such arrangements. Fifth compliance with air quality control requirements and responsibility for their violation rests with each source. Sixth, as also explained in detail above under the functional

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[28] *See* Letter from William Spratlin, Air, RCRA and Toxics Division Director, EPA Region 7, to State and Local Air Directors (September 18, 1995) ("Spratlin Letter"), available at http://www.epa.gov/region7/air/nsr/nsrmemos/control.pdf (last visited, January 14, 2013).

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relationship analysis, the Sinton Compressor Station is not dependent on the LNG Terminal. Specifically, if the LNG Terminal shuts down, the Sinton Compressor Station has no limitation on its ability pursue outside business interests, such as providing transportation services to the various other pipelines. Finally, the arrangements between the two entities are dictated in large part by the FERC requirements discussed above.

For all of these reasons, the Sinton Compressor Station and the LNG Terminal are not under common control, and as a result, they should not be aggregated for air permitting purposes.

IV. Because Both Sources Trigger PSD Independently, Aggregation is Unnecessary

Practically speaking, aggregation is completely unnecessary because both the Sinton Compressor Station and the LNG Terminal are major PSD sources on their own. The only instance where aggregation matters for two sources that independently trigger PSD is where combining the emissions of a single pollutant from the two sources would result in that pollutant exceeding its significance level and requiring BACT and effects review, where it would not otherwise have if emissions from the two sources were not aggregated. Here, no such result would occur. Accordingly, aggregation of the Sinton Compressor Station and LNG Terminal at this late stage would be a pointless exercise that would serve only to delay permit issuance.

For all of these reasons, the Sinton Compressor Station and the LNG Terminal should not be aggregated for PSD permitting purposes.

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Comment 4

Being mindful of EPA's PSD and Title V Permitting Guidance for GHG dated March, 2011, of page 17 which states the following:

"The CAA and corresponding implementing regulations require that a permitting authority conduct a BACT analysis on a case-by-case basis, and the permitting authority must evaluate the amount of emissions reductions that each available emissions-reducing technology or technique would achieve, as well as the energy, environmental, economic and other costs associated with each technology or technique. Based on this assessment, the permitting authority must establish a numeric emissions limitation that reflects the maximum degree of reduction achievable for each pollutant subject to BACT through the application of the selected technology or technique. However, if the permitting authority determines that the technical or economic limitations on the application of a measurement methodology would make a numerical emissions standard infeasible for one or more pollutants, it may establish design, equipment, work practices or operational standards to satisfy the BACT requirement."

In addition to the proposed tons per year emission limit provided in the permit application, please propose output based or efficiency based limits for all GHG emission sources (e.g., lb or ton CO2/MMBtu). Please provide an analysis that substantiates any reasons for infeasibility of a numerical emission limitation. For the emission sources where numerical emission limitations are infeasible, please propose an operating work practice standard that can be practically enforceable.

Response

Based on regulatory guidance from 40 CFR 60 Part 98 Subpart C, Table C-1, CCPL proposes an emission limit of 0.058 ton CO_2/MMBtu for each of the two (2) natural gas compression turbines. To ensure proper combustion, fuel flow meters will be installed to continuously monitor and record fuel flow. Additionally, the gas turbines will be operated using good combustion practices in accordance with manufactured recommendations.

Based on EPA's PSD and Title V Permitting Guidance for GHG, metrics should focus on longer-term averages (e.g. 30- or 365-day rolling average) rather than short-term averages (e.g. 3- or 24-hr rolling averages when determining numerical emission limits. A numerical emission limitation is not feasible for the standby generator as this unit is an intermittent source that will operate on a short-term, as-needed basis during periods of maintenance and testing, not more than 100 hours per year. However, combustion control for the standby generator will be continuously maintained with good combustion practices in accordance with manufactured recommendations. In accordance with EPA guidance, the following combustion practices will be implemented as standard work practice for the standby generator:

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- *Operator Practices – Maintenance of a written site specific operating procedures manual in which operating procedures, including startup, shutdown, and malfunction are well documented in accordance with the manufacturer's specifications. The operating procedures will be updated as applicable with any equipment operating practice changes. The operating procedures manual shall be maintained in an area allowing easy access to operations personnel and made available upon request.*
- *Maintenance Knowledge – The standby generator will be maintained in accordance with manufacturer's specifications by personnel with training specific to the equipment.*
- *Maintenance Practices – Maintenance of a written site-specific procedure manual for optimum maintenance practices will be kept in accordance to the manufacturer's specifications for the standby generator. Periodic evaluations, inspections, and overhauls as appropriate of the standby generator will be conducted. The maintenance practices will be updated as applicable with any equipment or operating practice changes. The modification of these practice changes, scheduled periodic evaluations inspections and overhaul, as appropriate, and any deviations from the prescribed maintenance practices will be well documented in maintenance logs. The maintenance practices manual shall be maintained in an area allowing easy access to operations personnel and made available upon request.*
- *Fuel Quality Analysis – CCPL will burn only pipeline quality natural gas in the standby generator. Additional fuel quality analysis to determine variations in composition will be conducted as needed and in accordance with any applicable fuel handling procedures.*

US EPA ARCHIVE DOCUMENT

Comment 5

Will the proposed condensate storage tank (EPN: TK-0001) emit or have the potential to emit GHG emissions? Also, will there be GHG emissions associated with the truck loading operations (EPN: TRKLD)? If so, please supplement BACT analysis to include these storage tanks and emissions calculations.

Response

No GHG emissions are anticipated for TK-0001 or the truck loading activities located downstream of TK-0001.

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Comment 6

In Section B.4 of the permit application, it is stated that GHG BACT that the equipment associated with the project will be outfitted with the best available engineering design and with the latest available technology to ensure energy efficiency. Please provide supplemental benchmark comparison data pertaining to energy efficiency and performance of the proposed turbine and generator to similar sources in similar industries. What operating parameters will be monitored to assure proper combustion? Please provide a monitoring, recordkeeping and compliance strategy for the proposed equipment.

Response

The units selected for CCPL's Sinton Compressor Station will be designed to meet the exact operating parameters of the station and to limit inefficient operations. Per Solar's published information, the Titan 130 gas turbine for compressor and mechanical drive applications is designed to deliver a simple-cycle thermal efficiency of 36 percent. Published data for the similarly sized (approximately 21,000 horsepower) Rolls Royce Avon turbine indicates 30 percent thermal efficiency in gas compression service and 29 percent in electric generation service.

To ensure proper combustion efficiency the gas turbines will be maintained with good combustion practices in accordance with manufactured recommendations, while burning only pipeline quality natural gas. Fuel consumption for each turbine will be continuously monitored and recorded with fuel flow meters.

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Comment 7

In Appendix C "Turbine and Engine Specs", it appears as though incorrect "Predicted Emission Performance" and "Predicted Engine Performance" specification sheets were submitted for the proposed 20,794 horsepower Solar Titan 134-20502S gas turbine. Please check the application to determine whether the correct specification sheets were submitted or provide the correct specification sheets for the proposed Solar Titan turbine.

Response

*The updated manufactured specifications for the Titan 130-20302S turbines are included as **Attachment 7** to this letter.*

US EPA ARCHIVE DOCUMENT

Comment 8

In the Emissions Calculations section of the application, please provide supporting data that discusses the process simulation used and the assumptions and rationale used to calculate the emissions for each blowdown event.

Response

As the proposed facility has no operational history, the blowdown emission calculations were based upon conservative assumptions for the anticipated pipe volume using process knowledge. Each blowdown simulation was estimated for 5-, 10-, and 15-minute events. From the results of each scenario, the worst-case simulation was assumed as a conservative approach. Based on process knowledge from other existing facilities, annual blowdown emissions were estimated based on one blowdown per unit per month for each of the unit blowdown stacks and one blowdown per three months for the station discharge and station suction blowdown stacks.

The results of each blowdown simulation have been included as ***Attachment 8*** *to this letter to supplement the blowdown emission summaries provided in Section 4 of the EPA GHG application.*

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Comment 9

In the Section B.4.2.3 and B.4.3.4 of the permit application, the CO2 and CH4 BACT Analysis states that "no additional controls are being proposed for the blowdown stacks." Were any operating practices evaluated that could be utilized to reduce emissions when taking compressor off-line such as keeping compressor pressureized when off-line, connecting blowdown vent line to fuel gas system, etc.? Please provide supplemental data that discusses the feasibility of utilizing blowdown recovery for the proposed project.

Response

As a part of station design to minimize blowdown gas, CCPL has decided to utilize an additional seal gas booster system for the gas compressors at Sinton Compressor Station. This system will allow compressors to remain pressurized for longer durations once the compressor is shut down. If the unit is restarted prior to the end of the duration, no gas will be blown down. In addition, CCPL will have the capability to burn potential blow down gas as fuel, provided at least one turbine is on-line. The current state of commercially available technology and potential variability of operating conditions including compressing at varying and high ratios make complete blowdown gas recovery through compression infeasible. The combination of the two proposed systems, seal gas boost allowing compressors to remain pressurized, and burning potential blow down gas as fuel gas will mitigate and minimize GHG releases due to blowdown gas. ***Attachment 9*** *to this letter describes the BACT analysis for the blowdown stacks.*

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Comment 10

Please provide the fugitive component count, service and emission calculations.

Response

*An analysis of the estimated fugitive component count, service and emissions is included as **Attachment 10** to this letter to supplement the fugitive emissions summary provided in Section 4.0 of the EPA GHG application.*

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Response to Comments
Application Completeness Determination for Cheniere Corpus Christi Pipeline, L.P.
Greenhouse Gas Prevention of Significant Deterioration Permit
Sinton Compressor Station

ATTACHMENT 3

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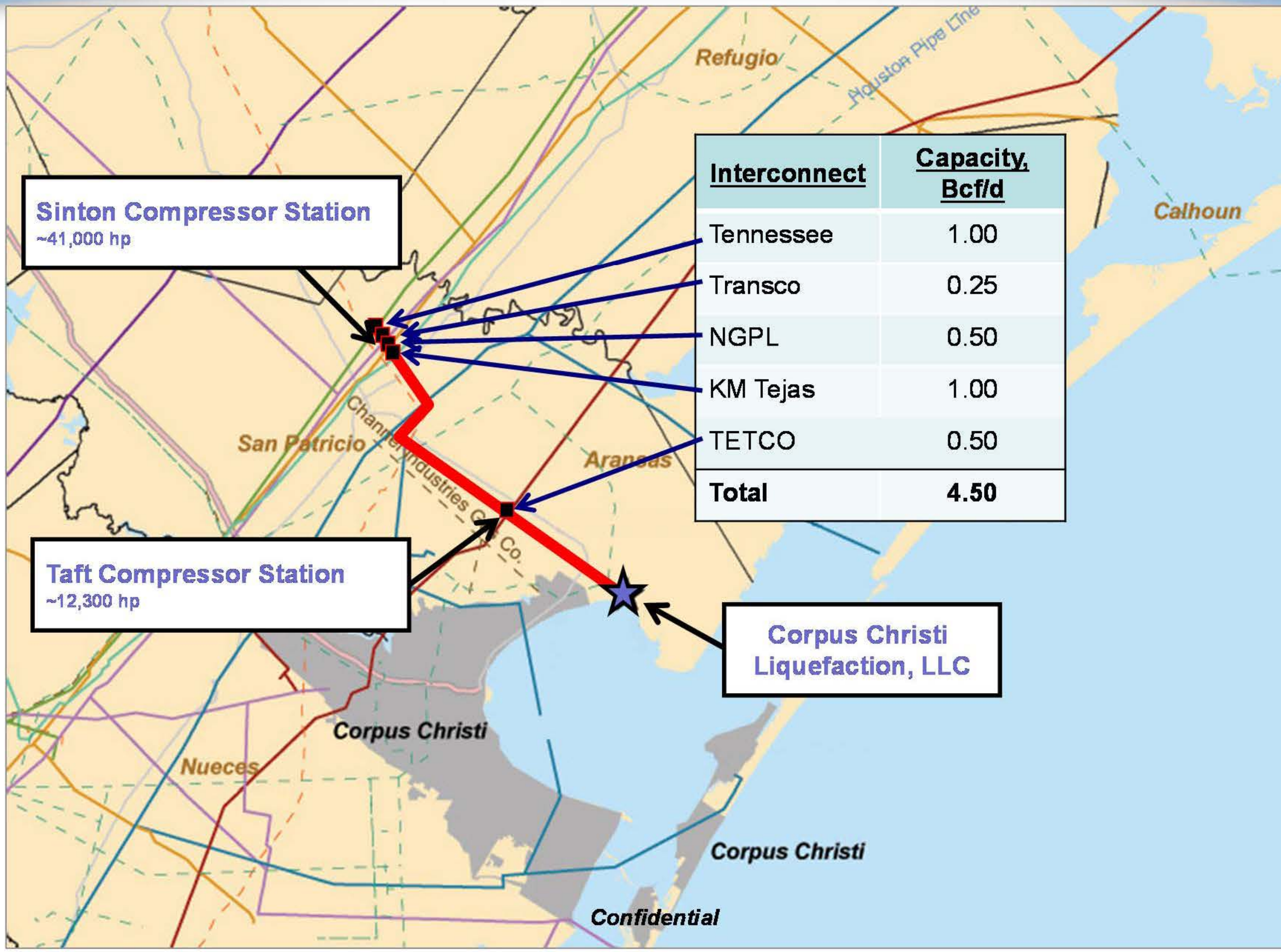
Corpus Christi Pipeline Design Details



Interconnect	Capacity, Bcf/d
Tennessee	1.00
Transco	0.25
NGPL	0.50
KM Tejas	1.00
TETCO	0.50
Total	**4.50**

CHENIERE

Response to Comments
Application Completeness Determination for Cheniere Corpus Christi Pipeline, L.P.
Greenhouse Gas Prevention of Significant Deterioration Permit
Sinton Compressor Station

ATTACHMENT 7

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Solar Turbines
A Caterpillar Company

PREDICTED EMISSION PERFORMANCE

Customer	Engine Model TITAN 130-20502S CS/MD 59F MATCH
Job ID	
Inquiry Number	Fuel Type: SD NATURAL GAS Water Injection: NO
Run By: Kevin M Frank Date Run: 6-Oct-11	Engine Emissions Data REV. 0.0

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
1 — 20794 HP 100.0% Load — Elev. 25 ft — Rel. Humidity 75.0% — Temperature 40.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	63.98	77.91	22.31
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr) (gas turbine shaft pwr)	0.94	1.15	0.33
lbm/hr	14.61	17.79	5.09
2 — 19166 HP 100.0% Load — Elev. 25 ft — Rel. Humidity 75.0% — Temperature 70.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	59.80	72.81	20.85
lbm/MMBtu (Fuel LHV)	0.099	0.121	0.035
lbm/(MW-hr) (gas turbine shaft pwr)	0.96	1.16	0.33
lbm/hr	13.65	16.62	4.76
3 — 16249 HP 100.0% Load — Elev. 25 ft — Rel. Humidity 75.0% — Temperature 100.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	53.28	64.88	18.58
lbm/MMBtu (Fuel LHV)	0.097	0.118	0.034
lbm/(MW-hr) (gas turbine shaft pwr)	1.00	1.22	0.35
lbm/hr	12.17	14.81	4.24

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst case" anticipated operating conditions specific to the application and the site conditions. Worst case for one pollutant is not necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than 0 deg F, and between 50% and 100% load for gas fuel, and between 65% and 100% load for liquid fuel (except for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available for greater than 0 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based on the attached fuel composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine operation outside typical warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and formaldehyde.
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) meet the above values within the tolerances quoted. Pricing and schedule impact will be provided upon request.
6. Any emissions warranty is applicable only for steady-state conditions and does not apply during start-up, shut-down, malfunction, or transient event.

