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STATE CORPORATION COMMISSION
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JUN 09 2022

Case No. PUR-2021-00298
Sponsor: COMMISSION STAFF

Exhibit No. 14

Witness: ANDREW T. BOEHNLEIN
Bailliff: RENEE MILES

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Summary of the Testimony of Andrew T. Boehlein

My testimony includes the following findings and recommendations:

1. The Company's proposed interconnection allowance of up to \$20 million would increase a typical residential customer bill by \$0.43 per month if the allowance was fully distributed after five years.
2. The proposed interconnection allowance represents a cost shift from Renewable Natural Gas producers to rate payers. As such, the Staff is opposed to the Company's proposal.
3. If the Commission determines that the Company's Renewable Natural Gas Pilot Program is in the public interest, the Staff is not opposed to the Company's proposed Schedule 17, nor the Company's proposal to synchronize the start date of the Pilot Program with the first Interconnection Agreement.
4. To the Staff's knowledge there are no regulations at either the State or Federal level that require the Company to purchase Renewable Natural Gas or gas that has been certified as lower emission gas. The Staff submits that the appropriateness of including these commodities in the Company's supply portfolio is a policy decision for the Commission's determination.
5. The Company is proposing to increase its annual gas costs by 15% in order to pay for the incremental expenses associated with Renewable Natural Gas and Next Generation Natural Gas. The 15% increase in gas costs would increase customer bills. The Staff believes that this is a policy issue for the Commission to consider and determine appropriateness thereof.
6. The Company's proposal to incorporate NextGen Gas and RNG into the supply portfolio will have the following bill impacts, as calculated by the Company:

Impact of 15% NextGen/RNG Costs on Customer Bills

Prevailing Market Price/MCF	Annual Additional Increase in Total Gas Cost	Annual Increase on Residential Bill
\$ 2.50	\$ 13,235,294	\$ 26.34
\$ 3.00	\$ 15,882,353	\$ 31.61
\$ 3.50	\$ 18,529,412	\$ 36.87
\$ 4.00	\$ 21,176,471	\$ 42.14
\$ 4.50	\$ 23,823,529	\$ 47.41
\$ 5.00	\$ 26,470,588	\$ 52.68
\$ 5.50	\$ 29,117,647	\$ 57.94
\$ 6.00	\$ 31,764,706	\$ 63.21
\$ 6.50	\$ 34,411,765	\$ 68.48
\$ 7.00	\$ 37,058,824	\$ 73.75
\$ 7.50	\$ 39,705,882	\$ 79.01

PREFILED TESTIMONY
OF
ANDREW T. BOEHNLEIN

APPLICATION OF
VIRGINIA NATURAL GAS, INC.
CASE NO. PUR-2021-00298

20210115

1 Q. PLEASE STATE YOUR NAME AND POSITION WITH THE STATE
2 CORPORATION COMMISSION.

3 A. My name is Andrew T. Boehnlein. I am a Senior Utilities Analyst in the Commission's
4 Division of Public Utility Regulation.

5 Q. WHAT ARE YOUR PRESENT RESPONSIBILITIES?

6 A. My primary responsibilities are to analyze public utility certificate and rate case
7 applications with regard to cost of service, tariff revisions, and rate design. I am also
8 responsible for presenting testimony as a witness and making alternative proposals to the
9 Commission when appropriate.

10 Q. PLEASE BRIEFLY SUMMARIZE THE APPLICATION FILED IN THIS
11 PROCEEDING.

12 A. On December 21, 2021, Virginia Natural Gas, Inc. ("VNG" or "Company") filed with the
13 State Corporation Commission ("Commission") an application ("Application") for
14 approval to: (i) implement a new rate schedule and tariff, designated Schedule 17,
15 Renewable Natural Gas ("RNG") Service; (ii) implement a new Renewable Natural Gas
16 Pilot Program; and (iii) modify the Company's Terms and Conditions, pursuant to §56-234
17 of the Code of Virginia.

1 Specifically, through the Pilot Program, the Company is proposing to invest \$20
2 million to offset the costs to RNG producers for interconnecting their facilities to the VNG
3 system.¹ The Company is also proposing to purchase RNG and Next Generation Natural
4 Gas ("Nextgen Gas") for delivery and use on the VNG system.² The Company proposes
5 to limit the incremental cost increase associated with these commodities to 15% of the total
6 annual projected comparable gas costs for traditional geologic production.³

7 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

8 **A.** The purpose of my testimony is to provide an overview of the proposed RNG Pilot
9 Program, the proposed changes to the Company's tariff pursuant to the Pilot, and the
10 proposed interconnection allowance and its impact on ratepayers. I will also provide a
11 discussion of NextGen Gas and RNG, the Company's proposal to recover their associated
12 costs, and the impact this proposal will have on ratepayers.

