



Southern Star Central Gas Pipeline, Inc.
4700 State Route 56
P.O. Box 20010
Owensboro, Kentucky 42301
Phone 270/852-5000

Will Wathen
Director, Rates & Billing
Phone: (270) 925-1969
Email: will.wathen@southernstar.com

December 22, 2022

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Southern Star Central Gas Pipeline, Inc.
Docket No. RP23-_____
Quality Specifications

Dear Ms. Bose:

Pursuant to Part 154 of the Rules and Regulations of the Federal Energy Regulatory Commission ("Commission") and Section 32 of the General Terms and Conditions ("GT&C") of its FERC Gas Tariff, First Revised Volume No. 1 ("Tariff"), Southern Star Central Gas Pipeline, Inc. ("Southern Star") respectfully submits via eFiling, the revised tariff sheets listed below to become effective on February 1, 2023, as more fully described herein.

First Revised Volume No. 1

Third Revised Sheet No. 207
Third Revised Sheet No. 208
Fourth Revised Sheet No. 209

Statement of Nature, Reasons and Basis for Filing

Southern Star is proposing adjustments to the gas quality specifications set forth in Section 3 of the General Terms and Conditions ("GT&C") of its Tariff to achieve a reasonable balance between Southern Star's operational standards and the importance of maximizing supply, all while remaining consistent with the Commission's Policy Statement on Provisions Governing Natural Gas Quality and Interchangeability in Interstate Natural Gas Pipeline Company Tariffs ("Policy Statement").¹

¹ 115 FERC ¶ 61,325 (2006).

Southern Star proposes these updates after a comprehensive review of its gas quality specifications and the gas quality provisions of its receipt points, end-use markets, and interconnected pipelines.² Further, Southern Star has been in regular communication and collaboration with its shippers and other interested parties, including holding open virtual meetings on June 10, 2021, August 12, 2021, and August 16, 2022, soliciting shippers or interested parties to inquire about proposed gas quality standards during its regular monthly virtual customer meetings, presenting on the gas quality standards at the in-person customer meeting in Kansas City on May 10, 2022, and conducting several individual meetings as requested by shippers, all of which have resulted in consensus with several interested parties.³

Specifically, Southern Star is proposing updates to its gas quality specifications to address three areas of interest: heat content, inert gases, and carbon dioxide. Unless otherwise specified, these standards are submitted individually and are not dependent or contingent on the approval of any other proposed standard herein.

a. Heat Content

To mitigate operational and interchangeability issues related to higher heat content, while maximizing supply to its markets, Southern Star proposes to adjust the following gas quality specifications for gas received onto its system related to heat content:

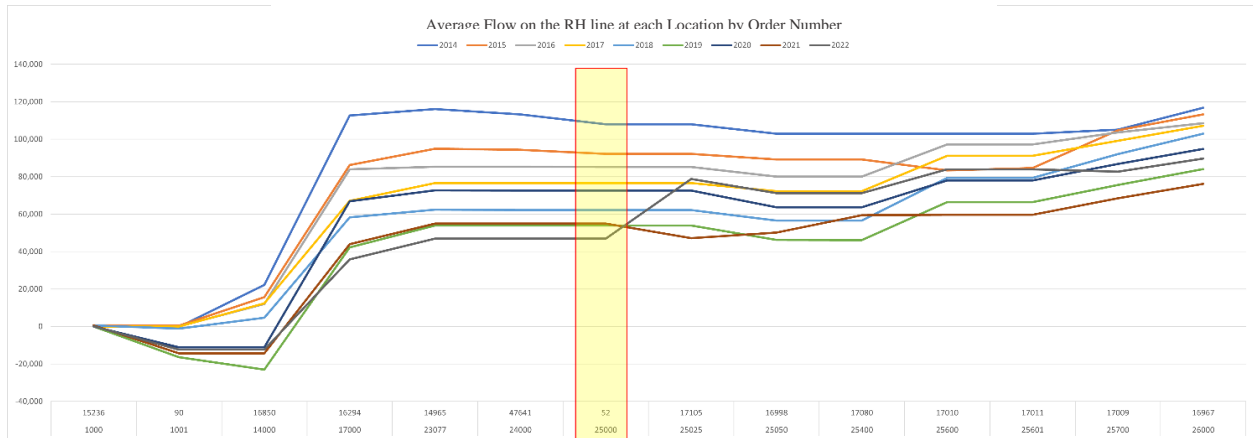
- **Maximum Heating Value** – Southern Star does not currently have a maximum heating value specification. Southern Star proposes to amend GT&C Section 3.2(g) to establish a maximum heating value of 1,125 BTU per cubic foot. This will improve Southern Star’s interchangeability with the pipeline grid and increase shippers’ confidence that their gas can be delivered to downstream operators.
- **Hydrocarbon Dewpoint (“HCDP”)** – Southern Star does not propose to change its current HCDP level of $\leq 40^{\circ}\text{F}$. However, Southern Star does propose to change the way HCDP is measured to give a more representative measurement of actual HCDP to shippers. Southern Star proposes to change the current language in GT&C Section 3.2(a) from $\leq 40^{\circ}\text{F}$ “*based upon an assumed pressure of seven hundred fifty (750) pounds per square inch absolute*” to $\leq 40^{\circ}\text{F}$ “*based upon flowing pressure*”. That is, Southern Star will determine a shipper’s HCDP using actual flowing pressure rather than an assumed pressure of 750 pounds per square inch absolute.

The proposed change to the maximum BTU level is just and reasonable. Southern Star has experienced an increase in the heat content of natural gas transported on certain portions of its system and expects this increase to continue. For example, in Southern Star’s RH line, Southern Star receives gas with elevated heat content at its Sterling (Grasslands) and Noble (Lilli) receipt points in Colorado. In the past, Southern Star has been able to successfully blend the gas down to levels acceptable to shippers at downstream delivery points. However, as shown in Diagram 1, the amount of lower BTU gas flowed upstream from these higher BTU points has decreased over time to a point where it is becoming difficult to blend down the gas with higher heat content.

² A table comparing the gas quality standards of the pipelines and markets connected to Southern Star is provided in Appendix C.

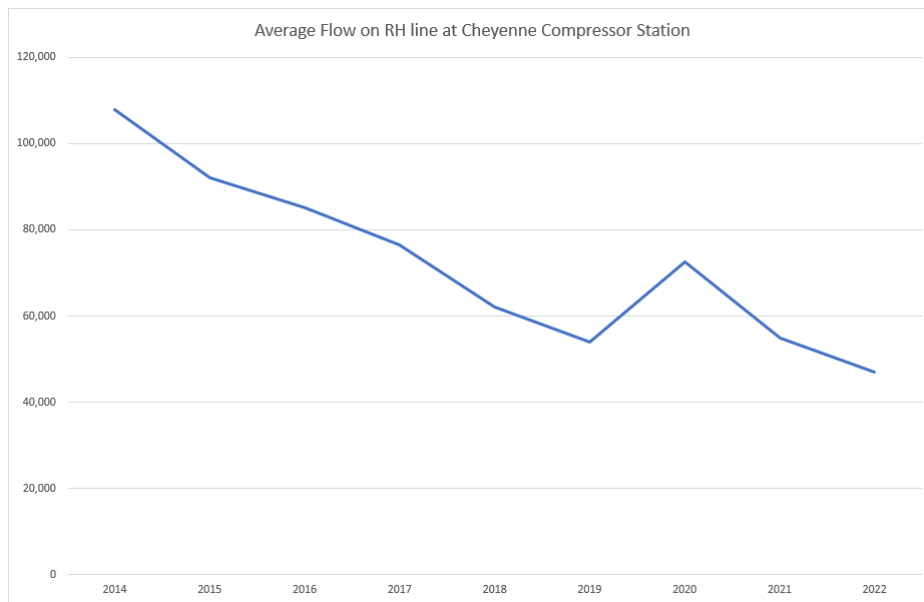
³ The presentations for the virtual meetings are attached as Appendix D.