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Solar Turbines

A Caterpillar Company

PREDICTED EMISSION PERFORMANCE

Customer		Engine Model	TITAN 130-20502S CS/MD 59F MATCH
Job ID			
Inquiry Number		Fuel Type: SD NATURAL GAS	Water Injection: NO
Run By: Kevin M Frank	Date Run: 6-Oct-11	Engine Emissions Data	REV. 0.0

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
1 — 20794 HP 100.0% Load, Elev. 25 ft, Rel. Humidity 75.0%, Temperature 40.0 Deg. F			
PPMvd at 15% O2	15.00	25.00	25.00
ton/yr	38.39	38.95	22.31
lbm/MMBtu (Fuel LHV)	0.060	0.061	0.035
lbm/(MW-hr) (gas turbine shaft pwr)	0.57	0.57	0.33
lbm/hr	8.76	8.89	5.09
2 — 19166 HP 100.0% Load, Elev. 25 ft, Rel. Humidity 75.0%, Temperature 70.0 Deg. F			
PPMvd at 15% O2	15.00	25.00	25.00
ton/yr	35.88	36.40	20.85
lbm/MMBtu (Fuel LHV)	0.059	0.060	0.035
lbm/(MW-hr) (gas turbine shaft pwr)	0.57	0.58	0.33
lbm/hr	8.19	8.31	4.76
3 — 16249 HP 100.0% Load, Elev. 25 ft, Rel. Humidity 75.0%, Temperature 100.0 Deg. F			
PPMvd at 15% O2	15.00	25.00	25.00
ton/yr	31.97	32.44	18.58
lbm/MMBtu (Fuel LHV)	0.058	0.059	0.034
lbm/(MW-hr) (gas turbine shaft pwr)	0.60	0.61	0.35
lbm/hr	7.30	7.41	4.24

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst case" anticipated operating conditions specific to the application and the site conditions. Worst case for one pollutant is not necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than 0 deg F, and between 50% and 100% load for gas fuel, and between 65% and 100% load for liquid fuel (except for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available for greater than 0 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based on the attached fuel composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine operation outside typical warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and formaldehyde.
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) meet the above values within the tolerances quoted. Pricing and schedule impact will be provided upon request.
6. Any emissions warranty is applicable only for steady-state conditions and does not apply during start-up, shut-down, malfunction, or transient event.

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Solar Turbines
A Caterpillar Company

PREDICTED ENGINE PERFORMANCE

Customer	
Job ID	
Run By: Kevin M Frank	Date Run: 6-Oct-11
Engine Performance Code: REV. 3.53	Engine Performance Data: REV. 1.1

Model	TITAN 130-20502S
Package Type	CS/MD
Match	59F MATCH
Fuel System	GAS
Fuel Type	SD NATURAL GAS

DATA FOR NOMINAL PERFORMANCE

Elevation	feet	25
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	4.0

		1	2	3
Engine Inlet Temperature	deg F	40.0	70.0	100.0
Relative Humidity	%	75.0	75.0	75.0
Driven Equipment Speed	RPM	8342	8294	8029
Specified Load	HP	FULL	FULL	FULL
Net Output Power	HP	20794	19166	16249
Fuel Flow	mmBtu/hr	146.36	137.84	125.21
Heat Rate	Btu/HP-hr	7039	7192	7706
Therm Eff	%	36.149	35.379	33.020
Engine Exhaust Flow	lbm/hr	407162	380087	338745
PT Exit Temperature	deg F	917	953	992
Exhaust Temperature	deg F	917	953	992

Fuel Gas Composition (Volume Percent)

Methane (CH4)	92.79
Ethane (C2H6)	4.16
Propane (C3H8)	0.84
N-Butane (C4H10)	0.18
N-Pentane (C5H12)	0.04
Hexane (C6H14)	0.04
Carbon Dioxide (CO2)	0.44
Hydrogen Sulfide (H2S)	0.0001
Nitrogen (N2)	1.51

Fuel Gas Properties

LHV (Btu/Scf)	939.2	Specific Gravity	0.5970	Wobbe Index at 60F	1215.6

This performance was calculated with a basic inlet and exhaust system. Special equipment such as low noise silencers, special filters, heat recovery systems or cooling devices will affect engine performance. Performance shown is "Expected" performance at the pressure drops stated, not guaranteed.

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Compression Requirements

	Suct Psig	Disch Psig	Ts F	Td	Flow MMSCFD	Ambient Temp F	Compressor Power HP	Turbine	Comp
MP 94-1	750	1180	60	127	500	40	11076	T130	C51-4
	850	1320	75	142	700	100	15925	**T130**	
	850	1210	60	114	750	40	13569	T130	
	850	1370	75	147	500	100	12088	T130	
	850	1180	60	109	600	40	9543	T130	
	850	1120	60	111	1000	40	18321	**T130**	
MP 94-2	750	1370	75	166	500	100	15574	**T130**	C51-4a
	750	1210	60	137	750	40	19763	**T130**	
	750	1180	60	127	500	40	11159	T130	
	750	1320	75	160	500	100	14556	T130	
	750	1180	60	127	400	40	8770	T130	
MP-76	825	1100	60	102	200	40	2768	C50	C40-2
	825	1160	60	111	500	40			
					2x250		4162	C50	
	825	1300	75	145	200	100	4556	C50	
	775	1000	60	104	750	40			
					3x250	40	3394	C50	
					2x375	40	5749	**C50**	
MP-16	875	980	60	77	300	40	1706	C50	C40-2a
	875	1210	75	123	300	100	4840	**C50**	
	875	1190	75	121	200	100	3071	C50	

Titan 130	Ambient	Power HP	Cent 50	Amb	Power
	40	20794		40	6387
	70	19166		70	5832
	100	16249		100	4959

Power figures are Nominal +/- 3%

Solar Turbines Incorporated (herein "Seller") is based in San Diego, California, with subsidiary and affiliated company offices located throughout the world. **These Terms and Conditions of Sale are issued in connection with a written offer, such as a sales proposal, (hereinafter "offer") by Seller to supply certain goods (and incidental services) to Buyer. Unless otherwise specifically stated in the offer, these Terms and Conditions of Sale establish the rights, obligations and remedies of Seller and Buyer that apply to the offer and any resulting Order (as defined in Article 1 below).**

1. ACCEPTANCE. The issuance of a purchase order document against the offer shall constitute an acceptance of the offer and not a counteroffer and shall create a contract of sale (herein "Order"). Provisions contained in purchase order documents issued against the offer that materially modify, add to, or change the provisions of the offer shall not be a part of the Order unless expressly agreed by Seller in Seller's written acknowledgement.

2. MODIFICATIONS/CHANGES. Requests by Buyer for any modifications or changes to the Order, including, without limitation, changes in specifications, quantities, delivery obligations and terms of payment, must be made in writing. All such requests are subject to Seller's written acceptance and may result in adjustments to price and/or delivery schedules.

3. PRICES AND PAYMENTS.

3.1 Prices. Unless otherwise specifically stated in the offer, all prices are in U.S. dollars and are valid for a period of thirty (30) days from the date of the offer. Prices do not include sales, use or excise taxes, import or export duties, special financing fees, value added taxes, income or royalty taxes, consular fees, special permits or licenses or similar charges (collectively, "taxes") (however, Seller shall be responsible for its own corporate income taxes and taxes related to its employees' work hereunder). Buyer shall either pay any and all such taxes and charges or Buyer shall provide Seller with acceptable exemption certificates. If Buyer fails to provide such certificates at least sixty (60) days prior to the scheduled ready to ship date, Seller shall provide Buyer proof that such taxes were paid, and it shall be Buyer's duty to recover such taxes. All prices are based on delivery in accordance with the delivery term specified in the offer, and do not include any charges for services such as preservation packaging, insurance, brokerage fees, marine survey, load out and tie down, site installation, or equipment start-up, unless such delivery term provides for such services under Incoterms 2000, or as otherwise agreed in writing by Seller.

3.2 Invoicing/Payment. Seller will submit invoices to Buyer according to the payment schedule stated in the offer, or as otherwise expressly agreed by Seller in writing. Unless otherwise specifically stated in the offer or expressly agreed by Seller in writing: (i) Seller may split invoice for units that are shipped individually when such units are separately priced in the Order; (ii) all payments shall be made in U.S. dollars; (iii) at Seller's option, all payments shall be made by commercial letter of credit acceptable to Seller or made by wire transfer prior to shipment. Open account terms are subject to Seller's credit review and approval. In the event that open account payment is approved by Seller, all payments shall be due net thirty (30) days from the date of Seller's invoice (provided, however, that Seller may at any time and in its sole discretion grant or cancel Buyer's open account payment terms). If Buyer fails to meet its payment obligations, Seller may discontinue manufacture and/or delivery of goods and treat such as a material breach by Buyer entitling Seller to the cancellation charges in Article 9. Any invoice amount not paid when due shall be subject to a late payment charge equal to one and one-half percent (1.5%) of the delinquent amount per month or the maximum amount permitted by law, whichever is less, prorated on a daily basis for each day that such amount remains unpaid.

3.3 Security Interest. Buyer grants Seller a security interest in all goods identified to or delivered under the Order until payment of the total Order price is received. Buyer shall, at the request of Seller, execute and deliver to Seller any instruments (including Uniform Commercial Code Financing Statements) that Seller may deem necessary to protect its security interest in the goods.

4. TITLE & RISK OF LOSS. Seller warrants title to all goods hereunder, and its transfer of ownership is rightful and free from any security interest or other lien or encumbrance of third parties. Unless otherwise expressly agreed in writing by Seller, title and risk of loss to the goods (or, in the case of partial or split shipments, the applicable items) shall pass to the Buyer when such goods or items are delivered in accordance with the applicable delivery term. Partial shipments of minor components and/or split shipments of multiple units are allowed. Claims for damages or shortages attributable to Seller must be in writing and received by Seller within thirty (30) days after receipt of goods, and must be accompanied by Seller's packing slip and full particulars of any such claim.

5. TESTS/INSPECTION. Buyer may observe Seller's normal factory inspections and test of the goods, as well as tests specifically stated in the Order, on a non-interference basis at times scheduled for Seller's convenience and subject to Seller's standard security procedures. Special tests and inspections may be arranged at Buyer's written request, upon acknowledgement from Seller and adjustment of the price. Buyer may inspect the goods and any unit and review all test results and documentation prior to shipment and, unless good cause for rejection is shown, the goods and any unit thereof shall be deemed accepted upon satisfactory completion of such factory tests and readiness for shipment.

6. WARRANTY.

6.1 Goods. Except as otherwise specified below, Seller warrants the goods during the Warranty Period (as defined below), on a unit-by-unit basis, to be free from defects in workmanship and material used in their manufacture. The "Warranty Period" commences upon the delivery of the goods, on a unit-by-unit basis, in accordance with the applicable delivery term, and expires on the earlier of: (i) the date which is eighteen (18) months after readiness of the unit for shipment; or (ii) the date which is twelve (12) months after the unit is first placed into service, or would be capable of being placed into service but for any cause beyond the reasonable control of Seller (e.g., lack of fuel supply). The foregoing warranty coverage shall be subject to the following conditions, qualifications, remedies and exclusions:

a. A warranty claim, substantially in accordance with Seller's warranty claim procedures, is submitted to Seller in writing promptly upon discovery of the claimed defect;

b. The goods are stored, installed, operated and maintained in accordance with good engineering practices and any applicable industry standards, and Seller's recommended procedures and specifications (including, without limitation, the applicable operation and maintenance manual(s) for the unit(s) and any applicable fuel, air, water, packaging or preservation specifications or recommendations communicated or otherwise made available to Buyer in writing);

c. Any defective part(s) of the goods are promptly returned to Seller in accordance with Seller's standard warranty claim instructions, transportation charges prepaid;

d. Examination of such part(s) by Seller confirms the existence of a defect within the Warranty Period;

e. Seller's obligations under this warranty are limited to repair or replacement of the confirmed defective part(s), as Seller elects, free of charge at Seller's place of business or repair center; and excluding freight and site labor costs to remove, repair or replace such part(s). All replacement parts and repaired parts are warranted through, but not beyond, the original Warranty Period;

f. The above warranty shall not apply to or include: (i) normal maintenance services or adjustments; (ii) the removal or reinstallation of warranted goods or the costs associated therewith; (iii) any goods that have been repaired or altered, other than by Seller, in any way so as to adversely affect their operation or reliability in Seller's judgment; or (iv) the effects of corrosion, erosion, degradation, wear and tear, or failure occasioned by operation, condition of service more severe than specified in the Order or otherwise not in accordance with Seller's written recommendations; and

g. Construction works, fabrications, major off-package accessories, ancillary equipment, and driven equipment not of Seller's manufacture are warranted only to the extent of the original manufacturer's or supplier's warranty, copies of which shall be made available upon request.

6.2 Service Activities. Except as otherwise specified below, Seller warrants the onsite service activities performed or provided by Seller in connection with the supply of the goods, including, without limitation, inspection, start-up, technical representation, erection, installation, commissioning supervision, construction, or other services provided by the Seller under the Order

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("Services") will be performed in a workmanlike manner. The foregoing warranty coverage shall be subject to the following conditions, qualifications, remedies and exclusions:

a. The Services are warranted for thirty (30) days from the date the applicable Services are furnished.

b. All claims for defective Services under this warranty must be made in writing immediately upon discovery, but in any event no later than thirty (30) days from the date the Services are furnished. Upon submission and substantiation of a claim, Seller shall, at its option, either: (i) correct the defective services; or (ii) refund an equitable portion of the price of the Services.

6.3 Additional Qualifications and Limitations to Warranty.

a. Seller warrants that the goods and any Services will conform only to those national, federal, state or local laws, ordinances, regulations, codes and standards, as specifically stated in the offer or agreed to in writing by Seller.

b. THE ABOVE WARRANTIES ARE IN LIEU OF ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, all other representations to the original Buyer, and all other obligations or liabilities, including liability for incidental or consequential damages. No person is authorized to give any other warranties or to assume any other liability on Seller's behalf unless agreed to in writing by Seller.

c. Seller's sole liability and responsibility, and Buyer's sole and exclusive remedy, with respect to any and all warranties shall be limited to the respective remedies set forth above. All such remedies will be subject to the limitations of Article 14 below.

7. EXCUSABLE DELAY. Seller shall not be liable for any delay in performance, any nonperformance, or any other deviation in performance of Seller's obligations, nor for any loss or damage to the goods supplied hereunder, when occasioned directly or indirectly by any cause or causes beyond the reasonable control of Seller or its subcontractors or suppliers, including, but not limited to, acts of God; acts of criminals or public enemy; war; riot; official or unofficial acts, orders, regulations or restrictions of any foreign or domestic government or agency thereof; acts of Buyer or its employees or representatives; strikes or labor difficulties involving employees of Seller or any other party; failure, shortage or delay in Seller's usual sources of labor or material supply. Seller shall have a reasonable extension of the time for performance when delayed by any such cause.

8. SUSPENSION OR DELAY.

8.1 Buyer's request for suspension of the Order or a delay in shipment/delivery ("Buyer delay") must be provided in writing to Seller, and is not effective until acknowledged in writing by Seller. Notwithstanding the foregoing, Buyer actions or inactions that effectively prevent Seller's progress shall be deemed a Buyer delay. A Buyer delay may result in adjustments to prices, payments, delivery terms, and delivery schedules. The time required for subsequent completion of the Order may exceed the number of days of delay due to Seller's scheduling constraints. If the cumulative duration of any and all Buyer delays exceeds sixty (60) days, then the Order shall be deemed terminated by the Buyer, and Seller shall be entitled to cancellation charges as set forth in Article 9.

8.2 In the event: (i) a Buyer delay occurs sixty (60) or fewer days prior to the scheduled readiness to ship date; (ii) a Buyer delay occurs at a point where production/fabrication has proceeded to the point that Seller determines that it cannot reasonably reschedule completion, or (iii) Seller reasonably determines that the goods will be ready for delivery in accordance with the applicable delivery term/location but Buyer will be unable or unwilling to take possession (e.g., when a job site is not ready for delivery due to no fault of Seller); then the Order shall be completed and the provisions in 8.2.a and 8.2.b shall apply.

a. Buyer shall have the right to designate an alternative delivery location. If Buyer fails to identify an alternative delivery location within fourteen (14) days after the notice of readiness to ship, then Seller shall be entitled to deliver the goods to a storage facility designated by Seller. Upon Seller's notice to Buyer thereof, the delivery location (and the delivery term, if applicable) will be modified accordingly, and the Order price will be adjusted to the extent necessary to account for any difference in applicable freight or other charges resulting from the modified delivery location/term.

b. Upon delivery of the goods in accordance with the modified delivery location/term: (i) title and risk of loss to the goods shall transfer to Buyer; (ii) Buyer shall be solely responsible for arranging and paying for storing the goods, subsequent loading, unloading, transportation and insuring the goods directly with the third parties providing such services; and (iii) the payment milestones shall be automatically modified to allow Seller to invoice Buyer for any remaining portion of the Order price, which shall be due and payable in accordance with the invoice.