13 **Renewable Natural Gas Pilot Program**

14 **Q. PLEASE DESCRIBE THE COMPANY'S PROPOSED RENEWABLE NATURAL**
15 **GAS PILOT PROGRAM.**

16 **A.** The Company is proposing a five-year Pilot program that will allow Renewable Natural
17 Gas producers to interconnect with the VNG system to facilitate the sale of RNG within
18 the VNG footprint.⁴ As a part of this Pilot program, the Company is proposing an
19 allowance which will offset the cost of interconnection facilities for potential producers.

¹ Application at 6.
² *Id* at 7.
³ *Id* at 8.
⁴ *Id* at 6.

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1 In order to receive the allowance, the producer would be required to sign an RNG
2 Interconnection Agreement with VNG.⁵ As part of the Interconnection Agreement,
3 producers will be required to provide a level of Environmental Attribute certificates
4 ("EAs") to VNG that is commensurate with their Interconnection Allowance.⁶ The cost of
5 the interconnection allowance is proposed to be recovered from the Company's ratepayers
6 through base rates.⁷

7 **Q. PLEASE DESCRIBE THE COMPANY'S PROPOSED SCHEDULE 17.**

8 **A.** To facilitate the interconnection of producers, the Company has filed for approval of an
9 associated tariff rate schedule ("Schedule 17").⁸ Schedule 17 sets forth the general
10 requirements necessary to interconnect, as well as a rate calculation methodology that will
11 establish a facilities fee for each supplier served under this rate schedule.⁹

12 The facilities fee will include costs associated with: i) the interconnection facilities
13 required, exclusive of the interconnection allowance; ii) operations and maintenance
14 expenses for the interconnection facilities; and iii) administrative expenses. This fee will
15 be converted to a monthly rate of 1/12th of the annual fee.¹⁰ According to the Company,
16 the fee will be unique to each RNG facility, and will be computed using the actual cost of
17 the required facilities.¹¹

18 **Q. WHAT IS A RENEWABLE NATURAL GAS PRODUCER?**

⁵ A copy of the Company's proposed Interconnection Agreement is attached as Schedule 3 of the prefiled Direct testimony of Company witness Joanne A. Mello.

⁶ Application at 7.

⁷ *Id.*

⁸ *Id.* at 5.

⁹ A copy of the Company's proposed Schedule 17 is attached as Schedule 1 of Company witness Mello's Direct testimony.

¹⁰ Prefiled Direct testimony of Company witness John M. Coburn at 7

¹¹ *Id.*

1 A. Methane is produced by the decomposition of organic waste. There is a potential to capture
2 and condition methane for resale at any site having a large concentration of organic waste,
3 such as a farm, landfill, or wastewater treatment facility. According to the Company, it
4 has received interest regarding RNG interconnections from wastewater treatment facilities,
5 agricultural facilities, and solid waste facilities.¹²

6 Q. PLEASE EXPLAIN THE INTERCONNECTION ALLOWANCE IN MORE
7 DETAIL.

8 A. RNG facilities require a significant amount of investment by the producer.¹³ One
9 component of that investment is the infrastructure needed to connect to the utility's
10 distribution system. As such, the Company is proposing an allowance to offset some, or
11 perhaps all, of the capital cost of these interconnection facilities. According to the
12 Company, a potential project will be eligible for an allowance of up to \$2 million.¹⁴ The
13 Company has proposed a cap on the level of allowances to \$4 million per year, and \$20
14 million in total over the 5 years of the proposed Pilot Program.¹⁵ The cost of these
15 allowances would be included for recovery in the Company's next general rate case.¹⁶

16 Q. YOU STATED THAT AS PART OF THE INTERCONNECTION AGREEMENT,
17 PRODUCERS WILL BE REQUIRED TO PROVIDE A NUMBER OF
18 ENVIRONMENTAL ATTRIBUTE CERTIFICATES TO VNG. CAN YOU
19 EXPAND ON THIS DISCUSSION?

¹² Company Response to Staff Interrogatory 1-6. All cited interrogatory responses are attached as part of Attachment ATB-1.

¹³ According to the Coalition for Renewable Natural Gas, the average cost to construct an RNG facility is \$17 million, with facilities costs ranging from \$1 million to \$100 million.

¹⁴ Cogburn Direct at 6.

¹⁵ *Id.*

¹⁶ *Id.*

1 A. Environmental Attributes are conceptually similar to the Renewable Energy Credits
2 ("RECs") that are used in electricity markets. Once RNG is produced and interconnected,
3 project developers can register their supply to create RNG Environmental Attributes.
4 Similar to RECs, RNG EAs convey to the holder the rights to the environmental or "green"
5 attributes associated with the fuel. One of the environmental characteristics of an RNG
6 EA is that, because RNG is derived from waste methane, it represents a reduction in
7 greenhouse gas ("GHG") emissions.¹⁷ RNG can be purchased with or without the
8 associated EAs and vice versa. EAs can be bought, sold, traded, and retired.