Diagram 1:



The following Diagram 2 further demonstrates the overall decrease in gas flowed on the RH line measured at Southern Star’s Cheyenne Compressor Station from 2014 to 2022, which is the highlighted area on Diagram 1. Again, this decrease in total volumes negatively affects Southern Star’s ability to successfully blend gas to lower BTU levels.

Diagram 2:



Southern Star experiences operational impacts because the increased heat content affects deliveries to several points where the gas exceeds certain downstream operators’ quality specifications. For example, at Southern Star’s KGST Alden delivery point, Kansas Gas Service (“KGS”) (one of Southern Star’s largest customers) often must be put on notice because of spiking BTU levels due to KGS’s 1,100 maximum BTU limit. KGS has notified Southern Star several times that it may have to shut in this delivery point due to this increased BTU limit. Additionally, average BTU levels at the KGST Alden delivery point have increased

from a level of 1,017.4 BTU in January of 2012 to 1,068.5 BTU in December of 2022, which demonstrates the trending increase of BTU levels at this important delivery point, which, again, Southern Star anticipates to increase in the future.

Southern Star has discussed the costs of compliance with at least one upstream shipper, and Southern Star has assured them they would be afforded reasonable time to modify their systems to meet the upper BTU limit if necessary. Southern Star will of course consider any other shippers' legitimate concerns as needed.

In its Policy Statement, the Commission stated that "pipelines and their customers are strongly encouraged to use the [National Gas Council Plus] ("*NGC+*") *interim guidelines* as a common scientific reference point for resolving gas quality and interchangeability issues." The *NGC+ interim guidelines* provide for a maximum heating value limit of 1,110 BTU/scf, a stricter standard than the 1,125 BTU proposed by Southern Star. Additionally, the proposed 1,125 BTU maximum heating value is supported by Southern Star's analysis of the heating values of gas that is delivered onto the Southern Star system. That is, Southern Star's proposal is tailored to be compatible with, and more relaxed than, the standards of various pipelines that interconnect and deliver gas onto Southern Star.⁴ Therefore, the costs to these interconnects to meet these proposed standards would be minimal (or often non-existent, assuming the pipelines meet their own quality standards).

For the foregoing reasons, Southern Star's proposed changes to its gas quality standards related to heat content are just and reasonable.

b. Inert Gases

Southern Star has experienced impacts to end-use markets with elevated concentrations of inert gases (carbon dioxide, oxygen, nitrogen, and helium) on certain segments of its system which make the natural gas unmerchantable to downstream operators. As a result, Southern Star proposes the following:

- **Inerts** – Southern Star proposes to add a new specification for total inerts (carbon dioxide, oxygen, nitrogen, and helium) in GT&C Section 3.2(j), limiting total inerts to no more than 5% by volume in the Market Area only. This is a more relaxed standard than found in the *NGC+ interim guidelines*, which recommends a 4% standard. Additionally, this specification is in line with many of Southern Star's interconnects with other pipelines.⁵

Inert gases have no heating value, take up space in Southern Star's pipeline and reduce its operational efficiency. Regarding nitrogen specifically, Southern Star often has several receipt points, including Superior Bellmon and Superior Perkins that spike up to 7% nitrogen levels. While these receipt points are in the Production Area, customers downstream at, for example, the large Enable Jane delivery point

⁴ E.g., Enable Gas Transmission, LLC – 1,100 maximum BTU; Enable Oklahoma Intrastate Transmission, LLC – 1,080 BTU; Kansas Gas Service – 1,100 BTU; Natural Gas Pipeline Company of America, LLC – 1,110 BTU; OkTex Pipeline Company – 1,080 BTU; ONEOK Gas Transportation, LLC – 1,080 BTU; ONEOK WesTex Transmission, LLC – 1,100 BTU; Tallgrass Interstate Gas Transmission, LLC – 1,100 BTU; Transwestern Pipeline Company, LLC – 1,110 BTU.

⁵ MountainWest Pipeline, LLC – 3%; Natural Gas Pipeline Company of America, LLC – 4%; ONEOK Gas Transportation, LLC – 4%; ONEOK WesTex Transmission, LLC – 5%; Rockies Express Pipeline, LLC – 3%; Transwestern Pipeline, LLC – 3% (Carbon Dioxide plus Nitrogen).

located in the Market Area must be warned of these spikes. Southern Star also has several customers that require gas quality warnings when nitrogen spikes above 3-4% so that they may time their deliveries from Southern Star accordingly. A main concern for shippers in the Market Area is the quick oscillation of inert levels do not allow enough time for them to prepare their equipment for such spikes. Southern Star has limited this specification to the Market Area after conferring with several Production Area producers concerned with the cost of compliance. This limited application will allow Southern Star to better address the operational impacts of inerts to shippers in the Market Area while balancing the Production Area producers' concerns that their gas will be accepted onto the Southern Star system.

After multiple discussions and collaboration on the final proposed specification, Southern Star anticipates the cost for upstream shippers to conform to these proposed standards to be minimal, especially since this standard is limited to the Market Area.

For the foregoing reasons, Southern Star's proposed change to its gas quality standards related to inert gases is just and reasonable.

c. Carbon Dioxide ("CO₂") and Oxygen ("O₂")

Southern Star proposes to offer a relaxed CO₂ specification option, conditioned on a decreased O₂ level, to dramatically increase the amount of in-specification gas that may be brought onto its system while still protecting against the acceleration and risk of corrosion posed by Southern Star's storage field operations. In effect, this proposed change would serve only to increase the amount of in-specification gas that can be brought onto Southern Star's system, as demonstrated below. The following changes to CO₂ and O₂ are submitted as a combined specification contingent on approval of both.

- **Carbon Dioxide ("CO₂") and Oxygen ("O₂")** – Currently, Southern Star's systemwide CO₂ specification is 1% by volume, and its systemwide O₂ specification is 0.2% by volume (2,000 parts per million ("PPM")). Southern Star proposes to include an option to relax the gas quality specification in GT&C Section 3.2(d) for CO₂ from ≤ 1% to ≤ 2% by volume, for any supply point that operates ≤ 10 PPM oxygen, while maintaining the current 0.2% by volume (2,000 PPM) oxygen limit for supply points that operate at or below one percent (1%) CO₂. Further, Southern Star currently has a 10 PPM oxygen standard on Line Segments 315, 340, and 385 to facilitate off-system deliveries associated with system expansion, and this specification will remain in place, regardless of the CO₂ levels. However, Southern Star proposes that the CO₂ limit on these segments also be relaxed from ≤ 1% to ≤ 2%.