9. TERMINATION/CANCELLATION. In the event of termination or cancellation of the Order by Buyer (other than due to a material breach by Seller), or termination by Seller due to a material breach by Buyer, Buyer shall pay Seller cancellation charges in accordance with the following cancellation schedule.

TERMINATION/CANCELLATION SCHEDULE

CALENDAR DAYS FROM	CALENDAR DAYS TO	CANCELLATION CHARGE (STRAIGHT LINE % OF ORDER PRICE)
Order	15 ARO	5
16 ARO	30 ARO	5-10
31 ARO	60 ARO	10-20
61 ARO	91 before RTS	20-70
90 before RTS	on or after RTS	70-90

ARO: after receipt of Order or other authorization to proceed with manufacturing (e.g., letter of commitment)
RTS: scheduled ready to ship date

All construction works, fabrications, major off-package accessories, and ancillary equipment to be supplied, and engineering, installation and construction work to be performed by Seller, as separately priced in the Order, shall be subject to termination charges of twenty-five percent (25%) over and above Seller's total costs, including costs associated with termination of subcontracts and purchase orders, and for any disposition of such goods/work.

In no event shall the cancellation charge exceed the Order price, and any payments made by Buyer up to the date of termination shall be credited against the applicable cancellation charge. The parties agree that the cancellation charges identified above are a fair and reasonable estimation of the damages to be incurred by Seller as a result of any such cancellation/termination, and are not intended to be compensation or consideration for any goods. Accordingly, upon any such cancellation or termination, Seller shall retain all goods, in whatever stage of completion.

10. PATENT INFRINGEMENT. Seller will defend, indemnify and hold Buyer harmless from any claim that the goods infringe upon a third party's rights in a registered United States patent or trademark, provided (i) Buyer promptly notifies Seller in writing of any such claim, (ii) Buyer gives Seller the sole right to defend, settle and control the defense of the suit or proceeding, (iii) Buyer provides all necessary information and assistance for such defense or settlement, and (iv) Buyer takes no position that is material and adverse to Seller's defense of such claim. In the event Seller is obligated to defend such suit or proceeding, Seller will pay costs and damages finally awarded or agreed upon by Seller that are directly related thereto. Seller may, at Seller's own discretion and expense: (i) procure for Buyer the right to continue using the goods, (ii) replace the goods with non-infringing goods, or (iii) modify the goods to make them non-infringing. Seller will have no liability or obligation to defend if the claim, suit or proceeding is based on or arises out of a configuration, modification or change to the goods that is made, specified or requested by Buyer. The foregoing indemnity constitutes Seller's sole responsibility for infringement claims. Notwithstanding the above, Buyer agrees to defend, indemnify and hold Seller harmless from any claim of infringement for goods designed or manufactured to Buyer's specifications if such design, manufacture or specification constitutes the basis for such actual or alleged infringement claim.

11. RIGHTS TO DRAWINGS AND DATA. All engineering designs, data, and specifications ("Technical Information") delivered to Buyer are proprietary and shall (a) only be used by Buyer for goods sold as part of this Order and, (b) not be disclosed or reused without Seller's prior written consent. Seller grants Buyer a royalty free, non-exclusive license to use the Technical Information that is specifically identified and purchased as a part of the Order for Buyer's internal business purposes, including the right to share such Technical Information with Buyer's contractors and their subcontractors for the sole purpose of providing services to Buyer (and no other purpose), but only if such contractors and their subcontractors execute confidentiality agreements that are acceptable to Seller; provided, however, that Seller assumes no responsibility for such use. Notwithstanding the above, Buyer and its contractors and their subcontractors shall not use any Technical Information for commercial purposes of any kind. Any right granted herein shall be non-transferable except that Buyer may transfer such right to any successor owner or operator of the goods sold by Seller in this Order.

US EPA ARCHIVE DOCUMENT

12. ASSIGNMENTS. Seller shall have the right to assign any rights or obligations under the Order to any of its affiliated or subsidiary companies. Any assignment of Buyer's rights or obligations under the Order shall be null and void unless Seller consents in writing.

13. ON-SITE ACTIVITY. In the event the Order calls for any Services to be performed on-site, the following conditions shall apply in addition to the conditions specified in Seller's Customer Services Rate Sheet:

13.1 Buyer Assistance. Buyer shall provide such assistance as Seller may reasonably require to facilitate timely completion of the Order. If Seller is unable to perform through no fault of its own or as a result of Buyer's failure to cooperate or provide assistance, Seller shall be excused from performance. In such event, Seller may, at its option, terminate the Order in accordance with Article 9, or continue to perform to the extent possible and shall be entitled to an equitable adjustment in the Order price and/or schedule. Buyer assistance shall be free of charge and include but shall not be limited to, the following:

a. Buyer shall provide reasonable security and protection for all persons, property and equipment employed or used by Seller in the performance of the Order.

b. Buyer shall make available to Seller the use of any required utilities, including electrical power, transport and water.

c. Buyer shall assist Seller in obtaining access to roads, railways, pumping stations, power lines, pipelines, canals, and the like necessary in the performance of the Order.

d. Buyer shall provide Seller with fuels and lubricants in sufficient quantity and quality to meet the requirements of each phase of the Order.

e. Buyer shall assist Seller in obtaining any permits, licenses, or authorizations necessary to complete the Order and Buyer shall be responsible for obtaining all environmental permits including without limitation, air permits, permits to construct and/or operate and those relating to land use.

f. Buyer shall provide Seller with safe access to the goods as may be necessary to perform services in accordance with the Order.

g. In the event Seller's agents, subcontractors, employees or other representatives have to perform work outside the United States, Buyer shall provide assistance to facilitate their entry, movement within or exit from any country where performance is rendered, including assisting Seller in obtaining necessary residence and work permits. Buyer shall be responsible for the payment of any applicable income taxes or other employee fees or taxes.

h. In the event Seller's agents, subcontractors, employees or other representatives have to perform any portion of the Order at a remote site or in offshore waters in the United States, Buyer shall provide the following in accordance with accepted international industry standards and norms and at no cost to Seller: (i) all transportation for such persons from an agreed staging point to and from the site; (ii) all messing, housing, sanitation facilities, and emergency medical care; and (iii) all transportation and necessary special handling equipment to move Seller's goods, tools, and equipment from an agreed staging point to and from the site.

13.2 Differing Site Conditions. If Seller, in the course of performing the Order discovers (i) subsurface or latent physical conditions at the site differing materially from those indicated in the Order, or (ii) unknown physical conditions at the site, of any unusual nature, differing materially from those ordinarily encountered in the work of the character provided for in the Order, then Seller shall inform Buyer and Buyer shall promptly investigate the conditions. If the conditions do so differ and cause an increase in Seller's cost of or time for performance of any part of the work under the Order, whether or not changed as a result of such conditions, an equitable adjustment in the Order price and/or schedule shall be made and the Order shall be modified accordingly.

13.3 Independent Contractor. At all times while performing the Order, Seller shall be deemed to be an INDEPENDENT CONTRACTOR and not an employee or agent of Buyer. Equipment operators and other Buyer employees, agents, subcontractors, or servants assigned to assist Seller may receive temporary instructions, directions, or control from Seller but shall, at all times, be considered the employees, agents, subcontractors, or servants of Buyer and not of Seller.

14. LIMIT OF LIABILITY.

14.1 Neither Buyer nor Seller or their affiliates, subcontractors, agents and/or employees shall be liable for any special, indirect, punitive, exemplary, incidental, or consequential loss or damages of any nature (including, but not limited to, loss of use, loss of profit, losses resulting from or related to downtime of the goods or the cost of replacement power or compression), howsoever caused and whether based on warranty, contract, tort (including negligence) strict liability or any other theory of the law.

14.2 The total liability of Seller, its affiliates, subcontractors, agents and employees arising out of the performance or nonperformance of the Order or any of its obligations (including, without limitation, obligations in connection with the design, manufacture, sale, delivery, storage, erection or use of the goods or the rendition of any work or other services in connection therewith), whether based on warranty, contract, tort (including negligence), strict liability or any other theory of the law, shall not exceed in the aggregate a sum equal to one times the Order price of the discrete unit involved in the applicable claim.

14.3 The limitations of liability set forth in this Article 14 shall prevail over any conflicting or inconsistent provisions contained in any documents comprising the Order.

15. REGULATORY COMPLIANCE/APPLICATION RESTRICTIONS. Buyer shall comply with all applicable laws and regulations related to the purchase of the goods and services under the Order including but not limited to, safety and environmental regulations, technical standards, and all applicable U.S. laws and regulations pertaining to any exportation of the goods (e.g., the United States Export Administration Act and the rules and regulations issued thereunder). Further, Buyer shall not use or operate the goods in a manner other than that intended in Seller's offering without Seller's prior written consent. The goods shall not be exported, re-exported or transshipped contrary to United States law. When Buyer is the exporter of record, it is Buyer's responsibility to acquire any required export license, to submit any required export declaration, and to provide any documentation required in connection with the export of the goods from the United States. Seller will assist in the supply of information required in the application process. Seller shall have no responsibility to review and confirm Buyer's compliance with any applicable laws and regulations relating to exports from the United States, and shall not be liable for any delays in delivery or suspensions in performance resulting directly or indirectly from the inability, due to causes beyond Seller's reasonable control, to obtain on a timely basis any necessary or applicable government authorizations (e.g., export licenses).

16. DISPUTES/APPLICABLE LAW. Buyer and Seller shall use their best efforts to resolve any dispute or claim that may arise under the Order in an amicable manner. Except for Seller's claims for non-payment by Buyer hereunder, in the event either party believes the other party is in breach of or is noncompliant with any of the provisions of the Order, such party shall promptly notify the other in writing of such claim and the receiving party shall take reasonable measures to remedy such breach or noncompliance within thirty (30) days after receipt of notice. If the dispute is not resolved within such time, then the party initiating the claim shall demand a meeting of the parties, which meeting shall be held promptly in San Diego, California, unless the parties otherwise agree. Persons attending such meeting shall have decision-making authority regarding the dispute to attempt, in good faith, to negotiate a resolution of the dispute. The parties agree to participate in such negotiations and, if agreeable, mediation related thereto, for a period of thirty (30) days. If the parties are not successful in resolving the dispute through the negotiations, or mediation, if used, then the parties may seek an adjudicated resolution through the appropriate court. Should any provision of the Order be declared invalid, such declaration shall not invalidate or void the remaining provisions of the Order. The Order, having a reasonable relationship to the State of California, shall be governed by the laws of the State of California, without regard to conflict of law principles.

US EPA ARCHIVE DOCUMENT

Response to Comments
Application Completeness Determination for Cheniere Corpus Christi Pipeline, L.P.
Greenhouse Gas Prevention of Significant Deterioration Permit
Sinton Compressor Station

ATTACHMENT 8

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

BLOW DOWN SYSTEM CALCULATIONS

PIPE VOLUME CALCULATIONS

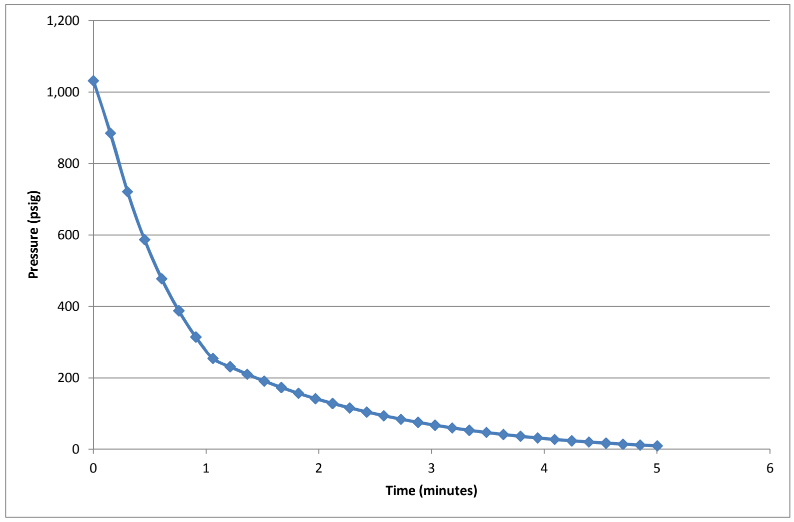
ECTION: COMPRESSOR UNIT A | **BDV TAG:**

Section	Description	Line Number	NPS (in)	Piping Class	Sch / BWG	OD(in)	ID(in)	WT(in)	Length (ft)	Transv Sect Area (ft2)	Cylinder Volume (ft3)	Heads Volume (ft3)	Volume (ft3)	Normal Volume (ft3)	Press (psig)	Temp (°F)	Pseudo-reduced Press	Pseudo-reduced Temp	Z Factor	Moles (lbmol)	Temp x Moles
Comp Suction	Piping		36"	D	40	36.000	34.500	0.750	100	6.492	649.181		649	30770	750	80	1.129	1.551	0.908	94	50964
Comp Discharge	Piping		30"	D	STD	30.000	29.250	0.375	200	4.666	933.274		933	61201	1200	160	1.793	1.780	0.920	185	114792
Cooler Inlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1610	1200	160	1.793	1.780	0.920	5	3019
Cooler Inlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1610	1200	160	1.793	1.780	0.920	5	3019
Cooler Outlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1720	1200	120	1.793	1.666	0.893	5	3112
Cooler Outlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1720	1200	120	1.793	1.666	0.893	5	3112
Cooler Discharge	Piping		30"	D	STD	30.000	29.250	0.375	50	4.666	233.318		233	16355	1200	120	1.793	1.666	0.893	51	29582
Compressor Bypass	Piping		24"	D	40	24.000	22.624	0.688	125	2.792	348.960		349	24462	1200	120	1.793	1.666	0.893	76	44245
Compressor Bypass	Piping		24"	D	40	24.000	22.624	0.688	125	2.792	348.960		349	16540	750	80	1.129	1.551	0.908	51	27395
Cooler	Tubing	Tubes	1"		14	1.000	0.834	0.083	9000	0.004	34.143		34	2239	1200	160	1.793	1.780	0.920	7	4200
Cooler	Tubing	Tubes	1"		14	1.000	0.834	0.083	9000	0.004	34.143		34	2239	1200	160	1.793	1.780	0.920	7	4200
													2680	160466			**Total**			491	287640

T Average	°F	125.15
P Average	psig	1,032.00
Std Vol	SCF	186,500.28
Molecular Weight	lb/lbmol	16.70
Pseudo Critical Pressure	psia	677.6
Pseudo Critical Temperature	°R	348.3