9 According to the Company, VNG will "receive a level of environmental attributes
10 from participating facilities commensurate with the Company's capital investment."¹⁸
11 Specifically, as part of the Interconnection Agreement, the Company will contract with
12 producers to receive some number of the EAs produced at each site; however, the Company
13 states that the "exact number of EAs is currently unknown and cannot be projected at this
14 time."¹⁹ Under the interconnection program, the Company does not intend to have a
15 producer supply *all* the environmental attributes that would be associated with a
16 participating RNG facility to VNG.²⁰ Additionally, according to VNG, the Company
17 intends to retire EAs received, on behalf of its customers.²¹

18 Q. IS THERE ANY REQUIREMENT FOR THE COMPANY TO OBTAIN THESE
19 ENVIRONMENTAL ATTRIBUTES?

¹⁷ Methane (i.e. natural gas) is considered a more harmful GHG than CO2. CO2 is a byproduct of combusting methane; therefore, it is considered less environmentally harmful to capture and later combust waste methane than allow it to escape into the atmosphere.
¹⁸ Application at 7.
¹⁹ Interrogatory Response 2-15(e). The amount of EA's will be dependent on the total investment allowance and value of the EA's produced at the site.
²⁰ Interrogatory Response 4-51.
²¹ Interrogatory Response 2-15(d).

1 A. The Staff is unaware of any program or regulation at either the Federal or the State level
2 that requires the Company to acquire RNG environmental attributes. According to the
3 Application, VNG itself is also unaware of any such requirements.²² The Company states
4 specifically:

5 The unbundled EAs that VNG will receive from participating RNG Producers are
6 a key component of this filing and will be utilized in a way that helps reduce
7 greenhouse gas emissions for VNG and its customers. Ownership of these attributes
8 allows VNG to demonstrate the commitment to reduce greenhouse gas emissions
9 for customers and the environment through the investment in interconnection
10 facilities.²³

11 In addition, the Company states that the components in its filing have "the potential
12 to reduce VNG's customer exposure to increased GHG policy costs as their direct and
13 indirect GHG footprints are reduced."²⁴

14 **Q. PLEASE EXPLAIN THE PROPOSED TERM OF THE PILOT PROGRAM.**

15 A. VNG is proposing to operate this Pilot Program for five years.²⁵ In its Application, the
16 Company states that as "VNG does not currently have any offering to attract or connect
17 potential RNG suppliers, it is unlikely that VNG will be ready to move forward with an
18 RNG interconnection project immediately upon Commission approval."²⁶ The Company
19 also notes that the development of an RNG process can take over a year from first
20 discussions to the time that construction is complete.²⁷ As such, the Company has proposed

²² Interrogatory Response 2-15 (b) and (c).

²³ Interrogatory Response 2-14(a).

²⁴ Mello Direct at 6. The Staff requested additional details on the Company's consideration of future GHG policy costs in Interrogatory Request 7-65. That response was not made available before the Staff filed testimony.

²⁵ Application at 7.

²⁶ Mello Direct at 28.

²⁷ Mello Direct at 27.

1 to synchronize the official start date of the Pilot Program with when it executes its first
2 Interconnection Agreement.²⁸

3 **Q. WHAT IMPACT WOULD THE INTERCONNECTION ALLOWANCE HAVE ON**
4 **RATEPAYERS?**

5 **A.** The Company has not yet proposed any projects pursuant to the Pilot Program. The impact
6 to ratepayer bills will be a function of how much of the proposed \$20 million in
7 interconnection allowances are eventually distributed. If the Company were to disburse
8 the entire \$20 million over the five-year Pilot Program, a typical residential customer's base
9 rates would rise by approximately \$0.43 per month from \$87.14 to \$87.57.²⁹ Any
10 investment below the full \$20 million would reduce that monthly bill impact.

11 **Q. WHAT IS STAFF'S POSITION ON THE PROPOSED RENEWABLE NATURAL**
12 **GAS PILOT PROGRAM?**

13 **A.** By design, this program will subsidize RNG producers' interconnection costs. In general,
14 the Staff typically does not support intentionally creating cross-subsidies between customer
15 classes or groups when designing rates. Specifically, under the proposed renewable natural
16 gas Pilot Program, interconnection costs will be shifted from a third-party producer onto
17 the Company's rate payers. While the Staff acknowledges that the rate impact of this
18 subsidy will be relatively small,³⁰ and may be outweighed by other public policy

²⁸ *Id.*

²⁹ *Cogburn at Schedule 2.* An investment of \$4 million per year for 5 years would result in a total increase of \$5.06 per customer, annually.

³⁰ As previously noted, the maximum increase that a typical residential customer may experience as a result of this program is approximately \$0.43 per month, or 0.49%.

1 considerations, the Staff believes that the appropriateness of subsidizing these
2 interconnections is a policy decision for the Commission to determine.