Southern Star wishes to relax its carbon dioxide standard from its current level of 1% to 2% primarily to promote increased supply from off-system receipt points. For years, a leading request on Southern Star customer surveys has been simple: more supply. Southern Star wants to meet this need. Additionally, and more urgently, during 2021's Winter Storm Uri, Southern Star was forced to rely on off-system pipelines to meet its customers' needs when the storm knocked out significant portions of its on-system supply. These interconnects proved crucial to Southern Star's ability to maintain service to its customers, including and especially LDCs serving residential customers. However, several of these off-system receipt points operate with gas containing carbon dioxide levels above Southern Star's current 1% specification. In fact, Southern Star's current 1% standard is stricter than most pipelines, which are typically at two

percent (2%), and is stricter than any pipeline to which Southern Star actually interconnects.⁶ As a result, during Uri, Southern Star was forced to accept out-of-specification gas at several receipt points to ensure continued operations.

Southern Star's system-wide 1% carbon dioxide standard currently in place was originally developed to minimize corrosion caused by the presence of water produced in its storage fields, which produces acid when combined with carbon dioxide.⁷ This acid causes pipeline corrosion, especially in the presence of elevated oxygen levels, which acts as a catalyst in acid production. Southern Star wishes to relax this tight CO₂ standard, but must account for the continued operational risk of pipeline corrosion in the presence of increased O₂ levels. Therefore, at receipt points where CO₂ levels exceed 1%, Southern Star proposes to limit the oxygen content to 10 PPM. Southern Star would simply maintain the current higher 2,000 PPM O₂ limit for supply points that operate at or below 1% CO₂.

In effect, this proposed change offers no additional burden or expense to any shipper since all deliveries system-wide are currently subject to the 1% CO₂/2,000 PPM O₂ levels. Further, there are currently no pipeline interconnects that flow gas onto Southern Star's system that would both exceed the 1% CO₂ and an oxygen content of 10 PPM (meaning that all could elect to flow gas onto Southern Star at the relaxed 2% level). This proposed option for higher CO₂ coupled with lower oxygen comports with stricter oxygen specifications at several interconnects.⁸ That is, this change would *only increase* the amount of supply that Southern Star can bring onto its system without limiting any shipper's current ability to deliver in-specification gas.

Southern Star expects that several shippers will save money due to this proposal because they will no longer have to treat their gas to meet Southern Star's strict CO₂ standard. For example, Cheyenne Plains ("CPP") can currently flow approximately 205k Dth/d at 1% CO₂ if they treat the gas through an amine treatment facility (at an increased cost). If it can forego amine treatment, CPP can flow at approximately 450-550k Dth/d. That is, allowing CPP to flow at the higher CO₂ level would negate the need for the amine treatment, allowing it to flow much more gas at a lower unit cost.

Additionally, Southern Star has a future need for this relaxed CO₂ specification as several pipelines that have been identified as possible future interconnects have a 2% CO₂ specification in their tariffs.

In summary, there is only upside to this proposal, which results in increased supply for Southern Star's current and future shippers at a minimal cost. For the foregoing reasons, Southern Star's proposed changes to CO₂ and O₂ standards are just and reasonable.

⁶ ANR Pipeline, Cheyenne Plains Gas Pipeline Company, LLC, Enable Gas Transmission, LLC, Kansas Gas Service, Natural Gas Pipeline Company of America, LLC; Northern Natural Gas Company; OkTex Pipeline Company; ONEOK Gas Transportation, LLC; ONEOK WestTex Transmission, LLC; Panhandle Eastern Pipe Line Company, LP; Rockies Express Pipeline, LLC; Tallgrass Interstate Gas Transmission, LLC; and Transwestern Pipeline Company LLC are all Southern Star interconnects with a 2% carbon dioxide standard. Colorado Interstate Gas Company has a 3% standard. MountainWest Pipeline, LLC has no standard.

⁷ These storage-related water concerns form the same basis for Columbia's accepted carbon dioxide limit of 1.25%. *See Norstar Operating, LLC*, 118 FERC ¶ 61,221, 62,114-15 (2007).

⁸ Cheyenne Plains Gas Pipeline Company, LLC; Colorado Interstate Gas Company, LLC; Enable Oklahoma Intrastate Transmission, LLC; MountainWest Pipeline, LLC; Natural Gas Pipeline Company of America, LLC; Rockies Express Pipeline, LLC; and Tallgrass Interstate Gas Transmission, LLC all have a 10 PPM oxygen specification.

d. Consistency with the Commission's Gas Quality Policy Statement

Southern Star's proposed gas quality specifications follow the five principles⁹ found in the Commission's Policy Statement:

1. *Only natural gas quality and interchangeability specifications contained in a Commission-approved gas tariff can be enforced;*

As outlined above, Southern Star is proposing to add the gas quality specifications to its Tariff that will be applicable as specified.

2. *Pipeline tariff provisions on gas quality and interchangeability need to be flexible;*

Southern Star has worked with its shippers to develop standards that offer optionality and flexibility. This is clearly demonstrated by the conditional CO₂ standard, which offers a novel solution to Southern Star's current tight 1% CO₂ limit while addressing the increased risk of corrosion posed by water entering the system through the storage fields. Similarly, the HCDP standard at 3.2(a) offers waivers for certain receipt points on Southern Star's "wet" line. Southern Star currently has adequate waiver provisions applicable to all quality standards which allow Southern Star to accept non-conforming gas on a non-discriminatory basis. Southern Star has worked with shippers individually and will allow shippers reasonable time to modify their facilities to meet the new specifications, if needed. Further, Southern Star has assured its shippers that, in the case of non-conformance, "Each occurrence will be evaluated to ensure system and end user integrity is maintained."¹⁰

3. *Pipelines and their customers should develop gas quality and interchangeability specifications based on technical requirements;*

Southern Star has held several public meetings, as well as worked directly with concerned shippers, to present its desired gas quality standards and its reasoning, take feedback from customers, and adjust its proposal to meet those concerns. Southern Star shared the proposed gas quality specifications through virtual presentations open to all interested parties on June 10, 2021, August 12, 2021, and August 16, 2022, solicited shippers or interested parties to inquire about proposed gas quality standards during its regular monthly virtual customer meetings, presented on the gas quality standards at the in-person customer meeting in Kansas City on May 10, 2022, and conducted several individual meetings as requested by shippers. Southern Star requested feedback after every presentation and adjustments were made to the proposed specifications based on the feedback received. On August 16, 2022, Southern Star shared the updated gas quality specifications resulting from the collaboration and discussion with the parties, which are the same as what are included in this filing. The presentation reflects the changes originally proposed to the shippers, and the changes Southern Star made as a result of their feedback.

⁹ Policy Statement on Provisions Governing Natural Gas Quality and Interchangeability in Interstate Natural Gas Pipeline Company Tariffs, 115 FERC ¶ 61,325 at P 1 (2006).

¹⁰ See *Gas Quality Specifications, Planned Tariff Changes, August 16, 2022*, attached as part of Appendix D.