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		2.674	2.674
Choke Area	in2	5.616	
Inlet Pipe OD	in	8"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	7.981	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.335	
Settleout Z		0.948	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		34.621	
Time Increment, seconds		9.091	
Critical Ratio, Pcrt		0.052	
Expansion Factor, Fcr		1.314	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		2,680.155	
Mole to Blowdown, LB-Moles		491.437	
Settleout Pressure, psig		1,032.003	
Ave. Settleout Temp., deg R/deg F		585.303	°R / 125°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1032.00	1032.0	0.014	12906400	491.437	-	
0.15	9	885.40	885.4	0.016	11098744	405.556	85.9	85.9
0.30	18	721.49	721.5	0.020	9077632	331.703	73.9	159.7
0.45	27	587.43	587.4	0.024	7424571	271.299	60.4	220.1
0.61	36	477.78	477.8	0.030	6072536	221.895	49.4	269.5
0.76	45	388.10	388.1	0.036	4966711	181.487	40.4	309.9
0.91	55	314.75	314.7	0.045	4062259	148.438	33.0	343.0
1.06	64	254.75	254.8	0.055	1560661	121.407	27.0	370.0
1.21	73	231.71	231.7	0.060	1430585	111.022	10.4	380.4
1.36	82	210.58	210.6	0.065	1311260	101.503	9.5	389.9
1.52	91	191.21	191.2	0.071	1201788	92.777	8.7	398.7
1.67	100	173.46	173.5	0.078	1101348	84.780	8.0	406.7
1.82	109	157.20	157.2	0.086	1009183	77.452	7.3	414.0
1.97	118	142.29	142.3	0.094	924601	70.737	6.7	420.7
2.12	127	128.64	128.6	0.103	846968	64.584	6.2	426.9
2.27	136	116.13	116.1	0.112	775699	58.948	5.6	432.5
2.42	145	104.68	104.7	0.123	710259	53.787	5.2	437.7
2.58	155	94.19	94.2	0.135	650156	49.060	4.7	442.4
2.73	164	84.58	84.6	0.148	594938	44.734	4.3	446.7
2.88	173	75.80	75.8	0.162	544190	40.775	4.0	450.7
3.03	182	67.76	67.8	0.178	497532	37.154	3.6	454.3
3.18	191	60.41	60.4	0.196	454611	33.844	3.3	457.6
3.33	200	53.70	53.7	0.215	415106	30.819	3.0	460.6
3.48	209	47.57	47.6	0.236	378719	28.056	2.8	463.4
3.64	218	41.98	42.0	0.259	345176	25.536	2.5	465.9
3.79	227	36.88	36.9	0.285	314225	23.239	2.3	468.2
3.94	236	32.24	32.2	0.313	285633	21.149	2.1	470.3
4.09	245	28.02	28.0	0.344	259184	19.248	1.9	472.2
4.24	255	24.19	24.2	0.378	234678	17.523	1.7	473.9
4.39	264	20.73	20.7	0.415	211930	15.962	1.6	475.5
4.55	273	17.60	17.6	0.455	190766	14.551	1.4	476.9
4.70	282	14.78	14.8	0.499	171025	13.282	1.3	478.2
4.85	291	12.25	12.3	0.545	152554	12.144	1.1	479.3
5.00	300	10.00	10.0	0.595	135210	11.129	1.0	480.3

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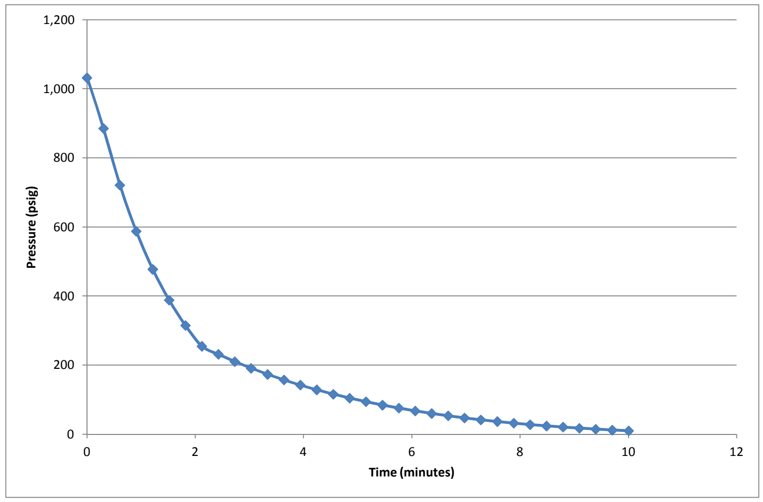
BLOWDOWN CALCULATIONS

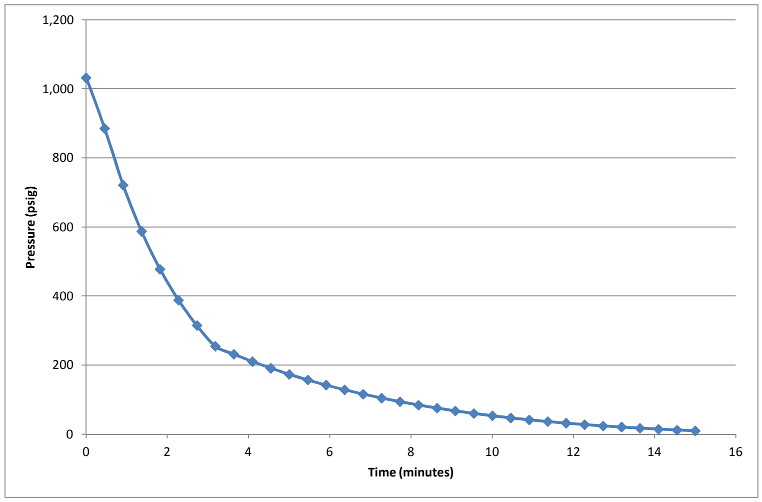
Reference Data		**Initial**	**Change**
Orifice Diameter, Inches		**1.891**	1.891
Choke Area	in2	2.808	
Inlet Pipe OD	in	**8"**	
Inlet Pipe Class		**D**	
Schedule		**40**	
Inlet Pipe ID	in	7.981	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.237	
Settleout Z		0.948	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		34.621	
Time Increment, seconds		**18.182**	
Critical Ratio, Pcrt		0.052	
Expansion Factor, Fcr		1.314	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		**0.000**	
Initial Blowdown Volume, ft3		2,680.155	
Mole to Blowdown, LB-Moles		491.437	
Settleout Pressure, psig		1,032.003	
Ave. Settleout Temp., deg R/deg F		585.303	°R / 125°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1032.00	1032.0	0.014	6453201	491.437	-	
0.30	18	885.40	885.4	0.016	5549372	405.556	85.9	85.9
0.61	36	721.49	721.5	0.020	4538816	331.703	73.9	159.7
0.91	55	587.43	587.4	0.024	3712286	271.299	60.4	220.1
1.21	73	477.78	477.8	0.030	3036268	221.895	49.4	269.5
1.52	91	388.10	388.1	0.036	2483355	181.487	40.4	309.9
1.82	109	314.75	314.7	0.045	2031130	148.438	33.0	343.0
2.12	127	254.75	254.8	0.055	780330	121.407	27.0	370.0
2.42	145	231.71	231.7	0.060	715293	111.022	10.4	380.4
2.73	164	210.58	210.6	0.065	655630	101.503	9.5	389.9
3.03	182	191.21	191.2	0.071	600894	92.777	8.7	398.7
3.33	200	173.46	173.5	0.078	550674	84.780	8.0	406.7
3.64	218	157.20	157.2	0.086	504591	77.452	7.3	414.0
3.94	236	142.29	142.3	0.094	462301	70.737	6.7	420.7
4.24	255	128.64	128.6	0.103	423484	64.584	6.2	426.9
4.55	273	116.13	116.1	0.112	387849	58.948	5.6	432.5
4.85	291	104.68	104.7	0.123	355129	53.787	5.2	437.7
5.15	309	94.19	94.2	0.135	325078	49.060	4.7	442.4
5.45	327	84.58	84.6	0.148	297469	44.734	4.3	446.7
5.76	345	75.80	75.8	0.162	272095	40.775	4.0	450.7
6.06	364	67.76	67.8	0.178	248766	37.154	3.6	454.3
6.36	382	60.41	60.4	0.196	227306	33.844	3.3	457.6
6.67	400	53.70	53.7	0.215	207553	30.819	3.0	460.6
6.97	418	47.57	47.6	0.236	189359	28.056	2.8	463.4
7.27	436	41.98	42.0	0.259	172588	25.536	2.5	465.9
7.58	455	36.88	36.9	0.285	157113	23.239	2.3	468.2
7.88	473	32.24	32.2	0.313	142817	21.149	2.1	470.3
8.18	491	28.02	28.0	0.344	129592	19.248	1.9	472.2
8.48	509	24.19	24.2	0.378	117339	17.523	1.7	473.9
8.79	527	20.73	20.7	0.415	105965	15.962	1.6	475.5
9.09	545	17.60	17.6	0.455	95383	14.551	1.4	476.9
9.39	564	14.78	14.8	0.499	85512	13.282	1.3	478.2
9.70	582	12.25	12.3	0.545	76277	12.144	1.1	479.3
10.00	600	10.00	10.0	0.595	67605	11.129	1.0	480.3

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		**1.544**	1.544
Choke Area	in2	1.872	
Inlet Pipe OD	in	**8"**	
Inlet Pipe Class		**D**	
Schedule		**40**	
Inlet Pipe ID	in	7.981	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.193	
Settleout Z		0.948	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		34.621	
Time Increment, seconds		**27.273**	
Critical Ratio, Pcrt		0.052	
Expansion Factor, Fcr		1.314	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		**0.000**	
Initial Blowdown Volume, ft3		2,680.155	
Mole to Blowdown, LB-Moles		491.437	
Settleout Pressure, psig		1,032.003	
Ave. Settleout Temp., deg R/deg F		585.303	°R / 125°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1032.00	1032.0	0.014	4302157	491.437	-	
0.45	27	885.40	885.4	0.016	3699597	405.555	85.9	85.9
0.91	55	721.49	721.5	0.020	3025887	331.702	73.9	159.7
1.36	82	587.43	587.4	0.024	2474862	271.298	60.4	220.1
1.82	109	477.78	477.8	0.030	2024180	221.894	49.4	269.5
2.27	136	388.10	388.1	0.036	1655569	181.486	40.4	310.0
2.73	164	314.74	314.7	0.045	1354084	148.437	33.0	343.0
3.18	191	254.75	254.8	0.055	520219	121.406	27.0	370.0
3.64	218	231.70	231.7	0.060	476860	111.021	10.4	380.4
4.09	245	210.58	210.6	0.065	437085	101.502	9.5	389.9
4.55	273	191.21	191.2	0.071	400594	92.776	8.7	398.7
5.00	300	173.46	173.5	0.078	367114	84.779	8.0	406.7
5.45	327	157.20	157.2	0.086	336392	77.451	7.3	414.0
5.91	355	142.29	142.3	0.094	308199	70.736	6.7	420.7
6.36	382	128.64	128.6	0.103	282321	64.583	6.2	426.9
6.82	409	116.13	116.1	0.112	258565	58.947	5.6	432.5
7.27	436	104.67	104.7	0.123	236751	53.786	5.2	437.7
7.73	464	94.18	94.2	0.135	216717	49.060	4.7	442.4
8.18	491	84.58	84.6	0.148	198311	44.734	4.3	446.7
8.64	518	75.80	75.8	0.162	181395	40.775	4.0	450.7
9.09	545	67.76	67.8	0.178	165842	37.154	3.6	454.3
9.55	573	60.41	60.4	0.196	151536	33.843	3.3	457.6
10.00	600	53.70	53.7	0.215	138367	30.818	3.0	460.6
10.45	627	47.57	47.6	0.236	126238	28.056	2.8	463.4
10.91	655	41.98	42.0	0.259	115057	25.536	2.5	465.9
11.36	682	36.88	36.9	0.285	104740	23.239	2.3	468.2
11.82	709	32.24	32.2	0.313	95210	21.148	2.1	470.3
12.27	736	28.02	28.0	0.344	86393	19.248	1.9	472.2
12.73	764	24.19	24.2	0.378	78225	17.523	1.7	473.9
13.18	791	20.73	20.7	0.415	70642	15.961	1.6	475.5
13.64	818	17.60	17.6	0.455	63588	14.551	1.4	476.9
14.09	845	14.78	14.8	0.499	57007	13.282	1.3	478.2
14.55	873	12.25	12.3	0.545	50850	12.144	1.1	479.3
15.00	900	10.00	10.0	0.595	45069	11.129	1.0	480.3

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Case	Stack Diameter in	Height Above Ground ft	Stack Gas Flow MW	lb/hr	MMSCFD	SCFS	lbmol/hr	Stack Temperature °F	R	Temperature Correction Factor	Stack Pressure psig	psia	Pressure Correction Factor	Corrected Stack Flow ft3/sec	ft3/min	Stack Area ft2	Stack Velocity ft/s
Emergency	84	15	16.700	642,609	350	4,051	38,478	80	540	1.174	0	14.700	1.000	4,755	285,312	38.485	123.562
5 min	84	15	16.700	568,715	310	3,585	34,054	80	540	1.174	0	14.700	1.000	4,208	252,504	38.485	109.353
10 min	84	15	16.700	284,358	155	1,793	17,027	80	540	1.174	0	14.700	1.000	2,104	126,252	38.485	54.677
15 min	84	15	16.700	189,573	103	1,195	11,351	80	540	1.174	0	14.700	1.000	1,403	84,169	38.485	36.451

	MOLECULAR WEIGHT LB/LBMOL	MOL FRACTION	MASS FRACTION	GAS VOLUME LBMOL	GAS MASS LBM
METHANE	16.042	0.968	0.895	475.47	7,627.41
ETHANE	30.069	0.015	0.051	7.53	226.53
PROPANE	44.096	0.002	0.011	0.95	41.82
ISO-BUTANE	58.122	0.000	0.003	0.19	10.85
N-BUTANE	58.122	0.000	0.003	0.20	11.43
ISO-PENTANE	72.149	0.000	0.000	0.08	5.67
N-PENTANE	72.149	0.000	0.000	0.05	3.55
N-HEXANE	86.175	0.000	0.005	0.16	13.55
CYCLOHEXANE	84.159	0.000	0.000	0.00	0.00
N-HEPTANE	100.202	0.000	0.000	0.00	0.00
BENZENE	78.112	0.000	0.000	0.00	0.00
TOLUENE	92.138	0.000	0.000	0.00	0.00
ETHYLBENZENE	106.165	0.000	0.000	0.00	0.00
XYLENE	106.165	0.000	0.000	0.00	0.00
STYRENE	104.149	0.000	0.000	0.00	0.00
CARBON DIOXIDE	44.100	0.010	0.026	4.75	209.57
WATER	18.015	0.000	0.000	0.00	0.00
NITROGEN	28.014	0.004	0.004	2.07	57.96
TOTAL	16.70	1.000	1.000	491	8,208
THC		0.986	0.969	485	7,941
NMHC		0.019	0.074	9	313
NMNEHC (VOCs)		0.003	0.023	2	87
HEXANE		0.000	0.005	0	14

US EPA ARCHIVE DOCUMENT

Company	Facility	
Cheniere Corpus Christi Pipeline, L.P.	Sinton Compressor Station	
Descriptive Name of Emission Point	TEMP Subject Item ID	Emission Point ID No.
Titan 130 - Unit A Blowdown Stack	N/A	EQT001

Emissions Per Event[1]			
Pollutant	5 min	10 min	15 min
	(lb/hr)	(lb/hr)	(lb/hr)
CO_2	2,514.84	1,257.42	838.28
CH_4	91,528.92	45,764.46	30,509.64
CO_2-e	-	-	-

Emissions Per Year[1]			
Pollutant	3 Events	6 Events	12 Events
	TPY	TPY	TPY
CO_2	0.31	0.63	1.26
CH_4	11.44	22.88	45.76
CO_2-e	240.58	481.16	962.31

(1) Emission calculation methodology based upon process simulations using worst case scenario.