3 If the Commission determines that the Pilot Program should be approved, the Staff
4 is not opposed to either the proposed Schedule 17 or the Company's proposal to
5 synchronize the start date of the Pilot Program with the first Interconnection Agreement.

6 RNG and NextGen Gas Purchases

7 **Q. PLEASE EXPLAIN THE COMPANY'S PROPOSAL TO PURCHASE NEXTGEN**
8 **GAS AND RNG.**

9 **A.** The Company's proposal is to increase participation in the NextGen Gas and RNG markets.
10 As explained below, both commodities have a price that, in some instances, is more
11 expensive than the wholesale price of gas that the Company may otherwise purchase.³¹
12 Currently, the Company purchases gas as a commodity in the wholesale market and passes
13 those costs directly to customers through the Purchased Gas Costs component of the
14 Quarterly Billing Factor. The Company's purchase activities are reconciled annually
15 through the Actual Cost Adjustment component of the Quarterly Billing Adjustment.

16 Specifically, the Company requests authority to incorporate into its supply portfolio
17 NextGen Gas and RNG that is more expensive than traditional geologic production.
18 However, the Company describes the process of accounting for these commodity purchases
19 in two different ways, as explained below.

³¹ Interrogatory Response 4-46 and 1-8.

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1 Q. PLEASE EXPLAIN THE TWO METHODS PROPOSED FOR INCORPORATING
2 THE INCREMENTAL EXPENSE OF NEXTGEN GAS AND RNG INTO THE
3 COMPANY'S PURCHASE GAS ADJUSTMENT.

4 A. First, the Company proposes to "limit the total annual incremental gas cost associated with
5 RNG and NextGen Gas purchases to 15% of the total annual projected comparable gas cost
6 that would have been included in the Purchase Gas Adjustment component of the Quarterly
7 Billing adjustment *had the RNG and NextGen Gas purchases not been made* (Emphasis
8 added).³² For example, if the Company expects to annually make \$100 in total annual
9 commodity purchases, the Company would then incur an additional \$15 in costs in order
10 to cover the incremental expenses of NextGen Gas and RNG as follows:

11
$$\text{Method 1: } \$100 * 115\% = \$115, \text{ a total increase of } \$15$$

12 However, later in its Application, the Company describes the incremental expense
13 as a "15% limitation of the total gas cost expense,"³³ in which case the incremental costs
14 associated with NextGen Gas and RNG would *represent* 15% of the total purchased gas
15 costs. In a workpaper supporting the Company's response to Staff Interrogatory 1-12 and
16 1-13,³⁴ the Company demonstrates the 15% limitation on the total gas cost expense as
17 follows:

18
$$\text{Method 2: } \$100 / (1-15\%) = \$117.65, \text{ a total increase of } \$17.65$$

³² Application at 8, #24 and Cogburn at 10.
³³ Application at 8 #25 and Cogburn at 11.
³⁴ Interrogatory Response 1-12 and 1-13 Attachment "Staff Set 1(12).xlsx".

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1 The second method effectively grosses up the total annual comparable gas cost so
2 that 15% of the total gas cost is attributable to RNG and/or NextGen Gas (\$17.65
3 RNG/NextGen / \$117.65 Total = 15%).

By contrast, Method 1 sets the total cost increase as a percentage of the projected annual gas cost, absent any RNG or NextGen Gas purchases having been made. Method 2 sets the annual projected standard gas cost as 85% of total gas costs after incorporating the incremental costs of RNG. As illustrated above the two conflicting methodologies proposed by the Company in its Application produce different total costs.

4 **Q. DOES THE STAFF PREFER ONE METHOD VS THE OTHER?**

5 A, The Staff neither supports nor opposes either method. Method 2 as demonstrated above
6 appears to be the Company's preferred methodology. The Staff would note that it results
7 in higher total costs compared to Method 1. For purposes of this testimony, the Staff will
8 work within the cost framework contemplated by Method 2.

9 **Q. PLEASE EXPLAIN THE ASSOCIATED TARIFF REVISIONS THE COMPANY**
10 **IS PROPOSING.**

11 A. The Company is proposing to amend its Terms and Conditions at part A "Definitions" of
12 Section XX "Quarterly Billing Adjustment" to include "Renewable Natural Gas" and "Next
13 Generation Natural Gas (or Certified Natural Gas)" in the Company's list of supply
14 sources.³⁵

15 **Q. HOW WOULD THE COMMISSION MONITOR THE COMPANY'S PURCHASE**
16 **ACTIVITIES?**

³⁵ Cogburn Direct at 9.