4. *In negotiating technically based solutions, pipelines and their customers are strongly encouraged to use the NGC+ interim guidelines as a common reference point for resolving gas quality and interchangeability issues;*

As mentioned above, Southern Star is proposing to add a maximum heating value of 1,125 BTU and a specification requiring total inerts, in the Market Area, to be no more than 5% by volume. Both of these proposed specifications are more relaxed than what is included in the *NGC+ interim guidelines*. The other specifications proposed by Southern Star in this filing are not addressed in the *NGC+ interim guidelines*.

5. *To the extent pipelines and their customers cannot resolve disputes over gas quality and interchangeability, those disputes can be brought before the Commission to be resolved on a case-by-case basis, on a record of fact and technical review.*

Southern Star reiterates that it has worked with its shippers and other concerned parties to minimize disagreement and attempt to resolve any concerns pre-filing. After each discussion with interested parties, Southern Star requested their feedback. Based on the feedback received, Southern Star further analyzed the specifications being proposed and adjusted them to accommodate the needs of both Southern Star and the party providing the feedback. Slide number four of the August 16, 2022 presentation shows the adjustments made to Southern Star's proposed specifications compared to the specifications originally proposed in its 2021 presentations.

List of Materials Enclosed

In accordance with Section 154.7(a)(1) of the Commission's regulations, submitted herewith is an eTariff XML filing package, filed as a zip (compressed) file, containing:

- i. The proposed tariff record versions in RTF format with metadata attached;
- ii. A transmittal letter;
- iii. Appendix A – A clean version of the tariff records;
- iv. Appendix B – A marked version of the tariff records;
- v. Appendix C – Interchangeability provisions; and
- vi. Appendix D – Virtual meeting presentations from June 10, 2021, August 12, 2021, and August 16, 2022.

Proposed Effective Date and Request for Waiver

Southern Star respectfully requests that the revised tariff sheets become effective February 1, 2023, which date is at least thirty (30) days after receipt of this filing by the Commission. Southern Star respectfully requests that the Commission grant any and all waivers as may be necessary for the tariff sheets to become effective February 1, 2023.

Kimberly D. Bose, Secretary

December 22, 2022

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Motion to Place Tariff Sheets into Effect

Pursuant to Section 154.7(a)(9) of the Commission's Regulations, Southern Star moves to place the aforementioned revised tariff sheets into effect at the end of the minimal suspension period requested above. Southern Star reserves the right, however, to file a later motion to move the tariff sheets into effect in the event of any change to such tariff sheets which may be ordered by the Commission or a determination by the Commission that a longer suspension period is in order.

Correspondence

Southern Star respectfully requests that all Commission orders and correspondence, as well as pleadings and correspondence from other persons, concerning this filing be served upon:

Will Wathen
Director, Rates & Billing
Southern Star Central Gas Pipeline, Inc.
4700 State Route 56
Owensboro, KY 42301
Phone: (270) 925-1969
will.wathen@southernstar.com

John S. Wathen
Staff Attorney
Southern Star Central Gas Pipeline, Inc.
4700 State Route 56
Owensboro, KY 42301
Phone: (502) 443-4549
john.wathen@southernstar.com

If there are any questions pertaining to this filing, please contact any of the parties listed above.

Posting and Certificate of Service

Copies of this filing are being distributed to Southern Star's jurisdictional customers and interested state commissions, as well as posted on CSI, Southern Star's online customer service system. A copy of this filing will be available for public inspection during regular business hours at Southern Star's main office at 4700 State Route 56, Owensboro, KY 42301.

Pursuant to Section 385.2005 of the Commission's regulations, the undersigned has read this filing and knows its contents, and the contents are true as stated, to the best of his knowledge and belief. Additionally, the undersigned possesses full power and authority to sign such filing.

Sincerely,

SOUTHERN STAR CENTRAL GAS PIPELINE, INC.

By: /s/ Will Wathen

Will Wathen
Director, Rates & Billing
(270) 925-1969

Enclosures

Appendix A

Clean Version of the Tariff Records

GENERAL TERMS AND CONDITIONS

3. QUALITY

3.1 Gas Delivered

Gas delivered by Southern Star shall be of merchantable quality and shall have a system-wide weighted average heat content of not less than 950 BTUs per cubic foot on a dry basis.

3.2 Gas Received

Unless otherwise specified in the executed Service Agreement, or arrangements acceptable to Southern Star to process, condition or treat non-conforming gas are made, all gas tendered to Southern Star at any receipt point hereunder shall conform to the following specifications:

- (a) Liquids: The gas shall be free from hydrocarbons and water in their liquid state at the temperatures and pressures delivered and shall not have a hydrocarbon dew point in excess of forty degrees Fahrenheit (40 deg. F) as calculated from a chemical analysis based upon flowing pressure; provided, however, if and to the extent that Southern Star is operating its Line RI as a “wet” line, Southern Star may waive such hydrocarbon dew point quality specification for unprocessed gas received at Receipt Location 15433 – Satanta Plant and nominated for delivery to Delivery Location 19000 – LINN Jayhawk Delivery for processing.
- (b) Hydrogen Sulfide and Total Sulfur: The gas shall contain not more than one quarter (1/4) grain of hydrogen sulfide per one hundred (100) cubic feet and not more than twenty (20) grains total sulfur per one hundred (100) cubic feet.

GENERAL TERMS AND CONDITIONS

3. QUALITY (Cont'd)

- (c) Oxygen: The gas shall not contain in excess of two-tenths of one percent (0.2%) by volume of oxygen or ten parts per million (10 PPM) of oxygen depending on the carbon dioxide content, as further described in paragraph (d) below. However, gas received on Line Segments 315, 340 and 385 shall not contain in excess of 10 PPM of oxygen. And every reasonable effort shall be made to keep the gas completely free of oxygen. Notwithstanding the foregoing, Southern Star may accept gas in excess of 10 PPM on Line Segments 315, 340 and 385 based on operational and engineering considerations and its ability to deliver gas with an oxygen content acceptable for deliveries to other interstate or intrastate pipelines, including its ability to blend gas adequately with other gas within the segment and still meet such downstream delivery specifications.
- (d) Carbon Dioxide: The gas shall contain not more than one percent (1%) by volume of carbon dioxide if the gas contains more than 10 PPM of oxygen but not more than 0.2% by volume of oxygen. However, if the gas contains not more than 10 PPM of oxygen, then the gas shall contain not more than two percent (2%) by volume of carbon dioxide.
- (e) Hydrogen: Gas from crude oil refineries shall contain no more than trace amounts of free hydrogen.
- (f) Dust, Gums, etc.: The gas shall be commercially free of dust, gums, dirt, paraffin, impurities and other solid matter.
- (g) Heating Value: The gas shall have a gross heating value of not less than nine hundred fifty (950) and not more than one thousand one hundred twenty-five (1,125) BTUs per cubic foot, assuming no water vapor. The term "gross heating value" when applied to a cubic foot of gas shall mean the number of BTUs produced by the complete combustion of the amount of the gas which would occupy a volume of one (1) cubic foot at 14.73 psia and a temperature of sixty degrees Fahrenheit (60 deg. F.).
- (h) Temperature: The temperature of the gas at the receipt point shall not exceed one hundred twenty degrees Fahrenheit (120 deg F.).