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BLOW DOWN SYSTEM CALCULATIONS

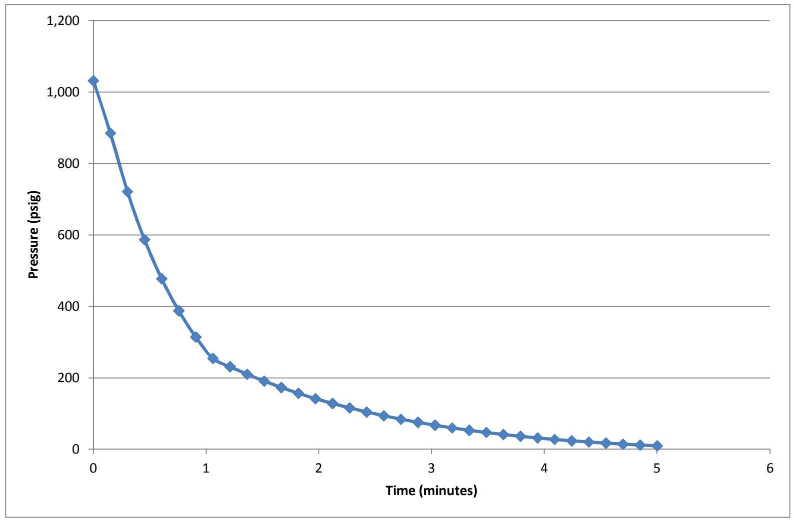
PIPE VOLUME CALCULATIONS

ECTION:	COMPRESSOR UNIT B	BDV TAG:	

Section	Description	Line Number	NPS (in)	Piping Class	Sch / BWG	OD(in)	ID(in)	WT(in)	Length (ft)	Transv Sect Area (ft2)	Cylinder Volume (ft3)	Heads Volume (ft3)	Volume (ft3)	Normal Volume (ft3)	Press (psig)	Temp (°F)	Pseudo-reduced Press	Pseudo-reduced Temp	Z Factor	Moles (lbmol)	Temp x Moles
Comp Suction	Piping		36"	D	40	36.000	34.500	0.750	100	6.492	649.181		649	30770	750	80	1.129	1.551	0.908	94	50964
Comp Discharge	Piping		30"	D	STD	30.000	29.250	0.375	200	4.666	933.274		933	61201	1200	160	1.793	1.780	0.920	185	114792
Cooler Inlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1610	1200	160	1.793	1.780	0.920	5	3019
Cooler Inlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1610	1200	160	1.793	1.780	0.920	5	3019
Cooler Outlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1720	1200	120	1.793	1.666	0.893	5	3112
Cooler Outlet	Piping		16"	D	XS	16.000	15.000	0.500	20	1.227	24.544		25	1720	1200	120	1.793	1.666	0.893	5	3112
Cooler Discharge	Piping		30"	D	STD	30.000	29.250	0.375	50	4.666	233.318		233	16355	1200	120	1.793	1.666	0.893	51	29582
Compressor Bypass	Piping		24"	D	40	24.000	22.624	0.688	125	2.792	348.960		349	24462	1200	120	1.793	1.666	0.893	76	44245
Compressor Bypass	Piping		24"	D	40	24.000	22.624	0.688	125	2.792	348.960		349	16540	750	80	1.129	1.551	0.908	51	27395
Cooler	Tubing	Tubes	1"		14	1.000	0.834	0.083	9000	0.004	34.143		34	2239	1200	160	1.793	1.780	0.920	7	4200
Cooler	Tubing	Tubes	1"		14	1.000	0.834	0.083	9000	0.004	34.143		34	2239	1200	160	1.793	1.780	0.920	7	4200
													2680	160466			**Total**			491	287640
																	T Average			°F	125.15
																	P Average			psig	1,032.00
																	Std Vol			SCF	186,500.28
																	Molecular Weight			lb/lbmol	16.70
																	Pseudo Critical Pressure			psia	677.6
																	Pseudo Critical Temperature			°R	348.3

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		2.674	2.674
Choke Area	in2	5.616	
Inlet Pipe OD	in	8"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	7.981	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.335	
Settleout Z		0.948	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		34.621	
Time Increment, seconds		9.091	
Critical Ratio, Pcrt		0.052	
Expansion Factor, Fcr		1.314	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		2,680.155	
Mole to Blowdown, LB-Moles		491.437	
Settleout Pressure, psig		1,032.003	
Ave. Settleout Temp., deg R/deg F		585.303	°R / 125°F

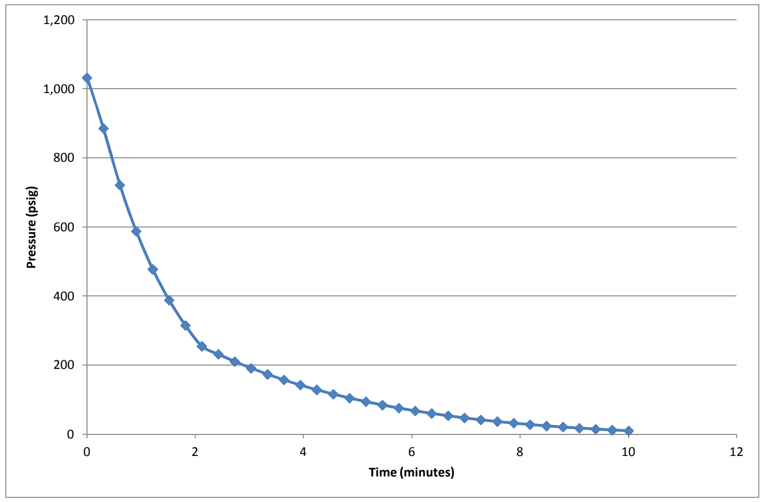


Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1032.00	1032.0	0.014	12906400	491.437	-	
0.15	9	885.40	885.4	0.016	11098744	405.556	85.9	85.9
0.30	18	721.49	721.5	0.020	9077632	331.703	73.9	159.7
0.45	27	587.43	587.4	0.024	7424571	271.299	60.4	220.1
0.61	36	477.78	477.8	0.030	6072536	221.895	49.4	269.5
0.76	45	388.10	388.1	0.036	4966711	181.487	40.4	309.9
0.91	55	314.75	314.7	0.045	4062259	148.438	33.0	343.0
1.06	64	254.75	254.8	0.055	1560661	121.407	27.0	370.0
1.21	73	231.71	231.7	0.060	1430585	111.022	10.4	380.4
1.36	82	210.58	210.6	0.065	1311260	101.503	9.5	389.9
1.52	91	191.21	191.2	0.071	1201788	92.777	8.7	398.7
1.67	100	173.46	173.5	0.078	1101348	84.780	8.0	406.7
1.82	109	157.20	157.2	0.086	1009183	77.452	7.3	414.0
1.97	118	142.29	142.3	0.094	924601	70.737	6.7	420.7
2.12	127	128.64	128.6	0.103	846968	64.584	6.2	426.9
2.27	136	116.13	116.1	0.112	775699	58.948	5.6	432.5
2.42	145	104.68	104.7	0.123	710259	53.787	5.2	437.7
2.58	155	94.19	94.2	0.135	650156	49.060	4.7	442.4
2.73	164	84.58	84.6	0.148	594938	44.734	4.3	446.7
2.88	173	75.80	75.8	0.162	544190	40.775	4.0	450.7
3.03	182	67.76	67.8	0.178	497532	37.154	3.6	454.3
3.18	191	60.41	60.4	0.196	454611	33.844	3.3	457.6
3.33	200	53.70	53.7	0.215	415106	30.819	3.0	460.6
3.48	209	47.57	47.6	0.236	378719	28.056	2.8	463.4
3.64	218	41.98	42.0	0.259	345176	25.536	2.5	465.9
3.79	227	36.88	36.9	0.285	314225	23.239	2.3	468.2
3.94	236	32.24	32.2	0.313	285633	21.149	2.1	470.3
4.09	245	28.02	28.0	0.344	259184	19.248	1.9	472.2
4.24	255	24.19	24.2	0.378	234678	17.523	1.7	473.9
4.39	264	20.73	20.7	0.415	211930	15.962	1.6	475.5
4.55	273	17.60	17.6	0.455	190766	14.551	1.4	476.9
4.70	282	14.78	14.8	0.499	171025	13.282	1.3	478.2
4.85	291	12.25	12.3	0.545	152554	12.144	1.1	479.3
5.00	300	10.00	10.0	0.595	135210	11.129	1.0	480.3

US EPA ARCHIVE DOCUMENT

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		1.891	1.891
Choke Area	in2	2.808	
Inlet Pipe OD	in	8"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	7.981	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.237	
Settleout Z		0.948	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		34.621	
Time Increment, seconds		18.182	
Critical Ratio, Pcrt		0.052	
Expansion Factor, Fcr		1.314	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		2,680.155	
Mole to Blowdown, LB-Moles		491.437	
Settleout Pressure, psig		1,032.003	
Ave. Settleout Temp., deg R/deg F		585.303	°R / 125°F

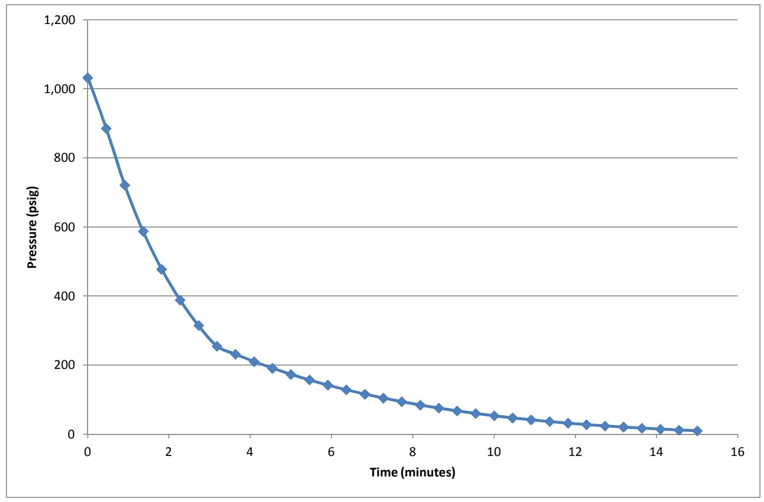


Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1032.00	1032.0	0.014	6453201	491.437	-	
0.30	18	885.40	885.4	0.016	5549372	405.556	85.9	85.9
0.61	36	721.49	721.5	0.020	4538816	331.703	73.9	159.7
0.91	55	587.43	587.4	0.024	3712286	271.299	60.4	220.1
1.21	73	477.78	477.8	0.030	3036268	221.895	49.4	269.5
1.52	91	388.10	388.1	0.036	2483355	181.487	40.4	309.9
1.82	109	314.75	314.7	0.045	2031130	148.438	33.0	343.0
2.12	127	254.75	254.8	0.055	780330	121.407	27.0	370.0
2.42	145	231.71	231.7	0.060	715293	111.022	10.4	380.4
2.73	164	210.58	210.6	0.065	655630	101.503	9.5	389.9
3.03	182	191.21	191.2	0.071	600894	92.777	8.7	398.7
3.33	200	173.46	173.5	0.078	550674	84.780	8.0	406.7
3.64	218	157.20	157.2	0.086	504591	77.452	7.3	414.0
3.94	236	142.29	142.3	0.094	462301	70.737	6.7	420.7
4.24	255	128.64	128.6	0.103	423484	64.584	6.2	426.9
4.55	273	116.13	116.1	0.112	387849	58.948	5.6	432.5
4.85	291	104.68	104.7	0.123	355129	53.787	5.2	437.7
5.15	309	94.19	94.2	0.135	325078	49.060	4.7	442.4
5.45	327	84.58	84.6	0.148	297469	44.734	4.3	446.7
5.76	345	75.80	75.8	0.162	272095	40.775	4.0	450.7
6.06	364	67.76	67.8	0.178	248766	37.154	3.6	454.3
6.36	382	60.41	60.4	0.196	227306	33.844	3.3	457.6
6.67	400	53.70	53.7	0.215	207553	30.819	3.0	460.6
6.97	418	47.57	47.6	0.236	189359	28.056	2.8	463.4
7.27	436	41.98	42.0	0.259	172588	25.536	2.5	465.9
7.58	455	36.88	36.9	0.285	157113	23.239	2.3	468.2
7.88	473	32.24	32.2	0.313	142817	21.149	2.1	470.3
8.18	491	28.02	28.0	0.344	129592	19.248	1.9	472.2
8.48	509	24.19	24.2	0.378	117339	17.523	1.7	473.9
8.79	527	20.73	20.7	0.415	105965	15.962	1.6	475.5
9.09	545	17.60	17.6	0.455	95383	14.551	1.4	476.9
9.39	564	14.78	14.8	0.499	85512	13.282	1.3	478.2
9.70	582	12.25	12.3	0.545	76277	12.144	1.1	479.3
10.00	600	10.00	10.0	0.595	67605	11.129	1.0	480.3

US EPA ARCHIVE DOCUMENT

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		1.544	1.544
Choke Area	in2	1.872	
Inlet Pipe OD	in	8"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	7.981	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.193	
Settleout Z		0.948	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		34.621	
Time Increment, seconds		27.273	
Critical Ratio, Pcrt		0.052	
Expansion Factor, Fcr		1.314	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		2,680.155	
Mole to Blowdown, LB-Moles		491.437	
Settleout Pressure, psig		1,032.003	
Ave. Settleout Temp., deg R/deg F		585.303	°R / 125°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1032.00	1032.0	0.014	4302134	491.437	-	
0.45	27	885.40	885.4	0.016	3699582	405.556	85.9	85.9
0.91	55	721.49	721.5	0.020	3025878	331.703	73.9	159.7
1.36	82	587.43	587.4	0.024	2474857	271.299	60.4	220.1
1.82	109	477.78	477.8	0.030	2024179	221.895	49.4	269.5
2.27	136	388.10	388.1	0.036	1655570	181.487	40.4	309.9
2.73	164	314.75	314.7	0.045	1354086	148.438	33.0	343.0
3.18	191	254.75	254.8	0.055	520220	121.407	27.0	370.0
3.64	218	231.71	231.7	0.060	476862	111.022	10.4	380.4
4.09	245	210.58	210.6	0.065	437087	101.503	9.5	389.9
4.55	273	191.21	191.2	0.071	400596	92.777	8.7	398.7
5.00	300	173.46	173.5	0.078	367116	84.780	8.0	406.7
5.45	327	157.20	157.2	0.086	336394	77.452	7.3	414.0
5.91	355	142.29	142.3	0.094	308200	70.737	6.7	420.7
6.36	382	128.64	128.6	0.103	282323	64.584	6.2	426.9
6.82	409	116.13	116.1	0.112	258566	58.948	5.6	432.5
7.27	436	104.68	104.7	0.123	236753	53.787	5.2	437.7
7.73	464	94.19	94.2	0.135	216719	49.060	4.7	442.4
8.18	491	84.58	84.6	0.148	198313	44.734	4.3	446.7
8.64	518	75.80	75.8	0.162	181397	40.775	4.0	450.7
9.09	545	67.76	67.8	0.178	165844	37.154	3.6	454.3
9.55	573	60.41	60.4	0.196	151537	33.844	3.3	457.6
10.00	600	53.70	53.7	0.215	138369	30.819	3.0	460.6
10.45	627	47.57	47.6	0.236	126240	28.056	2.8	463.4
10.91	655	41.98	42.0	0.259	115059	25.536	2.5	465.9
11.36	682	36.88	36.9	0.285	104742	23.239	2.3	468.2
11.82	709	32.24	32.2	0.313	95211	21.149	2.1	470.3
12.27	736	28.02	28.0	0.344	86395	19.248	1.9	472.2
12.73	764	24.19	24.2	0.378	78226	17.523	1.7	473.9
13.18	791	20.73	20.7	0.415	70643	15.962	1.6	475.5
13.64	818	17.60	17.6	0.455	63589	14.551	1.4	476.9
14.09	845	14.78	14.8	0.499	57008	13.282	1.3	478.2
14.55	873	12.25	12.3	0.545	50851	12.144	1.1	479.3
15.00	900	10.00	10.0	0.595	45070	11.129	1.0	480.3

US EPA ARCHIVE DOCUMENT

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Case	Stack	Height Above	Stack Gas Flow					Stack Temperature		Temperature Correction Factor	Stack Pressure		Pressure Correction Factor	Corrected Stack Flow		Stack Area	Stack
	Diameter in	Ground ft	MW	lb/hr	MMSCFD	SCFS	lbmol/hr	°F	R		psig	psia		ft3/sec	ft3/min	ft2	Velocity ft/s
Emergency	84	15	16.700	642,609	350	4,051	38,478	80	540	1.174	0	14.700	1.000	4,755	285,312	38.485	123.562
5 min	84	15	16.700	568,715	310	3,585	34,054	80	540	1.174	0	14.700	1.000	4,208	252,504	38.485	109.353
10 min	84	15	16.700	284,358	155	1,793	17,027	80	540	1.174	0	14.700	1.000	2,104	126,252	38.485	54.677
15 min	84	15	16.700	189,572	103	1,195	11,351	80	540	1.174	0	14.700	1.000	1,403	84,168	38.485	36.451

	MOLECULAR WEIGHT LB/LBMOL	MOL FRACTION	MASS FRACTION	GAS VOLUME LBMOL	GAS MASS LBM
METHANE	16.042	0.968	0.895	475.47	7,627.41
ETHANE	30.069	0.015	0.051	7.53	226.53
PROPANE	44.096	0.002	0.011	0.95	41.82
ISO-BUTANE	58.122	0.000	0.003	0.19	10.85
N-BUTANE	58.122	0.000	0.003	0.20	11.43
ISO-PENTANE	72.149	0.000	0.000	0.08	5.67
N-PENTANE	72.149	0.000	0.000	0.05	3.55
N-HEXANE	86.175	0.000	0.005	0.16	13.55
CYCLOHEXANE	84.159	0.000	0.000	0.00	0.00
N-HEPTANE	100.202	0.000	0.000	0.00	0.00
BENZENE	78.112	0.000	0.000	0.00	0.00
TOLUENE	92.138	0.000	0.000	0.00	0.00
ETHYLBENZENE	106.165	0.000	0.000	0.00	0.00
XYLENE	106.165	0.000	0.000	0.00	0.00
STYRENE	104.149	0.000	0.000	0.00	0.00
CARBON DIOXIDE	44.100	0.010	0.026	4.75	209.57
WATER	18.015	0.000	0.000	0.00	0.00
NITROGEN	28.014	0.004	0.004	2.07	57.96
TOTAL	16.70	1.000	1.000	491	8,208
THC		0.986	0.969	485	7,941
NMHC		0.019	0.074	9	313
NMNEHC (VOCs)		0.003	0.023	2	87
HEXANE		0.000	0.005	0	14

US EPA ARCHIVE DOCUMENT

Cheniere Corpus Christi Pipeline, L.P.