1 A. There is an established administrative process for Commission Staff to review the
2 Company's PGA on a quarterly basis. According to the Company, purchases of NextGen
3 Gas or RNG would be documented in such a way as to allow for review of purchase
4 volumes and prices in sufficient detail to delineate both the commodity cost and any
5 premiums paid.³⁶ If the Commission approves VNG's request to increase its NextGen Gas
6 and RNG purchase activities, the Staff recommends that the Company be directed to work
7 with the Staff to determine the specific information that it will file regarding these
8 purchases.

9 Q. PLEASE DESCRIBE NEXTGEN GAS.

10 A. NextGen Gas is geologically produced natural gas that undergoes a certification process in
11 order to label its emissions characteristics.³⁷ According to the Company, "[m]ost NextGen
12 Gas offerings are characterized by the certification of the environmental performance of
13 the natural gas production, not the delivered supply."³⁸

14 Q. WHAT DO NEXTGEN GAS CERTIFICATES REPRESENT?

15 A. Broadly, these certificates represent the methane emission intensity of a specified volume
16 of natural gas. Methodologies to certify gas could include directly measuring emissions at
17 the production point, or developing an assumed emissions profile based on equipment
18 type.³⁹ There does not yet appear to be a single standard that has been adopted by the
19 industry to certify the low emissions profile of the gas,⁴⁰ nor does there appear to be any

³⁶ Interrogatory Response 4-52.
³⁷ Mello Direct at 17.
³⁸ Interrogatory Response 4-30.
³⁹ *Id.*
⁴⁰ Interrogatory Response 4-35(a).

1 organization charged with licensing certifiers.⁴¹ According to the Company, "[t]here are
2 several methane emission intensity certification providers in operation, and each employs
3 a different proprietary methodology for determining methane emission intensity. The
4 providers attest to the accuracy of their own process."⁴²

5 **Q. WHAT IS THE REDUCTION IN EMISSIONS ASSOCIATED WITH THE**
6 **PURCHASE OF NEXTGEN GAS?**

7 A. The Company states that it seeks to procure NextGen Gas that demonstrates a certified
8 methane emissions intensity of less than 0.28%.⁴³ In other words, through production and
9 processing, less than 0.28%⁴⁴ of the total volume of gas will be lost to leakage. As a
10 comparison, the Company referred the Staff to a report by National Energy Technology
11 Laboratory which reports that the average methane emissions intensity for natural gas
12 production in the United States is 0.454%.⁴⁵

13 Using the Company's provided figures, a rough estimate of the total emissions
14 reduction that may be achieved by NextGen Gas is 0.174 %. Based on the foregoing, for
15 1,000,000 cubic feet of natural gas production, NextGen Gas may prevent an additional
16 1,740 cubic feet of methane emissions.

17 **Q. WHAT IS INCLUDED IN THE PRICE OF NEXTGEN GAS?**

18 A. The NextGen Gas price is derived from two different price components: the wholesale
19 commodity price of natural gas, and the price associated with certifying the low emissions

⁴¹ Interrogatory Response 4-35(i).

⁴² Interrogatory Response 4-35.

⁴³ Interrogatory Response 4-30.

⁴⁴ The Staff notes it is easier to contextualize this number verbally. One would verbalize 0.28% as "Two-Point-Eight Tenths of one percent."

⁴⁵ Interrogatory Response 4-31.

1 characteristics. The company states that the price for the certification could represent an
2 increase to the wholesale gas price of between \$0.02 to \$0.10 per Metric Million British
3 Thermal Unit ("MMBTU").⁴⁶ Gas is certified in bulk.⁴⁷ The price for the certification is
4 divided by the total volume of the purchase and expressed as an incremental expense per
5 MMBTU.

6 **Q. IS THE COMPANY CURRENTLY PROCURING NEXTGEN GAS?**

7 **A.** Yes. According to the Company's response to Staff Interrogatory 1-9, the Company made
8 purchases of NextGen Gas consistently in the eight quarters between December 2019 and
9 November 2021. Those purchases represented between 12-34% of all commodity
10 purchases made by the Company.⁴⁸ In the quarter of Dec 2021 – Feb 2022, NextGen Gas
11 represented 0.4 percent of purchases.⁴⁹

12 **Q. HAS THE COMPANY INCURRED ANY ADDITIONAL INCREMENTAL PRICE**
13 **DUE TO THESE PURCHASES?**

14 **A.** According to the Company, no.⁵⁰ These purchases were made at price parity with standard
15 geological gas. As an illustrative example, if the Company put out a request for proposal
16 ("RFP") for gas, they theoretically would receive two bids back: one for standard geologic
17 gas at \$4.00 per MMBTU, and one for certified gas at \$3.90 per MMBTU plus a 0.10 cent
18 adder per MMBTU for the associated certification. Thus, the Company could contract for
19 NextGen Gas supply at no increased incremental price compared to standard gas.

⁴⁶ Interrogatory Response 1-8.

⁴⁷ Interrogatory Response 4-34. According to the Company: "the methane emission intensity certification required by the Company is attached to the purchase and sale for the total volume for the term of the confirmed transaction."