GENERAL TERMS AND CONDITIONS

3. QUALITY (Cont'd)

- (i) Water Vapor: Gas received in Kansas, Oklahoma, Missouri, or Texas shall not contain more than seven (7) pounds of water in vapor phase per million cubic feet and gas received in Colorado or Wyoming shall not contain more than five (5) pounds of water in vapor phase per million cubic feet, except for gas tendered to Southern Star at a receipt point where Southern Star owns and operates the equipment necessary to reduce the water vapor content of the gas to meet this requirement.
- (j) Inerts: The gas shall contain not more than five percent (5%) by volume of inert gases in the Market Area.
- (k) Notwithstanding the provisions of paragraphs (a) through (j) above, gas quality varies throughout segments of Southern Star's pipeline system based on the function of each segment. The quality of the gas delivered by Shipper to Southern Star must, in Southern Star's reasonable discretion, be compatible with the gas typically existing in the segment of Southern Star's pipeline into which Shipper makes delivery.

If, at any time, gas tendered to Southern Star shall fail to substantially conform to any of the applicable quality specifications and Southern Star notifies the Shipper of such deficiency, and such deficiency is not corrected within a reasonable period of time, Southern Star may, at its option, refuse to accept delivery pending correction of the deficiency by Shipper or continue to accept delivery and make such changes necessary to cause the gas to conform to such specifications, in which event, prior to making such changes, Southern Star shall provide Shipper with an estimate of the costs that are expected to be incurred by Southern Star in effecting such changes and Shipper shall agree to reimburse Southern Star for all such costs incurred by Southern Star in effecting such changes; provided, however, that Southern Star may at any time refuse to accept delivery of gas which it considers to be unsafe or hazardous or to impair the operation or use of its facilities. Failure by Shipper to tender deliveries that conform to any of the applicable quality specifications shall not be construed to eliminate, or limit in any manner, the rights and obligations existing under any other provisions of the executed Service Agreement.

Appendix B

Marked Version of the Tariff Records

GENERAL TERMS AND CONDITIONS

3. QUALITY

3.1 Gas Delivered

Gas delivered by Southern Star shall be of merchantable quality and shall have a system-wide weighted average heat content of not less than 950 ~~Btus~~BTUs per cubic foot on a dry basis.

3.2 Gas Received

Unless otherwise specified in the executed Service Agreement, or arrangements acceptable to Southern Star to process, condition or treat non-conforming gas are made, all gas tendered to Southern Star at any receipt point hereunder shall conform to the following specifications:

- (a) Liquids: The gas shall be free from hydrocarbons and water in their liquid state at the temperatures and pressures delivered and shall not have a hydrocarbon dew point in excess of forty degrees Fahrenheit (40 deg. F) as calculated from a chemical analysis based upon ~~an assumed-flowing pressure of seven hundred fifty (750) pounds per square inch absolute~~; provided, however, if and to the extent that Southern Star is operating its Line RI as a “wet” line, Southern Star may waive such hydrocarbon dew point quality specification for unprocessed gas received at Receipt Location 15433 – Satanta Plant and nominated for delivery to Delivery Location 19000 – LINN Jayhawk Delivery for processing.
- (b) Hydrogen Sulfide and Total Sulfur: The gas shall contain not more than one quarter (1/4) grain of hydrogen sulfide per one hundred (100) cubic feet and not more than twenty (20) grains total sulfur per one hundred (100) cubic feet.

GENERAL TERMS AND CONDITIONS

3. QUALITY (Cont'd)

- (c) Oxygen: The gas shall not contain in excess of two-tenths of one percent (0.2%) by volume of oxygen or ten parts per million (10 PPM) of oxygen depending on the carbon dioxide content, as further described in paragraph (d) below. ~~However,~~ gas received on Line Segments 315, 340 and 385 shall not contain in excess of ~~ten parts per million (10 PPM)~~ of oxygen. And every reasonable effort shall be made to keep the gas completely free of oxygen. Notwithstanding the foregoing, Southern Star may accept gas in excess of 10 PPM on Line Segments 315, 340 and 385 based on operational and engineering considerations and its ability to deliver gas with an oxygen content acceptable for deliveries to other interstate or intrastate pipelines, including its ability to blend gas adequately with other gas within the segment and still meet such downstream delivery specifications.
- (d) Carbon Dioxide: The gas shall contain not more than one percent (1%) by volume of carbon dioxide if the gas contains more than 10 PPM of oxygen but not more than 0.2% by volume of oxygen. However, if the gas contains not more than 10 PPM of oxygen, then the gas shall contain not more than two percent (2%) by volume of carbon dioxide.
- (e) Hydrogen: Gas from crude oil refineries shall contain no more than trace amounts of free hydrogen.
- (f) Dust, Gums, etc.: The gas shall be commercially free of dust, gums, dirt, paraffin, impurities and other solid matter.
- (g) Heating Value: The gas shall have a gross heating value of not less than nine hundred fifty (950) and not more than one thousand one hundred twenty-five (1,125) Btu's-BTUs per cubic foot, assuming no water vapor. The term "gross heating value" when applied to a cubic foot of gas shall mean the number of ~~Btu's-BTUs~~ produced by the complete combustion of the amount of the gas which would occupy a volume of one (1) cubic foot at 14.73 psia and a temperature of sixty degrees Fahrenheit (60 deg. F.).
- (h) Temperature: The temperature of the gas at the receipt point shall not exceed one hundred twenty degrees Fahrenheit (120 deg F.).
- ~~(i) Water Vapor: Gas received in Kansas, Oklahoma, Missouri, or Texas shall not contain more than seven (7) pounds of water in vapor phase per million cubic feet and gas received in Colorado or Wyoming shall not~~

~~contain more than five (5) pounds of water in vapor phase per million cubic feet, except for gas tendered to Southern Star at a receipt point where Southern Star owns and operates the equipment necessary to reduce the water vapor content of the gas to meet this requirement.~~

GENERAL TERMS AND CONDITIONS

3. QUALITY (Cont'd)

- (i) Water Vapor: Gas received in Kansas, Oklahoma, Missouri, or Texas shall not contain more than seven (7) pounds of water in vapor phase per million cubic feet and gas received in Colorado or Wyoming shall not contain more than five (5) pounds of water in vapor phase per million cubic feet, except for gas tendered to Southern Star at a receipt point where Southern Star owns and operates the equipment necessary to reduce the water vapor content of the gas to meet this requirement.
- (j) Inerts: The gas shall contain not more than five percent (5%) by volume of inert gases in the Market Area.
- (k) Notwithstanding the provisions of paragraphs (a) through (j) above, gas quality varies throughout segments of Southern Star's pipeline system based on the function of each segment. The quality of the gas delivered by Shipper to Southern Star must, in Southern Star's reasonable discretion, be compatible with the gas typically existing in the segment of Southern Star's pipeline into which Shipper makes delivery.

If, at any time, gas tendered to Southern Star shall fail to substantially conform to any of the applicable quality specifications and Southern Star notifies the Shipper of such deficiency, and such deficiency is not corrected within a reasonable period of time, Southern Star may, at its option, refuse to accept delivery pending correction of the deficiency by Shipper or continue to accept delivery and make such changes necessary to cause the gas to conform to such specifications, in which event, prior to making such changes, Southern Star shall provide Shipper with an estimate of the costs that are expected to be incurred by Southern Star in effecting such changes and Shipper shall agree to reimburse Southern Star for all such costs incurred by Southern Star in effecting such changes; provided, however, that Southern Star may at any time refuse to accept delivery of gas which it considers to be unsafe or hazardous or to impair the operation or use of its facilities. Failure by Shipper to tender deliveries that conform to any of the applicable quality specifications shall not be construed to eliminate, or limit in any manner, the rights and obligations existing under any other provisions of the executed Service Agreement.