Company	Facility	
Cheniere Corpus Christi Pipeline, L.P.	Sinton Compressor Station	
Descriptive Name of Emission Point	TEMP Subject Item ID	Emission Point ID No.
Titan 130 - Unit B Blowdown Stack	N/A	EQT002

Emissions Per Event[1]			
Pollutant	5 min	10 min	15 min
	(lb/hr)	(lb/hr)	(lb/hr)
CO_2	2,514.84	1,257.42	838.28
CH_4	91,528.92	45,764.46	30,509.64
CO_2-e	-	-	-

Emissions Per Year[1]			
Pollutant	3 Events	6 Events	12 Events
	TPY	TPY	TPY
CO_2	0.31	0.63	1.26
CH_4	11.44	22.88	45.76
CO_2-e	240.58	481.16	962.31

(1) Emission calculation methodology based upon process simulations using worst case scenario.

US EPA ARCHIVE DOCUMENT

BLOW DOWN SYSTEM CALCULATIONS

PIPE VOLUME CALCULATIONS

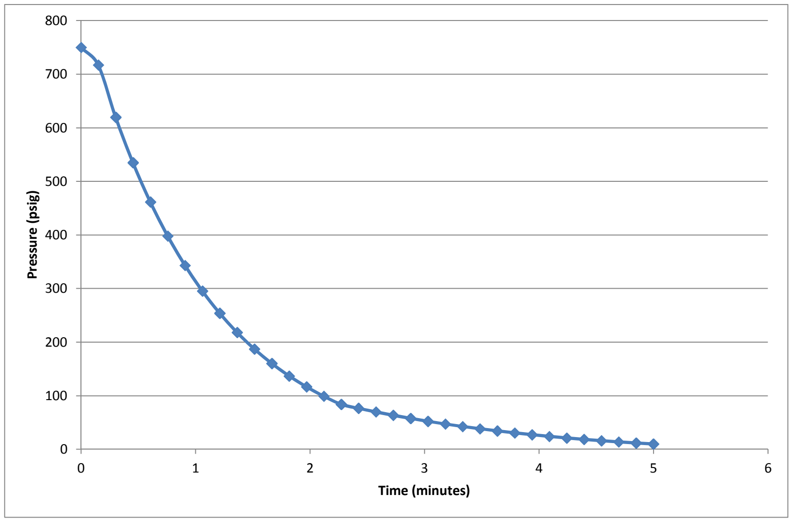
ECTION:	COMPRESSOR UNIT	BDV TAG:	

Section	Description	Line Number	NPS (in)	Piping Class	Sch / BWG	OD(in)	ID(in)	WT(in)	Length (ft)	Transv Sect Area (ft2)	Cylinder Volume (ft3)	Heads Volume (ft3)	Volume (ft3)	Normal Volume (ft3)	Press (psig)	Temp (°F)	Pseudo-reduced Press	Pseudo-reduced Temp	Z Factor	Moles (lbmol)	Temp x Moles
Comp Suction Header	Piping		48"	D	STD	48.000	47.250	0.375	1000	12.177	12176.739		12177	577149	750	80	1.129	1.551	0.908	1770	955945
													12177	577149			Total			1770	955945
																	T Average			°F	80.00
																	P Average			psig	750.00
																	Std Vol			SCF	671,630.39
																	Molecular Weight			lb/lbmol	16.70
																	Pseudo Critical Pressure			psia	677.6
																	Pseudo Critical Temperature			°R	348.3

US EPA ARCHIVE DOCUMENT

BLOWDOWN CALCULATIONS

Reference Data		**Initial**	**Change**
Orifice Diameter, Inches		5.245	5.245
Choke Area	in2	21.606	
Inlet Pipe OD	in	12"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	11.938	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.439	
Settleout Z		0.991	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		10.672	
Time Increment, seconds		9.091	
Critical Ratio, Pcrt		0.143	
Expansion Factor, Fcr		1.132	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		12,176.739	
Mole to Blowdown, LB-Moles		1,769.777	
Settleout Pressure, psig		750.000	
Ave. Settleout Temp., deg R/deg F		540.150	°R / 80°F

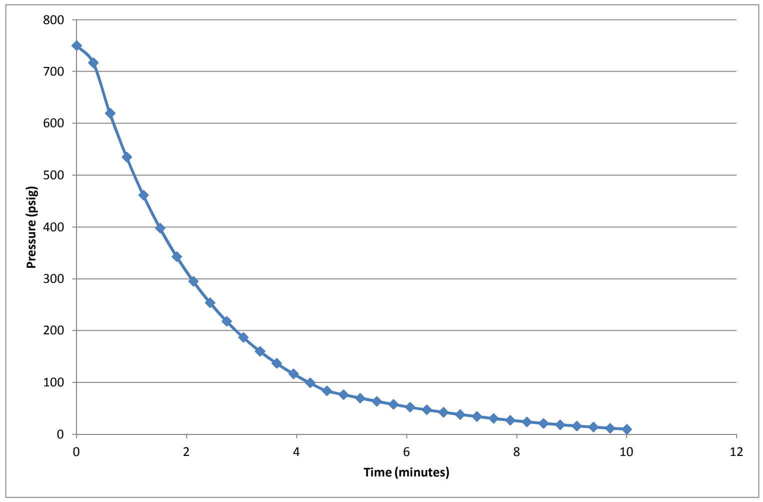


Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	750.00	750.0	0.019	32524185	1769.777	-	
0.15	9	717.16	717.2	0.020	31127557	1553.356	216.4	216.4
0.30	18	619.57	619.6	0.023	26976945	1346.228	207.1	423.5
0.45	27	535.00	535.0	0.027	23379785	1166.720	179.5	603.1
0.61	36	461.70	461.7	0.031	20262277	1011.147	155.6	758.6
0.76	45	398.18	398.2	0.036	17560464	876.318	134.8	893.5
0.91	55	343.12	343.1	0.041	15218916	759.468	116.9	1,010.3
1.06	64	295.41	295.4	0.047	13189595	658.199	101.3	1,111.6
1.21	73	254.06	254.1	0.055	11430867	570.434	87.8	1,199.3
1.36	82	218.22	218.2	0.063	9906652	494.371	76.1	1,275.4
1.52	91	187.16	187.2	0.073	8585679	428.450	65.9	1,341.3
1.67	100	160.25	160.2	0.084	7440847	371.320	57.1	1,398.5
1.82	109	136.92	136.9	0.097	6448669	321.807	49.5	1,448.0
1.97	118	116.70	116.7	0.112	5588791	278.897	42.9	1,490.9
2.12	127	99.18	99.2	0.129	4843570	241.708	37.2	1,528.1
2.27	136	84.00	84.0	0.149	2331263	209.478	32.2	1,560.3
2.42	145	76.69	76.7	0.161	2164917	193.966	15.5	1,575.8
2.58	155	69.90	69.9	0.174	2009789	179.560	14.4	1,590.2
2.73	164	63.60	63.6	0.188	1865077	166.187	13.4	1,603.6
2.88	173	57.75	57.8	0.203	1730030	153.776	12.4	1,616.0
3.03	182	52.33	52.3	0.219	1603947	142.264	11.5	1,627.5
3.18	191	47.30	47.3	0.237	1486174	131.591	10.7	1,638.2
3.33	200	42.64	42.6	0.256	1376101	121.702	9.9	1,648.1
3.48	209	38.33	38.3	0.277	1273155	112.545	9.2	1,657.2
3.64	218	34.33	34.3	0.300	1176803	104.074	8.5	1,665.7
3.79	227	30.64	30.6	0.324	1086543	96.243	7.8	1,673.5
3.94	236	27.24	27.2	0.351	1001906	89.013	7.2	1,680.8
4.09	245	24.10	24.1	0.379	922452	82.346	6.7	1,687.4
4.24	255	21.21	21.2	0.409	847765	76.208	6.1	1,693.6
4.39	264	18.55	18.5	0.442	777454	70.567	5.6	1,699.2
4.55	273	16.11	16.1	0.477	711151	65.393	5.2	1,704.4
4.70	282	13.88	13.9	0.514	648506	60.661	4.7	1,709.1
4.85	291	11.85	11.8	0.554	589186	56.346	4.3	1,713.4
5.00	300	10.00	10.0	0.595	532872	52.426	3.9	1,717.4

US EPA ARCHIVE DOCUMENT

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		3.709	3.709
Choke Area	in2	10.803	
Inlet Pipe OD	in	12"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	11.938	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.311	
Settleout Z		0.991	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		10.672	
Time Increment, seconds		18.182	
Critical Ratio, Pcrt		0.143	
Expansion Factor, Fcr		1.132	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		12,176.739	
Mole to Blowdown, LB-Moles		1,769.777	
Settleout Pressure, psig		750.000	
Ave. Settleout Temp., deg R/deg F		540.150	°R / 80°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	750.00	750.0	0.019	16262057	1769.777	-	
0.30	18	717.16	717.2	0.020	15563749	1553.356	216.4	216.4
0.61	36	619.58	619.6	0.023	13488452	1346.229	207.1	423.5
0.91	55	535.00	535.0	0.027	11689878	1166.721	179.5	603.1
1.21	73	461.70	461.7	0.031	10131130	1011.148	155.6	758.6
1.52	91	398.18	398.2	0.036	8780227	876.320	134.8	893.5
1.82	109	343.12	343.1	0.041	7609456	759.470	116.9	1,010.3
2.12	127	295.41	295.4	0.047	6594798	658.201	101.3	1,111.6
2.42	145	254.06	254.1	0.055	5715436	570.435	87.8	1,199.3
2.73	164	218.22	218.2	0.063	4953330	494.372	76.1	1,275.4
3.03	182	187.16	187.2	0.073	4292844	428.452	65.9	1,341.3
3.33	200	160.25	160.2	0.084	3720429	371.321	57.1	1,398.5
3.64	218	136.92	136.9	0.097	3224341	321.809	49.5	1,448.0
3.94	236	116.70	116.7	0.112	2794401	278.898	42.9	1,490.9
4.24	255	99.18	99.2	0.129	2421791	241.709	37.2	1,528.1
4.55	273	84.00	84.0	0.149	1165635	209.479	32.2	1,560.3
4.85	291	76.69	76.7	0.161	1082461	193.967	15.5	1,575.8
5.15	309	69.90	69.9	0.174	1004898	179.561	14.4	1,590.2
5.45	327	63.60	63.6	0.188	932542	166.188	13.4	1,603.6
5.76	345	57.75	57.8	0.203	865018	153.777	12.4	1,616.0
6.06	364	52.33	52.3	0.219	801976	142.265	11.5	1,627.5
6.36	382	47.30	47.3	0.237	743090	131.592	10.7	1,638.2
6.67	400	42.64	42.6	0.256	688053	121.703	9.9	1,648.1
6.97	418	38.33	38.3	0.277	636580	112.546	9.2	1,657.2
7.27	436	34.33	34.3	0.300	588404	104.074	8.5	1,665.7
7.58	455	30.65	30.6	0.324	543274	96.244	7.8	1,673.5
7.88	473	27.24	27.2	0.351	500956	89.014	7.2	1,680.8
8.18	491	24.10	24.1	0.379	461228	82.347	6.7	1,687.4
8.48	509	21.21	21.2	0.409	423885	76.208	6.1	1,693.6
8.79	527	18.55	18.5	0.442	388729	70.567	5.6	1,699.2
9.09	545	16.11	16.1	0.477	355578	65.394	5.2	1,704.4
9.39	564	13.88	13.9	0.514	324255	60.662	4.7	1,709.1
9.70	582	11.85	11.8	0.554	294595	56.347	4.3	1,713.4
10.00	600	10.00	10.0	0.595	266438	52.426	3.9	1,717.4

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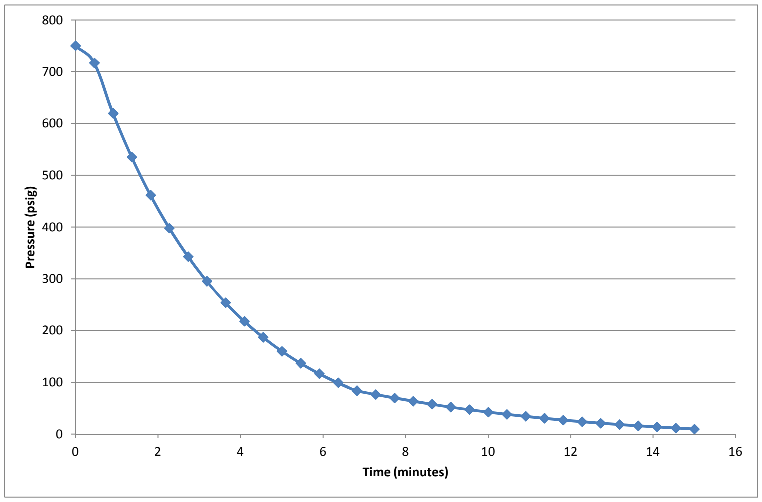
BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		**3.028**	3.028
Choke Area	in2	7.202	
Inlet Pipe OD	in	**12"**	
Inlet Pipe Class		**D**	
Schedule		**40**	
Inlet Pipe ID	in	11.938	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.254	
Settleout Z		0.991	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		10.672	
Time Increment, seconds		**27.273**	
Critical Ratio, Pcrt		0.143	
Expansion Factor, Fcr		1.132	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		**0.000**	
Initial Blowdown Volume, ft3		12,176.739	
Mole to Blowdown, LB-Moles		1,769.777	
Settleout Pressure, psig		750.000	
Ave. Settleout Temp., deg R/deg F		540.150	°R / 80°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	750.00	750.0	0.019	10841468	1769.777	-	
0.45	27	717.16	717.2	0.020	10375912	1553.355	216.4	216.4
0.91	55	619.57	619.6	0.023	8992358	1346.226	207.1	423.6
1.36	82	535.00	535.0	0.027	7793290	1166.716	179.5	603.1
1.82	109	461.70	461.7	0.031	6754110	1011.143	155.6	758.6
2.27	136	398.17	398.2	0.036	5853497	876.314	134.8	893.5
2.73	164	343.12	343.1	0.041	5072975	759.464	116.9	1,010.3
3.18	191	295.41	295.4	0.047	4396530	658.195	101.3	1,111.6
3.64	218	254.06	254.1	0.055	3810284	570.429	87.8	1,199.3
4.09	245	218.22	218.2	0.063	3302209	494.366	76.1	1,275.4
4.55	273	187.16	187.2	0.073	2861883	428.446	65.9	1,341.3
5.00	300	160.25	160.2	0.084	2480271	371.316	57.1	1,398.5
5.45	327	136.92	136.9	0.097	2149545	321.803	49.5	1,448.0
5.91	355	116.70	116.7	0.112	1862918	278.893	42.9	1,490.9
6.36	382	99.18	99.2	0.129	1614511	241.705	37.2	1,528.1
6.82	409	83.99	84.0	0.149	777081	209.475	32.2	1,560.3
7.27	436	76.69	76.7	0.161	721633	193.963	15.5	1,575.8
7.73	464	69.90	69.9	0.174	669924	179.557	14.4	1,590.2
8.18	491	63.60	63.6	0.188	621686	166.184	13.4	1,603.6
8.64	518	57.75	57.8	0.203	576671	153.773	12.4	1,616.0
9.09	545	52.33	52.3	0.219	534643	142.262	11.5	1,627.5
9.55	573	47.30	47.3	0.237	495386	131.589	10.7	1,638.2
10.00	600	42.64	42.6	0.256	458695	121.700	9.9	1,648.1
10.45	627	38.32	38.3	0.277	424379	112.543	9.2	1,657.2
10.91	655	34.33	34.3	0.300	392262	104.071	8.5	1,665.7
11.36	682	30.64	30.6	0.324	362176	96.241	7.8	1,673.5
11.82	709	27.24	27.2	0.351	333964	89.011	7.2	1,680.8
12.27	736	24.10	24.1	0.379	307479	82.344	6.7	1,687.4
12.73	764	21.20	21.2	0.409	282583	76.206	6.1	1,693.6
13.18	791	18.55	18.5	0.442	259146	70.565	5.6	1,699.2
13.64	818	16.11	16.1	0.477	237045	65.392	5.2	1,704.4
14.09	845	13.88	13.9	0.514	216164	60.660	4.7	1,709.1
14.55	873	11.85	11.8	0.554	196390	56.345	4.3	1,713.4
15.00	900	10.00	10.0	0.595	177619	52.424	3.9	1,717.4