⁴⁸ Interrogatory Response 1-9.

⁴⁹ Interrogatory Response 4-36.

⁵⁰ Interrogatory Response 4-36(a) and (b).

1 Q. WOULD THE INCREMENTAL 15% ADDER TO THE COMPANY'S PGA
2 ALLOW THE COMPANY TO PURCHASE MORE NEXTGEN GAS?

3 A. Theoretically it would allow the company to procure additional NextGen Gas that, due to
4 the costs of the certification process, would otherwise not be competitive with the market
5 price. The 15% adder would serve as a buffer to the increased costs of the incremental
6 NextGen Gas. According to the Company:

7 [R]esponses to previous requests for proposals to provide NextGen Gas suggest
8 that there is a growing volume of NextGen gas available for purchase at the
9 Company's pipeline transportation capacity receipt points to meaningfully increase
10 volumes previously purchased if the Company could recover the cost premiums
11 associated with the certification of the methane emission intensity.⁵¹

12 And:

13 [t]he ability to recover an incremental amount of the total annual gas costs would
14 allow VNG to award offers for sales of NextGen Gas that are greater than the next
15 highest offer for standard geologic production.⁵²

16 Q. COULD CUSTOMERS BENEFIT FINANCIALLY FROM THE COMPANY'S
17 PARTICIPATION IN THE NEXTGEN MARKET?

18 A. Technically, any leakage reduction that occurs along the pathway from the wellhead to a
19 customer's burner tip would reduce the amount of gas VNG would need to procure.⁵³ This
20 would necessarily lower the Company's total annual gas cost and therefore the cost to rate
21 payers. However, as explained above, the leakage savings are *de minimis* and most likely
22 would not offset the increased costs associated with the procurement of NextGen gas.

⁵¹ Interrogatory Response 4-37.
⁵² Interrogatory Response 4-38.
⁵³ Interrogatory Response 4-39.

1 Q. TO STAFF'S KNOWLEDGE ARE THERE ANY REGULATIONS REQUIRING
2 THE COMPANY TO INCLUDE CERTIFIED LOWER EMISSIONS GAS IN ITS
3 GAS PORTFOLIO?

4 A. No. To the Staff's knowledge there are no regulations that require the company to purchase
5 gas that has been certified as low methane emission gas.

6 Q. PLEASE SUMMARIZE THE STAFF'S THOUGHTS REGARDING NEXTGEN
7 GAS.

8 A. The assumed benefits of NextGen Gas are that it has a lower methane emissions level.
9 Certifications are performed by third parties, and there does not appear to be a standard
10 methodology. There is an incremental cost associated with this product.

11 While there will most likely be incremental benefits associated with incorporating
12 additional NextGen Gas into the Company's supply portfolio, in the Staff's opinion, these
13 benefits are not particularly well defined or quantified by VNG.

14 Q. CAN YOU DEFINE RNG?

15 A. RNG differs from geologic gas from a production standpoint. RNG is biogas sourced from
16 feedstocks such as landfills, waste treatment facilities or agricultural manure that has been
17 captured and conditioned to pipeline quality. Chemically, RNG is no different from natural
18 gas that is pulled out of a geologic formation.

19 Q. WHAT IS THE CERTIFICATION PROCESS FOR RNG?

20 A. As stated previously, once RNG is produced, project developers can register their supply
21 to create RNG Environmental Attributes. According to the Company, independent
22 qualified auditors and/or verifiers conduct verification in accordance with end-use

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1 procedures.⁵⁴ For example, under the Federal Renewable Fuel Standards market, the EPA
2 determines whether the fuel qualifies under the appropriate statute and regulations.⁵⁵

3 **Q. DOES THE COMPANY HAVE ANY EXPERIENCE PROCURING RNG?**

4 **A.** The Company states that Southern Company (VNG's parent company) has limited
5 experience in the RNG market.⁵⁶

6 **Q. WHAT IS THE EMISSIONS REDUCTION ASSOCIATED WITH RNG?**

7 **A.** Theoretically, RNG represents methane that would otherwise have escaped to the
8 atmosphere.⁵⁷ Therefore, each unit of RNG represents an incremental decrease in methane
9 emissions. According to the Company, the EAs that can be paired with a unit of RNG
10 include "all avoided emissions, environmental benefits, and other aspects associated with
11 the production, combustion, use, and transport of RNG when compared to geologic natural
12 gas."⁵⁸ In some circumstances, methane offsets can be derived from RNG.⁵⁹ Specifically,
13 the Company states "[o]ffsets are used to document claims for voluntary emission
14 reductions from qualifying activities, including methane capture and beneficial use from
15 certain RNG facilities", and "[i]f the claim is verified, offsets credits are issued to document
16 the emissions reduction."⁶⁰

17 It is important to note that combusting RNG produces CO₂ and H₂O in the same
18 way that geologic gas would. However, as previously noted, methane is generally assumed

⁵⁴ Interrogatory Response 4-48.