Appendix C

Interchangeability Provisions

<u>Company</u>	<u>Tariff BTU Limits</u>	<u>Tariff Max Inerts</u>	<u>Tariff Oxygen Limits (PPM)</u>	<u>Tariff Carbon Dioxide Limits</u>	<u>Tariff Nitrogen Limits</u>
ANR Pipeline Company	967 - 1200	NA	10,000	2%	3%
Cheyenne Plains Gas Pipeline Company, LLC	950 - No upper limit	NA	10	2%***	NA
Colorado Interstate Gas Company, LLC	968 - 1235	NA	10	3%	NA
Enable Gas Transmission, LLC	975 - 1100	NA	2,000	2%	3%
Enable Oklahoma Intrastate Transmission, LLC	975 - 1080	NA	10	2%	3%
Kansas Gas Service	950 - 1100	NA	100	2%	NA
MountainWest Pipeline, LLC	950 - 1150	3%	10	NA	NA
Natural Gas Pipeline Company of America, LLC	950 - Various*	4%	10	2%	NA
Northern Natural Gas Company	950 - No upper limit	NA	2,000	2%	NA
OkTex Pipeline Company	975 - 1080	4%	2,000	2%	NA
ONEOK Gas Transportation, LLC	975 - 1080	4%	2,000	2%	NA
ONEOK WesTex Transmission, LLC	950 - 1100	5%	2,000	2%	3%
Panhandle Eastern Pipe Line Company, LP	950 - 1200	NA	50	2%	NA
Rockies Express Pipeline, LLC	950 - 1150	3%	10	2%	NA
Tallgrass Interstate Gas Transmission, LLC	950 - 1100	NA	10	2%	NA
Transwestern Pipeline Company, LLC	970 - 1110	3%**	1,000	2%	3%**

* Tariff includes max BTU limit of 1,110 for gas receipts in the Permian, Midcontinent, South Texas, TexOK, and Louisiana Receipt Zones and a max BTU limit of 1,065 for gas receipts in the Amarillo Mainline, Gulf Coast Mainline, and the Iowa-Illinois Market Receipt Zones. In addition, the Tariff states that "Natural may, from time to time, establish and post on the Informational Postings portion of its Interactive Website an upper Btu value limit for receipts on specified segments or other specified locations on its system to assure that gas will be accepted for delivery into interconnects with interstate and intrastate pipelines, plants, end-users or directly connected local distribution companies, consistent with the delivery requirement set out in subsection (3) below."

** Tariff does not specifically address inerts or nitrogen, but states that the gas "shall contain not more than a combined total of 3.0% by volume of carbon dioxide plus nitrogen".

*** "Shall not contain (i) more than 3 percent by volume of carbon dioxide for gas received from the Cheyenne Hub, (ii) more than 2 percent from all other receipt points, and (iii) more than 2 percent for deliveries by Transporter at Shipper's primary delivery point."

Appendix D

Virtual Meeting Presentations from June 10, 2021, August 12, 2021,
and August 16, 2022



GAS QUALITY SPECIFICATIONS

Proposed Tariff Changes

June 10, 2021



SOUTHERN STAR

CENTRAL GAS PIPELINE

**WHEN APPROPRIATE MAKE SURE
AN ATHLETE USES THE CORRECT
HELMET FOR THEIR ACTIVITY.**



**Wearing a helmet
can help protect
athletes from
serious brain or
head injuries.**

THERE IS NO "CONCUSSION-PROOF" HELMET.

https://www.cdc.gov/headsup/images/infographics/concussion_infographic_helmets.jpg

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SOUTHERN STAR

CENTRAL GAS PIPELINE



SOUTHERN STAR

CENTRAL GAS PIPELINE

Component	Current Spec	Proposed Spec	Notes
Carbon Dioxide (CO ₂)	≤ 1% by volume	≤ 2% by volume	Adjusted spec
Nitrogen (N ₂)	-	-	
Oxygen (O ₂)	≤ 2,000 ppm (0.2%)	≤ 10 ppm	Match current spec for Line Segments 315, 340, & 385
Total Inerts	-	≤ 4% by volume	New spec
Water/vapor Content (H ₂ O)	≤ 7 lbs/mmcf	≤ 7 lbs/mmcf	
Hydrocarbon Dewpoint (HCDP)	≤ 40 °F	≤ 25 °F	Adjusted spec
Heat Content (BTUs)	≥ 950 BTU/scf	≥ 950 BTU/scf ≤ 1100 BTU/scf	Added a max spec
Hydrogen Sulfide (H ₂ S)	≤ 0.25 grains/100cf	≤ 0.25 grains/100cf	
Sulphur (S)	≤ 20 grains/100cf	≤ 20 grains/100cf	
Wobbe Index (Interchangeability)	-	1250 BTU/scf 1400 BTU/scf	New spec
Temperature	≤ 120 °F	≤ 120 °F	
RNG Specs	-	See Details	New specs

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CENTRAL GAS PIPELINE

CARBON DIOXIDE (CO₂)

- Carbon Dioxide is a diluent gas that reduces the overall heating value of a fuel gas and can be chemically reactive.
- Southern Star's current limit is 1% by volume.
- Propose a limit of 2% by volume.
- Benefits:
 - Allows for more supply options by relaxing our limit.
 - In conjunction with a tighter Oxygen limit, will still protect pipe integrity.

OXYGEN (O₂)

- Oxygen is a diluent gas that reduces the overall heating value of a fuel gas and can be chemically reactive.
- Southern Star's limit is 0.2% by volume except gas received on Line Segments 315, 340 and 385 shall not contain in excess of 10 PPM of oxygen.
- Propose a limit of 10 PPM.
- Benefits:
 - Minimize internal corrosion associated with O₂ (usually generates pitting and crevice corrosion).
 - O₂ acts as a corrosion accelerator causing the corrosion associated with CO₂ and H₂S to be more severe. A lower limit would allow our CO₂ limit to be raised and still protect pipe integrity.
 - Allow for consistent deliveries to pipelines with more stringent limits (KGST, NGPL, PEPL, QUESTAR, TIGT, TW).

TOTAL INERTS (% BY VOLUME)

- Inert and diluent gases are non-hydrocarbons that reduce the overall heating value of a fuel gas. Inert gases (N_2) are not chemically reactive. Diluent gases (CO_2 , O_2) can be chemically reactive.
- Southern Star currently doesn't have a specification.
- Propose a limit of 4% by volume.
- Benefits:
 - Minimize Quality variability for Power Gen and other susceptible industrial users.
 - Proposed limit is in-line with tariff specifications for many of our delivery interconnects with other pipelines (NGPL, NNG, TW, QUESTAR, OGT).