US EPA ARCHIVE DOCUMENT

Case	Stack Diameter in	Height Above Ground ft	Stack Gas Flow MW	lb/hr	MMSCFD	SCFS	lbmol/hr	Stack Temperature °F	R	Temperature Correction Factor	Stack Pressure psig	psia	Pressure Correction Factor	Corrected Stack Flow ft3/sec	ft3/min	Stack Area ft2	Stack Velocity ft/s
Emergency	96	20	16.700	1,193,416	650	7,523	71,460	80	540	1.174	0	14.700	1.000	8,831	529,866	50.265	175.689
5 min	96	20	16.700	1,433,165	781	9,034	85,816	80	540	1.174	0	14.700	1.000	10,605	636,312	50.265	210.984
10 min	96	20	16.700	716,581	390	4,517	42,908	80	540	1.174	0	14.700	1.000	5,303	318,155	50.265	105.492
15 min	96	20	16.700	477,725	260	3,012	28,605	80	540	1.174	0	14.700	1.000	3,535	212,105	50.265	70.328

	MOLECULAR WEIGHT LB/LBMOL	MOL FRACTION	MASS FRACTION	GAS VOLUME LBMOL	GAS MASS LBM
METHANE	16.042	0.968	0.895	1,712.26	27,468.06
ETHANE	30.069	0.015	0.051	27.13	815.79
PROPANE	44.096	0.002	0.011	3.42	150.62
ISO-BUTANE	58.122	0.000	0.003	0.67	39.09
N-BUTANE	58.122	0.000	0.003	0.71	41.15
ISO-PENTANE	72.149	0.000	0.000	0.28	20.43
N-PENTANE	72.149	0.000	0.000	0.18	12.77
N-HEXANE	86.175	0.000	0.005	0.57	48.80
CYCLOHEXANE	84.159	0.000	0.000	0.00	0.00
N-HEPTANE	100.202	0.000	0.000	0.00	0.00
BENZENE	78.112	0.000	0.000	0.00	0.00
TOLUENE	92.138	0.000	0.000	0.00	0.00
ETHYLBENZENE	106.165	0.000	0.000	0.00	0.00
XYLENE	106.165	0.000	0.000	0.00	0.00
STYRENE	104.149	0.000	0.000	0.00	0.00
CARBON DIOXIDE	44.100	0.010	0.026	17.11	754.72
WATER	18.015	0.000	0.000	0.00	0.00
NITROGEN	28.014	0.004	0.004	7.45	208.73
TOTAL	16.70	1.000	1.000	1,770	29,560
THC		0.986	0.969	1,745	28,597
NMHC		0.019	0.074	33	1,129
NMNEHC (VOCs)		0.003	0.023	6	313
HEXANE		0.000	0.005	1	49

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Company	Facility	
Cheniere Corpus Christi Pipeline, L.P.	Sinton Compressor Station	
Descriptive Name of Emission Point	TEMP Subject Item ID	Emission Point ID No.
Station Suction Blowdown Stack	N/A	EQT003

Emissions Per Event[(1)]			
Pollutant	5 min	10 min	15 min
	(lb/hr)	(lb/hr)	(lb/hr)
CO_2	9,056.64	4,528.32	3,018.88
CH_4	329,616.72	164,808.36	109,872.24
CO_2-e	-	-	-

Emissions Per Year[(1)]			
Pollutant	2 Events	3 Events	4 Events
	TPY	TPY	TPY
CO_2	0.75	1.13	1.51
CH_4	27.47	41.20	54.94
CO_2-e	577.58	866.38	1,155.17

(1) Emission calculation methodology based upon process simulations using worst case scenario.

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BLOW DOWN SYSTEM CALCULATIONS

PIPE VOLUME CALCULATIONS

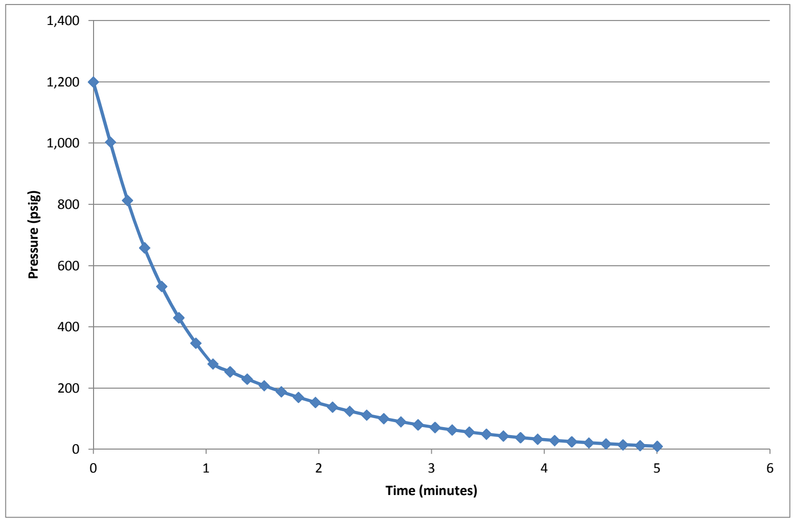
ECTION:	COMPRESSOR UNIT	BDV TAG:	

Section	Description	Line Number	NPS (in)	Piping Class	Sch / BWG	OD(in)	ID(in)	WT(in)	Length (ft)	Transv Sect Area (ft2)	Cylinder Volume (ft3)	Heads Volume (ft3)	Volume (ft3)	Normal Volume (ft3)	Press (psig)	Temp (°F)	Pseudo-reduced Press	Pseudo-reduced Temp	Z Factor	Moles (lbmol)	Temp x Moles
omp Discharge Header	Piping		48"	D	STD	48.000	47.250	0.375	1000	12.177	12176.739		12177	853571	1200	120	1.793	1.666	0.893	2661	1543886
													12177	853571			Total			2661	1543886

T Average	°F	120.00
P Average	psig	1,200.00
Std Vol	SCF	1,009,919.18
Molecular Weight	lb/lbmol	16.70
Pseudo Critical Pressure	psia	677.6
Pseudo Critical Temperature	°R	348.3

BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		5.804	5.804
Choke Area	in2	26.458	
Inlet Pipe OD	in	12"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	11.938	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.486	
Settleout Z		0.916	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		40.988	
Time Increment, seconds		9.091	
Critical Ratio, Pcrt		0.044	
Expansion Factor, Fcr		1.353	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		12,176.739	
Mole to Blowdown, LB-Moles		2,661.184	
Settleout Pressure, psig		1,200.000	
Ave. Settleout Temp., deg R/deg F		580.150	°R / 120°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1200.00	1200.0	0.012	72949616	2661.184	-	
0.15	9	1003.43	1003.4	0.014	61144421	2175.765	485.4	485.4
0.30	18	813.04	813.0	0.018	49710514	1768.901	406.9	892.3
0.45	27	658.25	658.3	0.022	40414730	1438.119	330.8	1,223.1
0.61	36	532.41	532.4	0.027	32857241	1169.193	268.9	1,492.0
0.76	45	430.10	430.1	0.033	26712991	950.556	218.6	1,710.6
0.91	55	346.93	346.9	0.041	21717706	772.804	177.8	1,888.4
1.06	64	279.30	279.3	0.050	8347230	628.291	144.5	2,032.9
1.21	73	253.31	253.3	0.055	7627069	572.747	55.5	2,088.4
1.36	82	229.56	229.6	0.060	6968597	521.995	50.8	2,139.2
1.52	91	207.86	207.9	0.066	6366488	475.625	46.4	2,185.6
1.67	100	188.04	188.0	0.073	5815872	433.261	42.4	2,227.9
1.82	109	169.93	169.9	0.080	5312296	394.562	38.7	2,266.6
1.97	118	153.39	153.4	0.087	4851686	359.213	35.3	2,302.0
2.12	127	138.28	138.3	0.096	4430316	326.929	32.3	2,334.3
2.27	136	124.49	124.5	0.106	4044779	297.449	29.5	2,363.7
2.42	145	111.89	111.9	0.116	3691956	270.534	26.9	2,390.6
2.58	155	100.40	100.4	0.128	3368993	245.967	24.6	2,415.2
2.73	164	89.91	89.9	0.141	3073278	223.550	22.4	2,437.6
2.88	173	80.34	80.3	0.155	2802418	203.100	20.5	2,458.1
3.03	182	71.61	71.6	0.170	2554222	184.452	18.6	2,476.7
3.18	191	63.66	63.7	0.188	2326682	167.456	17.0	2,493.7
3.33	200	56.41	56.4	0.207	2117956	151.974	15.5	2,509.2
3.48	209	49.82	49.8	0.228	1926354	137.880	14.1	2,523.3
3.64	218	43.82	43.8	0.251	1750326	125.062	12.8	2,536.1
3.79	227	38.37	38.4	0.277	1588446	113.415	11.6	2,547.8
3.94	236	33.43	33.4	0.305	1439399	102.845	10.6	2,558.3
4.09	245	28.94	28.9	0.337	1301978	93.267	9.6	2,567.9
4.24	255	24.89	24.9	0.371	1175064	84.604	8.7	2,576.6
4.39	264	21.23	21.2	0.409	1057622	76.785	7.8	2,584.4
4.55	273	17.94	17.9	0.450	948693	69.747	7.0	2,591.4
4.70	282	14.98	15.0	0.495	847380	63.434	6.3	2,597.7
4.85	291	12.35	12.3	0.544	752842	57.796	5.6	2,603.4
5.00	300	10.00	10.0	0.595	664284	52.786	5.0	2,608.4

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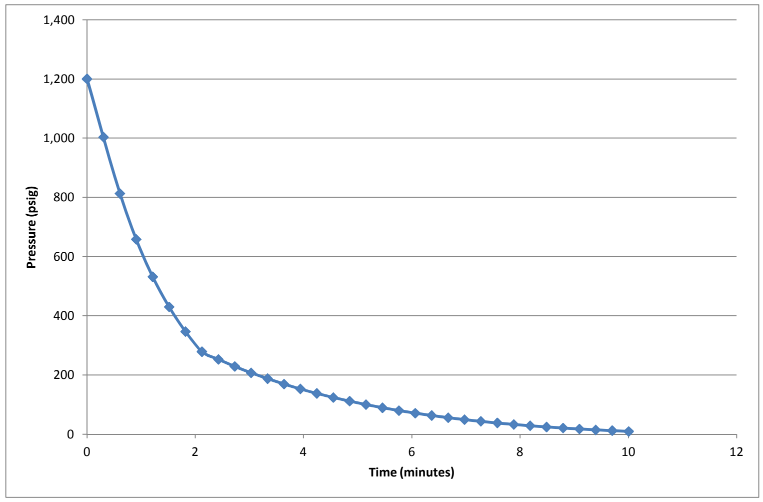
BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		4.104	4.104
Choke Area	in2	13.229	
Inlet Pipe OD	in	12"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	11.938	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.344	
Settleout Z		0.916	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		40.988	
Time Increment, seconds		18.182	
Critical Ratio, Pcrt		0.044	
Expansion Factor, Fcr		1.353	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		12,176.739	
Mole to Blowdown, LB-Moles		2,661.184	
Settleout Pressure, psig		1,200.000	
Ave. Settleout Temp., deg R/deg F		580.150	°R / 120°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1200.00	1200.0	0.012	36475130	2661.184	-	
0.30	18	1003.43	1003.4	0.014	30572420	2175.761	485.4	485.4
0.61	36	813.04	813.0	0.018	24855377	1768.894	406.9	892.3
0.91	55	658.25	658.3	0.022	20207421	1438.111	330.8	1,223.1
1.21	73	532.41	532.4	0.027	16428633	1169.184	268.9	1,492.0
1.52	91	430.10	430.1	0.033	13356479	950.547	218.6	1,710.6
1.82	109	346.92	346.9	0.041	10858817	772.794	177.8	1,888.4
2.12	127	279.30	279.3	0.050	4173594	628.282	144.5	2,032.9
2.42	145	253.31	253.3	0.055	3813512	572.738	55.5	2,088.4
2.73	164	229.56	229.6	0.060	3484275	521.987	50.8	2,139.2
3.03	182	207.86	207.9	0.066	3183220	475.617	46.4	2,185.6
3.33	200	188.04	188.0	0.073	2907912	433.254	42.4	2,227.9
3.64	218	169.93	169.9	0.080	2656123	394.554	38.7	2,266.6
3.94	236	153.39	153.4	0.087	2425818	359.206	35.3	2,302.0
4.24	255	138.28	138.3	0.096	2215134	326.922	32.3	2,334.3
4.55	273	124.49	124.5	0.106	2022366	297.443	29.5	2,363.7
4.85	291	111.89	111.9	0.116	1845955	270.528	26.9	2,390.7
5.15	309	100.40	100.4	0.128	1684474	245.962	24.6	2,415.2
5.45	327	89.91	89.9	0.141	1536617	223.544	22.4	2,437.6
5.76	345	80.34	80.3	0.155	1401187	203.094	20.4	2,458.1
6.06	364	71.61	71.6	0.170	1277090	184.447	18.6	2,476.7
6.36	382	63.66	63.7	0.188	1163320	167.451	17.0	2,493.7
6.67	400	56.41	56.4	0.207	1058958	151.969	15.5	2,509.2
6.97	418	49.82	49.8	0.228	963158	137.876	14.1	2,523.3
7.27	436	43.82	43.8	0.251	875145	125.058	12.8	2,536.1
7.58	455	38.37	38.4	0.277	794205	113.412	11.6	2,547.8
7.88	473	33.42	33.4	0.305	719683	102.842	10.6	2,558.3
8.18	491	28.94	28.9	0.337	650972	93.264	9.6	2,567.9
8.48	509	24.89	24.9	0.371	587516	84.601	8.7	2,576.6
8.79	527	21.23	21.2	0.409	528796	76.782	7.8	2,584.4
9.09	545	17.94	17.9	0.450	474332	69.745	7.0	2,591.4
9.39	564	14.98	15.0	0.495	423675	63.432	6.3	2,597.8
9.70	582	12.34	12.3	0.544	376407	57.794	5.6	2,603.4
10.00	600	10.00	10.0	0.595	332128	52.784	5.0	2,608.4