⁵⁵ <https://www.epa.gov/renewable-fuel-standard-program/overview-renewable-fuel-standard>.

⁵⁶ Interrogatory Response 4-42.

⁵⁷ This is not necessarily a 1-1 reduction, as biogas contains molecules other than CH₄. Biogas is not considered RNG until it has been conditioned to remove contaminants.

⁵⁸ Interrogatory Response 4-49.

⁵⁹ *Id.*

⁶⁰ Interrogatory Response 7-67.

1 to be a more potent greenhouse gas (GHG) than CO2; therefore, an argument can be made
2 that capturing, conditioning and combusting methane may be considered more
3 environmentally beneficial than allowing the methane to escape directly into the
4 atmosphere.

5 **Q. WHAT IS THE PRICE OF RNG?**

6 **A.** The RNG price is comprised of two different components – the wholesale commodity price
7 of natural gas, and the additional price associated with the Environmental Attributes
8 associated with the gas. According to the Company:

9 The physical gas from an RNG facility is priced similarly to the market price of
10 geologic natural gas; however, once the physical gas is unbundled from the
11 environmental attribute(s), the physical gas is no longer considered "RNG."⁶¹

12 RNG bundled with the associate Environmental Attributes is typically offered at a
13 higher price than most geologic natural gas prices.⁶²

14 **Q. TO THE STAFF'S KNOWLEDGE ARE THERE ANY REGULATIONS**
15 **REQUIRING THE COMPANY TO INCLUDE IN ITS GAS PORTFOLIO ANY**
16 **AMOUNT OF RENEWABLE NATURAL GAS?**

17 **A.** No. To the Staff's knowledge there are no regulations that require the company to purchase
18 renewable natural gas.

19 **Q. WOULD THE INCREMENTAL 15% ADDER TO THE COMPANY'S PGC**
20 **ALLOW THE COMPANY TO PURCHASE MORE RNG?**

⁶¹ Interrogatory Response 4-45.

⁶² Interrogatory Response 4-46.

1 A. Theoretically, yes. However, the price for RNG can be significantly higher than the price
 2 for standard geologic gas, or NextGen Gas. Assuming a prevailing market price of \$5 per
 3 MCF, the 15% adder the Company is requesting represents an additional \$26 million
 4 dollars in gas costs that the Company would incur for recovery from ratepayers.⁶³ The
 5 difference between the incremental cost of NextGen Gas – \$0.02 - \$0.10 – and the
 6 incremental costs for RNG, [BEGIN CONFIDENTIAL] [REDACTED]
 7 [END CONFIDENTIAL] means that the company would be able to procure fewer MCFs
 8 of RNG compared to NextGen Gas, if the Company were to purchase only one commodity
 9 versus the other. Presumably, the Company would be making a combination of purchases
 10 (i.e. both RNG and NextGen Gas).⁶⁵

11 In its Application, the Company states that the "goal is to replace as much
 12 traditionally produced natural gas as possible within the expense limit."⁶⁶ Using the low-
 13 end of the incremental cost estimates provided by the Company, the incremental cost of
 14 RNG is approximately [BEGIN CONFIDENTIAL] [REDACTED] [END
 15 CONFIDENTIAL] times more expensive than NextGen Gas.⁶⁷

16 Q. PLEASE SUMMARIZE STAFF'S THOUGHTS REGARDING RNG.

17 A. RNG is a bundled product consisting of the physical gas commodity and the associated
 18 environmental attributes. There is a definite cost associated with the EAs, but again, the
 19 specific benefits to rate payers have not been clearly defined by the Company. Moreover,

⁶³ Based on an annual throughput of 30,00,000 MCF.

⁶⁴ See Confidential Interrogatory Response 4-47, attached as ATB-2. [BEGIN CONFIDENTIAL] [REDACTED] END
 CONFIDENTIAL].

⁶⁵ Mello Direct at 29.

⁶⁶ Cogburn Direct at 11.

⁶⁷ Assuming an incremental cost of a NextGen gas certificate of \$0.02 per MMBTU and an incremental cost of an
 RNG RA of [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL].

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1 and to the Staff's knowledge, there is currently no requirement in Virginia for local
2 distribution companies to incur additional costs for methane or CO2 emissions reductions.

3 At a market price of \$6 per MCF for the gas commodity, and [BEGIN
4 CONFIDENTIAL] [REDACTED]

5 [REDACTED] END CONFIDENTIAL] times the wholesale cost of a MCF of
6 standard natural gas. It is not clear to the Staff that VNG's ratepayers would be receiving
7 a likewise increase in environmental benefits compared to a situation where the Company
8 purchased standard geologic gas.