HYDROCARBON DEWPOINT (HCDP)

- Hydrocarbon Dewpoint is the minimum temperature above which no condensation of hydrocarbons occurs at a specified pressure.
- Southern Star's limit is 40°F (750 psia)
- Propose a limit of 25°F
- Benefits:
 - Reduce hydrocarbon liquid dropout which can cause operational issues including increased pressure drop, reduced line capacity, and equipment problems such as compressor damage.
 - Proposed limit is more in-line with tariff specifications for many of our delivery interconnects with other pipelines (CIG, KGST, TIGT).

MAXIMUM HEATING VALUE (BTU)

- The term "gross heating value" refers to the amount of heat (Btu's) produced by the combustion of one (1) cubic foot of gas at STP.
- Southern Star currently doesn't have a specification.
- Propose a limit of 1100 BTUs per cubic foot
- Benefits:
 - Minimize BTU swings for Power Gen and other susceptible industrial users.
 - For gas interchangeability: Per NGC+ White Paper interim guidelines, A limit of 1110 BTU/scf is recommended in conjunction with Wobbe number limits to maintain interchangeability.
 - Proposed limit is in-line with tariff specifications for many of our interconnects with other pipelines (EGT, KGST, NGPL, TIGT, TW, QUESTAR).

WOBBE INDEX

- Wobbe Number is a single index parameter used for determining gas interchangeability. The Wobbe Number is based on the heating value and specific gravity of a gas and is related to the thermal input to a burner.
- Southern Star currently doesn't have a specification.
- Propose a limit of 1250 – 1400 BTU/scf.
- Benefits:
 - Most common and robust single index parameter for interchangeability.
 - Per NGC+ White Paper, establishing a maximum Wobbe Number can address yellow tipping, incomplete combustion, and potential for increased emissions of NOx and CO. Establishing a minimum can address lifting, blowout, and CO.



SOUTHERN STAR

CENTRAL GAS PIPELINE

Southern Star Central Gas Pipeline Renewable Natural Gas (RNG) Quality Specifications

Component	Current Spec	Notes
Ammonia	< 10 ppmv	Includes Ammonia and Ammonia-based byproducts
Total Bacteria	≤ 0.2 microns	
Mercury	< 0.01 µg/m ³	Includes Mercury and Mercury-based derivatives
Volatile Metals	< 20 µg/m ³	Includes, but not limited to : lead, zinc, copper, chromium, manganese, and arsenic
VOCs and Semi-VOCs	≤ 350 ppmv	Includes, but not limited to : BTEX, phthalates, N-nitroso-di-n-propylamine, and benzyl alcohols
Siloxanes	≤ 0.1 mg of Si/Nm ³	
Halocarbons	< 0.1 ppmv	Includes, but not limited to: freons, chloroethane, and vinyl chloride
Aldehydes and Ketones	<10 ppbv	

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CENTRAL GAS PIPELINE

SILOXANES

- Siloxanes are organic compounds that contain silicon, oxygen, hydrogen, and carbon. Due to the increase in silicon-containing personal hygiene, health care, and industrial products, the presence of silicon in waste streams has increased. As the silicon-containing waste stream is anaerobically digested, the silicon converts to siloxane compounds that volatilize and become entrained in biogas.
- Southern Star currently doesn't have a specification.
- Propose a limit of ≤ 0.1 mg Si/m³.
- Benefits:
 - Minimize formation of silica dust from combustion, which can damage internal combustion engines and turbines.
 - Protect customers with sensitive end-use equipment.
 - Allow for the comfortable pursuit of RNG supply sources.



GAS QUALITY SPECIFICATIONS

Proposed Tariff Changes

August 12, 2021

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SOUTHERN STAR

CENTRAL GAS PIPELINE



VISUAL



Keep your
eyes on the road.

Pull over to read
directions.

Put your **phone** in “**Do**
Not Disturb” mode.



MANUAL



Keep your
phone out of reach.

Make all adjustments
before driving.

Don't reach for items
while driving.



COGNITIVE



Avoid phone calls,
even hands-free.

Stay focused on the
road.

Keep your
emotions in check.

<https://classroomlaw.org/resources/distracted-driving/>

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SOUTHERN STAR

CENTRAL GAS PIPELINE

CURRENT TIMELINE

- ✓ • June 10, 2021 – Customer Kick-off Call [\(Link to slides\)](#)
- ✓ • July 2, 2021 – Feedback requested
- ✓ • July 30, 2021 – Additional feedback requested
- Aug 12, 2021 – Customer Follow-Up Call
- Aug 27, 2021 – Final feedback requested
- Sept 16, 2021 – Customer Follow-Up Call (if needed)
- Oct 1, 2021 – File with FERC (usually an immediate notice)
- April 1, 2022 – FERC Order (within 180 days from filing)



SOUTHERN STAR

CENTRAL GAS PIPELINE

Component	Current Spec	Proposed Spec	Notes
Carbon Dioxide (CO ₂)	≤ 1% by volume	≤ 2% by volume	Adjusting spec
Nitrogen (N ₂)	-	-	
Oxygen (O ₂)	≤ 2,000 ppm (0.2%)	≤ 10 ppm	Matching current spec for Line Segments 315, 340, & 385
Total Inerts	-	≤ 4% by volume	New spec
Water/vapor Content (H ₂ O)	* ≤ 7 lbs/mmcf	* ≤ 7 lbs/mmcf	*5 lbs/mmcf in WY/CO (no change)
Hydrocarbon Dewpoint (HCDP)	≤ 40 °F	≤ 25 °F	Adjusting spec
Heat Content (BTUs)	≥ 950 BTU/scf	≥ 950 BTU/scf ≤ 1100 BTU/scf	Adding a max spec
Hydrogen Sulfide (H ₂ S)	≤ 0.25 grains/100cf	≤ 0.25 grains/100cf	
Sulphur (S)	≤ 20 grains/100cf	≤ 20 grains/100cf	
Wobbe Index (Interchangeability)	-	1250 BTU/scf 1400 BTU/scf	New spec
Temperature	≤ 120 °F	≤ 120 °F	
RNG Specs	-	See Details	New specs

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SOUTHERN STAR

CENTRAL GAS PIPELINE



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CENTRAL GAS PIPELINE

Southern Star Central Gas Pipeline Renewable Natural Gas (RNG) Quality Specifications

Component	Current Spec	Notes
Ammonia	< 10 ppmv	Includes Ammonia and Ammonia-based byproducts
Total Bacteria	≤ 0.2 microns	
Mercury	< 0.01 µg/m ³	Includes Mercury and Mercury-based derivatives
Volatile Metals	< 20 µg/m ³	Includes, but not limited to : lead, zinc, copper, chromium, manganese, and arsenic
VOCs and Semi-VOCs	≤ 350 ppmv	Includes, but not limited to : BTEX, phthalates, N-nitroso-di-n-propylamine, and benzyl alcohols
Siloxanes	≤ 0.1 mg of Si/Nm ³	
Halocarbons	< 0.1 ppmv	Includes, but not limited to: freons, chloroethane, and vinyl chloride
Aldehydes and Ketones	<10 ppbv	