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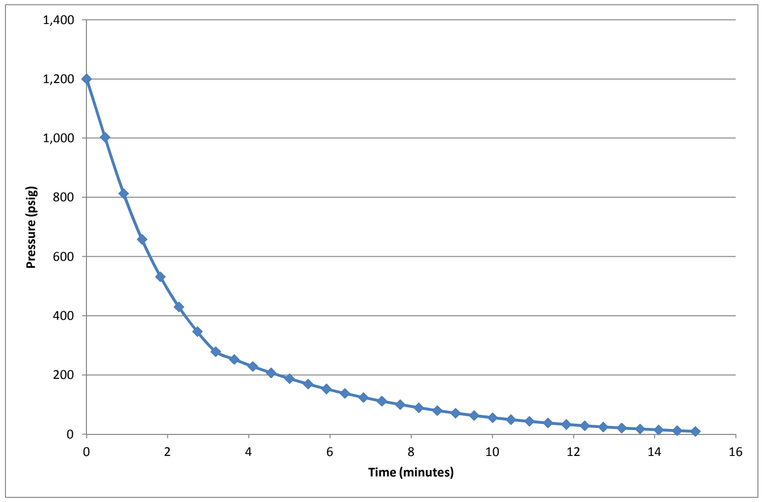
BLOWDOWN CALCULATIONS

Reference Data		Initial	Change
Orifice Diameter, Inches		3.351	3.351
Choke Area	in2	8.820	
Inlet Pipe OD	in	12"	
Inlet Pipe Class		D	
Schedule		40	
Inlet Pipe ID	in	11.938	
Pseudo Critical Pressure		675.500	
Pseudo Critical Temperature		347.900	
Beta Ratio, d2/d1		0.281	
Settleout Z		0.916	
Gas Molecular Weight		16.700	
Gas Gravity		0.576	
Cp/Cv Ratio		40.988	
Time Increment, seconds		27.273	
Critical Ratio, Pcrt		0.044	
Expansion Factor, Fcr		1.353	
Gravity Correction Factor		1.020	
Vent Header Back Pressure, psig		0.000	
Initial Blowdown Volume, ft3		12,176.739	
Mole to Blowdown, LB-Moles		2,661.184	
Settleout Pressure, psig		1,200.000	
Ave. Settleout Temp., deg R/deg F		580.150	°R / 120°F



Time, minutes	Time, seconds	Pi, psig	dP, psi	Po / Pi	Rate, scfh	Inventory Moles	Vented Moles	Total Vent
0.00	0	1200.00	1200.0	0.012	24316754	2661.184	-	
0.45	27	1003.43	1003.4	0.014	20381613	2175.761	485.4	485.4
0.91	55	813.04	813.0	0.018	16570251	1768.894	406.9	892.3
1.36	82	658.25	658.3	0.022	13471614	1438.111	330.8	1,223.1
1.82	109	532.41	532.4	0.027	10952422	1169.184	268.9	1,492.0
2.27	136	430.10	430.1	0.033	8904319	950.547	218.6	1,710.6
2.73	164	346.92	346.9	0.041	7239211	772.794	177.8	1,888.4
3.18	191	279.30	279.3	0.050	2782396	628.282	144.5	2,032.9
3.64	218	253.31	253.3	0.055	2542341	572.738	55.5	2,088.4
4.09	245	229.56	229.6	0.060	2322850	521.987	50.8	2,139.2
4.55	273	207.86	207.9	0.066	2122147	475.617	46.4	2,185.6
5.00	300	188.04	188.0	0.073	1938608	433.254	42.4	2,227.9
5.45	327	169.93	169.9	0.080	1770749	394.554	38.7	2,266.6
5.91	355	153.39	153.4	0.087	1617212	359.206	35.3	2,302.0
6.36	382	138.28	138.3	0.096	1476756	326.922	32.3	2,334.3
6.82	409	124.49	124.5	0.106	1348244	297.443	29.5	2,363.7
7.27	436	111.89	111.9	0.116	1230636	270.528	26.9	2,390.7
7.73	464	100.40	100.4	0.128	1122982	245.962	24.6	2,415.2
8.18	491	89.91	89.9	0.141	1024411	223.544	22.4	2,437.6
8.64	518	80.34	80.3	0.155	934125	203.094	20.4	2,458.1
9.09	545	71.61	71.6	0.170	851393	184.447	18.6	2,476.7
9.55	573	63.66	63.7	0.188	775547	167.451	17.0	2,493.7
10.00	600	56.41	56.4	0.207	705972	151.969	15.5	2,509.2
10.45	627	49.82	49.8	0.228	642105	137.876	14.1	2,523.3
10.91	655	43.82	43.8	0.251	583430	125.058	12.8	2,536.1
11.36	682	38.37	38.4	0.277	529470	113.412	11.6	2,547.8
11.82	709	33.42	33.4	0.305	479788	102.842	10.6	2,558.3
12.27	736	28.94	28.9	0.337	433982	93.264	9.6	2,567.9
12.73	764	24.89	24.9	0.371	391677	84.601	8.7	2,576.6
13.18	791	21.23	21.2	0.409	352530	76.782	7.8	2,584.4
13.64	818	17.94	17.9	0.450	316221	69.745	7.0	2,591.4
14.09	845	14.98	15.0	0.495	282450	63.432	6.3	2,597.8
14.55	873	12.34	12.3	0.544	250938	57.794	5.6	2,603.4
15.00	900	10.00	10.0	0.595	221419	52.784	5.0	2,608.4

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Case	Stack	Height Above	Stack Gas Flow					Stack Temperature		Temperature Correction Factor	Stack Pressure		Pressure Correction Factor	Corrected Stack Flow		Stack Area	Stack
	Diameter in	Ground ft	MW	lb/hr	MMSCFD	SCFS	lbmol/hr	°F	R		psig	psia		ft3/sec	ft3/min	ft2	Velocity ft/s
Emergency	96	20	16.700	1,193,416	650	7,523	71,460	80	540	1.174	0	14.700	1.000	8,831	529,866	50.265	175.689
5 min	96	20	16.700	3,214,495	1,751	20,264	192,479	80	540	1.174	0	14.700	1.000	23,787	1,427,206	50.265	473.223
10 min	96	20	16.700	1,607,262	875	10,132	96,240	80	540	1.174	0	14.700	1.000	11,893	713,609	50.265	236.613
15 min	96	20	16.700	1,071,508	584	6,755	64,160	80	540	1.174	0	14.700	1.000	7,929	475,740	50.265	157.742

	MOLECULAR WEIGHT LB/LBMOL	MOL FRACTION	MASS FRACTION	GAS VOLUME LBMOL	GAS MASS LBM
METHANE	16.042	0.968	0.895	2,574.70	41,303.26
ETHANE	30.069	0.015	0.051	40.80	1,226.69
PROPANE	44.096	0.002	0.011	5.14	226.48
ISO-BUTANE	58.122	0.000	0.003	1.01	58.78
N-BUTANE	58.122	0.000	0.003	1.06	61.87
ISO-PENTANE	72.149	0.000	0.000	0.43	30.72
N-PENTANE	72.149	0.000	0.000	0.27	19.20
N-HEXANE	86.175	0.000	0.005	0.85	73.38
CYCLOHEXANE	84.159	0.000	0.000	0.00	0.00
N-HEPTANE	100.202	0.000	0.000	0.00	0.00
BENZENE	78.112	0.000	0.000	0.00	0.00
TOLUENE	92.138	0.000	0.000	0.00	0.00
ETHYLBENZENE	106.165	0.000	0.000	0.00	0.00
XYLENE	106.165	0.000	0.000	0.00	0.00
STYRENE	104.149	0.000	0.000	0.00	0.00
CARBON DIOXIDE	44.100	0.010	0.026	25.73	1,134.85
WATER	18.015	0.000	0.000	0.00	0.00
NITROGEN	28.014	0.004	0.004	11.20	313.86
TOTAL	16.70	1.000	1.000	2,661	44,449
THC		0.986	0.969	2,624	43,000
NMHC		0.019	0.074	50	1,697
NMNEHC (VOCs)		0.003	0.023	9	470
HEXANE		0.000	0.005	1	73

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Company	Facility	
Cheniere Corpus Christi Pipeline, L.P.	Sinton Compressor Station	
Descriptive Name of Emission Point	TEMP Subject Item ID	Emission Point ID No.
Station Discharge Blowdown Stack	N/A	EQT004

Emissions Per Event[1]			
Pollutant	5 min	10 min	15 min
	(lb/hr)	(lb/hr)	(lb/hr)
CO_2	13,618.20	6,809.10	4,539.40
CH_4	495,639.12	247,819.56	165,213.04
CO_2-e	-	-	-

Emissions Per Year[1]			
Pollutant	2 Events	3 Events	4 Events
	TPY	TPY	TPY
CO_2	1.13	1.70	2.27
CH_4	41.30	61.95	82.61
CO_2-e	868.50	1,302.75	1,737.01

(1) Emission calculation methodology based upon process simulations using worst case scenario.

US EPA ARCHIVE DOCUMENT

Response to Comments
Application Completeness Determination for Cheniere Corpus Christi Pipeline, L.P.
Greenhouse Gas Prevention of Significant Deterioration Permit
Sinton Compressor Station

ATTACHMENT 9

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CO_2 BACT for Blowdown Stacks

The station suction and discharge blowdown stacks and unit blowdown stacks for the compression turbines are used in the event of process upsets. Based on process knowledge from other existing facilities, annual blowdown emissions were estimated based on one blowdown per unit per month for each of the unit blowdown stacks and one blowdown per three months for the station discharge and station suction blowdown stacks. The total CO_2 emissions from the blowdown stacks are anticipated to be no more than 6.30 tpy.

Identification of Potential CO2 Control Technologies (Step 1)

GHG Emission Reduction Measure	Description
Seal Gas Booster System	A seal gas booster system which helps maintain longer periods of pressurization.

Eliminate Technically Infeasible Options (Step 2)

CCPL is planning to implement an additional seal gas booster system for the gas compressors. This system will allow compressors to remain pressurized for longer durations once the compressor goes into shutdown mode. Once the unit is restarted within the extended pressurization period, no gas will be blown down.

Rank of Remaining Control Technologies (Step 3)

This reduction measure will be implemented; therefore, no additional ranking is required.

Evaluation of Most Stringent Controls (Step 4)

The seal gas booster system provides a positive flow of clean, dry gas to the compressors' dry gas seals during compressor shutdowns, while maintaining pressurization to reduce the possibility of potential blown down gas. There is no adverse energy or environmental impacts associated with the implementation of a seal gas booster system.

Selection of CO2 BACT (Step 5)

CO2 BACT for the blowdown stacks will be a seal gas booster system which will allow the gas compressors to remain pressurized for longer durations once the compressors go into shutdown mode, reducing the potential for gas to be blown down. A numerical BACT emission limitation is not feasible for the blowdown stacks as the number of scheduled events is based on process knowledge from similar existing facilities.
CH4 BACT for Blowdown Stacks

The station suction and discharge blowdown stacks and unit blowdown stacks for the compression turbines are used in the event of process upsets. Based on process

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knowledge from other existing facilities, annual blowdown emissions were estimated based on one blowdown per unit per month for each of the unit blowdown stacks and one blowdown per three months for the station discharge and station suction blowdown stacks. The total CH_4 emissions from the blowdown stacks are anticipated to be no more than 229.07 tpy.

Identification of Potential CH4 Control Technologies (Step 1)

GHG Emission Reduction Measure	Description
Seal Gas Booster System	A seal gas booster system which helps maintain longer periods of pressurization.
Burn Potential Blowdown Gas as Fuel	Burn potential blowdown gas as fuel for the turbines.

Eliminate Technically Infeasible Options (Step 2)

CCPL is planning to implement an additional seal gas booster system for the gas compressors. This system will allow compressors to remain pressurized for longer durations once the compressor goes into shutdown mode. Once the unit is restarted within the extended pressurization period, no gas will be blown down.

In addition CCPL will have the capability to burn potential blowdown gas as fuel for the turbines, which will minimize potential CH_4 emissions.

Rank of Remaining Control Technologies (Step 3)

Both reduction measures will be implemented; therefore, no additional ranking is required.

Evaluation of Most Stringent Controls (Step 4)

The seal gas booster system provides a positive flow of clean, dry gas to the compressors' dry gas seals during compressor shutdowns, while maintaining pressurization to reduce the possibility of potential blown down gas. In addition, the capability to burn potential blowdown gases will reduce the possibility of releasing CH_4 directly to the atmosphere. There is no adverse energy or environmental impacts associated with the implementation of a seal gas booster system that would affect the GHG BACT selection process for the blowdown stacks.

Selection of CH4 BACT (Step 5)

CH_4 BACT for the blowdown stacks will be a seal gas booster system which will allow the gas compressors to remain pressurized for longer durations once the compressors go into shutdown mode, reducing the potential for gas to be blown down. The facility will also have the capability to burn potential blowdown gases as fuel in turbines, provided that at least one turbine is on-line.

US EPA ARCHIVE DOCUMENT

Response to Comments
Application Completeness Determination for Cheniere Corpus Christi Pipeline, L.P.
Greenhouse Gas Prevention of Significant Deterioration Permit
Sinton Compressor Station

ATTACHMENT 10

US EPA ARCHIVE DOCUMENT

Component Name	Stream Type	Number of Components	Emission Factor	Uncontrolled Emissions Rates	
			lb/hr	lb/hr	Ton/year
Valves	Gas	**70**	9.92E-03	0.69	3.04
Pumps	Gas	**0**	5.29E-03	0.00	0.00
Flanges/Connectors	Gas	**140**	8.60E-04	0.12	0.53
Compressors	Gas	**2**	1.94E-02	0.04	0.17
Relief Valves	Gas	**10**	1.94E-02	0.19	0.85
Open-ended Lines	Gas	**7**	4.41E-03	0.03	0.14
Connectors	Gas	**0**	4.40E-04	0.00	0.00
Others	Gas	**0**	1.94E-02	0.00	0.00
Process Drains	Gas	**7**	1.94E-02	0.14	0.59
Valves	Water / Light Oil	**15**	2.16E-04	0.00	0.01
Pumps	Water / Light Oil	**1**	5.20E-05	0.00	0.00
Flanges/Connectors	Water / Light Oil	**26**	6.00E-06	0.00	0.00
Compressors	Water / Light Oil	**0**	3.09E-02	0.00	0.00
Relief Valves	Water / Light Oil	**2**	3.09E-02	0.06	0.27
Open-ended Lines	Water / Light Oil	**7**	5.50E-04	0.00	0.02
Connectors	Water / Light Oil	**7**	2.43E-04	0.00	0.01
Others	Water / Light Oil	**0**	3.09E-02	0.00	0.00
Process Drains	Water / Light Oil	**7**	3.09E-02	0.22	0.95
Valves	Light Oil	**15**	5.50E-03	0.08	0.36
Pumps	Light Oil	**1**	2.87E-02	0.03	0.13
Flanges/Connectors	Light Oil	**25**	2.43E-04	0.01	0.03
Compressors	Light Oil	**0**	1.65E-02	0.00	0.00
Relief Valves	Light Oil	**2**	1.65E-02	0.03	0.14
Open-ended Lines	Light Oil	**7**	3.09E-03	0.02	0.09
Connectors	Light Oil	**7**	4.63E-04	0.00	0.01
Others	Light Oil	**0**	1.65E-02	0.00	0.00
Process Drains	Light Oil	**7**	1.65E-02	0.12	0.51
		THC	96.74	1.73	7.59
		NMHCs	3.82	0.07	0.30
		NMNEHCs(VOCs)	1.06	0.02	0.08
		HEXANE	0.17	0.00	0.01

Company	**Facility**	
Cheniere Corpus Christi Pipeline, L.P.	Sinton Compressor Station	
Descriptive Name of Emission Point	**TEMP Subject Item ID**	**Emission Point ID No.**
Fugitive Emissions	NA	FUG01

Pollutant	Emission Factor	Reference	Emission Rates		
			Avg (lb/hr)	Max (lb/hr)	Annual (tons/yr)
CH_4	NA	Client Provided	-	1.66	7.29
CO_2e[(1)]	NA	40 CFR 60 Part 98 Subpart A, Table A-1	-	-	153.09

(1) Global Warming Potentials (GWP) taken from 40 CFR 60 Part 98 Subpart A, Table A-1

(2) All emission factors taken from Table 4 for Oil and Gas Production Operations in "Emissions for Equipment Leak Fugitive Components" (Jan, 2008) - Addendum to RG-360A

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