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CENTRAL GAS PIPELINE

QUESTIONS / FEEDBACK

- Would SSC consider lowering the Sulfur spec down to 0.5 grains?
 - To assist in maintaining low emissions for various end users
 - **SSC expects to remain at 20 grains, in line with interconnects. Can coordinate with shippers interested in gas sampling.**
- How would SSC work with a supply point that has an occurrence of gas quality outside of tariff limit?
 - Would a point be shut in immediately if O₂, N₂, BTU, HCDP, etc was outside of tariff limits?
 - **SSC expects to continue flexibility with point operators when such upsets occur. Each occurrence will be evaluated to ensure system and end user integrity is maintained.**

QUESTIONS / FEEDBACK

- How much time will be allowed for operators to make adjustments and meet any tariff changes?
 - Depending on the necessary changes, funding and installation of needed equipment could take months.
 - **SSC expects the FERC to issue a decision on the proposed specs within 6 months from the filing date.**
- How is the Wobbe Index calculated?
 - Not familiar with this value and how it is determined.
 - **Wobbe = BTU ÷ √(Specific Gravity).**

WRAP-UP



GAS QUALITY SPECIFICATIONS

Planned Tariff Changes

August 16, 2022

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SOUTHERN STAR

CENTRAL GAS PIPELINE

Back To School Safety

•Dropping off at school:

- Do not double park; it blocks visibility for other children and vehicles.
- Do not load or unload children across the street from the school.
- Carpool to reduce the number of vehicles at the school.

• Sharing road with pedestrians:

- Do not block the crosswalk when stopped at a red light or waiting to make a turn, forcing pedestrians to go around you; this could put them in the path of moving traffic.
- Always stop for a school patrol officer or crossing guard holding up a stop sign.
- Never pass a vehicle stopped for pedestrians.

• Sharing the road with buses:

- Never pass a bus from behind – or from either direction if you're on an undivided road if it is stopped to load or unload children.
- If the yellow or red lights are flashing and the stop arm is extended, traffic must stop.
- The area 10 feet around a school bus is the most dangerous for children; stop far enough back to allow them space to safely enter and exit the bus.
- Be alert; children often are unpredictable, and they tend to ignore hazards and take risks.



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SOUTHERN STAR

CENTRAL GAS PIPELINE

UPDATED TIMELINE

- ✓ • June 10, 2021 – Customer Kick-off Call ([Link to slides](#))
 - Feedback requested by July 30, 2021
- ✓ • Aug 12, 2021 – Customer Follow-Up Call ([Link to slides](#))
 - Feedback requested by August 27, 2021
- ✓ • Periodic updates during “How’s It Flowing”
- ✓ • May 10, 2022 - Customer meeting update
- ✓ • Q1-Q2 2022 – Additional discussions with customers (upon request)
- August 16, 2022 – Customer Update Call
 - Feedback requested by August 24, 2022
- Q3 2022 (target August 31) – File with FERC
- FERC Order (within 180 days from filing)



SOUTHERN STAR

CENTRAL GAS PIPELINE

Southern Star Central Gas Pipeline - Current and Proposed Quality Specifications

Component	Current Spec	2021 Proposal	2022 Plan	Notes
Carbon Dioxide (CO ₂)	≤ 1% by volume	≤ 2% by volume	1% CO₂/2,000ppm O₂ OR, 2% CO₂/10ppm O₂	Additional Optionality
Oxygen (O ₂)	≤ 2,000 ppm (0.2%)	≤ 10 ppm		Maintain system integrity LS 315, 340, & 385 at 10ppm
Nitrogen (N ₂)	-	-	-	(no change)
Total Inerts	-	≤ 4% by volume	≤ 5% by volume	New market spec, max supply
Water/vapor Content (H ₂ O)	* ≤ 7 lbs/mmcf	* ≤ 7 lbs/mmcf	* ≤ 7 lbs/mmcf	*5 lbs/mmcf in WY/CO (no change)
Hydrocarbon Dewpoint (HCDP)	≤ 40 °F	≤ 25 °F	** ≤ 40 °F	**At flowing psia (was @ 750 psia)
Heat Content (BTUs)	≥ 950 BTU/scf	≥ 950 BTU/scf ≤ 1100 BTU/scf	≥ 950 BTU/scf ≤ 1125 BTU/scf	Adding a max spec
Hydrogen Sulfide (H ₂ S)	≤ 0.25 grains/100cf	≤ 0.25 grains/100cf	≤ 0.25 grains/100cf	(no change)
Sulphur (S)	≤ 20 grains/100cf	≤ 20 grains/100cf	≤ 20 grains/100cf	(no change)
Wobbe Index (Interchangeability)	-	1250 BTU/scf 1400 BTU/scf	-	Seeing benefit with max BTU
Temperature	≤ 120 °F	≤ 120 °F	≤ 120 °F	(no change)
RNG Specs	-	See Details	See Details	New specs

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SOUTHERN STAR

CENTRAL GAS PIPELINE



SOUTHERN STAR

CENTRAL GAS PIPELINE

Southern Star Central Gas Pipeline - Renewable Natural Gas (RNG) Quality Specifications

Component	2021 Proposal	2022 Plan	Notes
Ammonia	< 10 ppmv	< 10 ppmv	Includes Ammonia and Ammonia-based byproducts
Total Bacteria	≤ 0.2 microns	≤ 0.2 microns	
Mercury	< 0.01 µg/m ³	< 0.1 µg/m³	Includes Mercury and Mercury-based derivatives
Volatile Metals	< 20 µg/m ³	< 20 µg/m ³	Includes, but not limited to : lead, zinc, chromium, and manganese
VOCs and Semi-VOCs	≤ 350 ppmv	≤ 350 ppmv	Includes, but not limited to : BTEX, phthalates, N-nitroso-di-n-propylamine, and benzyl alcohols
Arsenic		≤ 0.15 ppmv	
Copper		< 0.60 mg/m³	
Siloxanes	≤ 0.1 mg of Si/Nm ³	≤ 0.1 mg of Si/m ³	
Halocarbons	< 0.1 ppmv	< 0.1 ppmv	Includes, but not limited to: freons and chloroethane
Vinyl Chloride		≤ 8.3 mg/m³	
Aldehydes and Ketones	<10 ppbv	≤ 100 ppbv	

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SOUTHERN STAR

CENTRAL GAS PIPELINE

QUESTIONS / FEEDBACK

- Would SSC consider any other breakpoints of the CO₂ & O₂ option?
 - For example, 1.5% CO₂ and 1,000 ppm O₂?
 - **SSC expects to stay with the 2 options (existing 1% CO₂ / 2,000 ppm O₂ & new 2% CO₂ / 10 ppm O₂).**
 - **Balancing supply optionality while maintaining the necessary integrity of the pipeline.**
- How would SSC work with a supply point that has an occurrence of gas quality outside of tariff limit?
 - Would a point be shut in immediately if CO₂, O₂, Inerts, BTU, etc was outside of tariff limits?
 - **SSC expects to continue flexibility with point operators when such upsets occur. Each occurrence will be evaluated to ensure system and end user integrity is maintained.**

QUESTIONS / FEEDBACK

- How much time will be allowed for operators to make adjustments and meet any tariff changes?
 - Depending on the necessary changes, funding and installation of needed equipment could take months.
 - **SSC expects the FERC to issue a decision on the proposed specs within 6 months from the filing date.**
 - **SSC expects to work with point operators that document their efforts to meet the planned specifications and the timeline for compliance.**



WRAP-UP

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