9 **Q. ARE THERE ANY BROADER BENEFITS SPECIFIC TO NEXTGEN GAS AND
10 RNG THAT THE COMMISSION SHOULD CONSIDER?**

11 **A.** Yes. The Company's response to Staff Interrogatory 2-14, states that "the components
12 included in this filing, these efforts, among other benefits, have the potential to reduce
13 VNG's customers' exposure to increased GHG policy costs."⁶⁹ The Staff would note that
14 while some Federal or State policies regarding local gas distribution companies' GHG
15 emissions may eventually materialize, VNGs ratepayers would incur *immediate* costs if
16 this tariff were to be approved at this time. Whether the Company's activities under this
17 currently proposed tariff would be applicable under some future and currently unknown
18 regulatory structure, or whether VNGs customers would be less exposed to the costs
19 thereof, is unclear.

20 Additionally, according to the Company, "methane emission reductions in the
21 Commonwealth of Virginia, as well as nationwide through the purchase of NextGen Gas

⁶⁸ [BEGIN CONFIDENTIAL] [REDACTED] END CONFIDENTIAL]

⁶⁹ Interrogatory Response 2-14(a).

220530145

1 and RNG for gas supply, will contribute to reducing GHG emissions and addressing
2 climate change."⁷⁰

3 The Company states that purchasing RNG could reduce air pollutants and "may
4 improve local air quality, decrease local environmental hazards, and may help achieve
5 environmental and social justice goals consistent with state policy."⁷¹

6 Finally, according to the Company, there may be operational benefits, including an
7 increase to the reliability and resiliency of the gas supply, if RNG is sourced from facilities
8 within the VNG footprint."⁷²

9 **Q. WHAT WOULD THE BILL IMPACT BE IF THE COMMISSION WERE TO**
10 **APPROVE THE PROPOSED 15% ADDER?**

11 **A.** It would depend on the Company's projected annual gas cost, as the fifteen percent adder
12 is based on the total projected cost of other annual gas purchases the Company would make.
13 According to the U.S. Energy Information Administration, the spot price of natural gas at
14 Henry Hub was \$6.64 per MMBTU for the week of 4/15/2022.⁷³ At a price of \$6.50 per
15 MCF, a 15% adder would represent an increase to the company's annual total gas costs of
16 \$34,411,765, or an additional \$68.48 per residential customer per year.⁷⁴ The table below
17 demonstrates the additional increase that a 15% adder would have on residential customers,
18 depending on the Company's annual per MCF price projection:

⁷⁰ Mello Direct at 29.

⁷¹ Mello Direct at 30.

⁷² Mello Direct at 15.

⁷³ The Staff notes an MCF of natural gas is roughly equivalent to 1.03 MMBTUs.

⁷⁴ \$6.50 per MCF x 30,000,000 MCF annual throughput = \$195,000,000.
\$195,000,000/(1-15%) = \$229,411,765, or an additional \$34,411,765 in gas costs per year.

22052015

Impact of 15% NextGen/RNG Costs on Customer Bills

<u>Prevailing Market Price/MCF</u>	<u>Annual Additional Increase in Total Gas Cost</u>	<u>Annual Increase on Residential Bill</u>
\$ 2.50	\$ 13,235,294	\$ 26.34
\$ 2.75	\$ 14,558,824	\$ 28.97
\$ 3.00	\$ 15,882,353	\$ 31.61
\$ 3.50	\$ 18,529,412	\$ 36.87
\$ 3.75	\$ 19,852,941	\$ 39.51
\$ 4.00	\$ 21,176,471	\$ 42.14
\$ 4.25	\$ 22,500,000	\$ 44.78
\$ 4.50	\$ 23,823,529	\$ 47.41
\$ 4.75	\$ 25,147,059	\$ 50.04
\$ 5.00	\$ 26,470,588	\$ 52.68
\$ 5.25	\$ 27,794,118	\$ 55.31
\$ 5.50	\$ 29,117,647	\$ 57.94
\$ 5.75	\$ 30,441,176	\$ 60.58
\$ 6.00	\$ 31,764,706	\$ 63.21
\$ 6.25	\$ 33,088,235	\$ 65.85
\$ 6.50	\$ 34,411,765	\$ 68.48
\$ 6.75	\$ 35,735,294	\$ 71.11
\$ 7.00	\$ 37,058,824	\$ 73.75
\$ 7.25	\$ 38,382,353	\$ 76.38
\$ 7.50	\$ 39,705,882	\$ 79.01

1 Q. WHAT IS THE STAFFS POSITION ON THE COMPANY'S PROPOSAL TO
 2 MODIFY ITS TARIFF TO INCLUDE NEXTGEN GAS AND RNG IN THE
 3 COMPANY'S GAS SUPPLY PORTFOLIO?

4 A. Staff is not theoretically opposed to the inclusion of either commodity in the Company's
 5 portfolio, especially given that the Company has already successfully integrated a moderate
 6 amount of NextGen Gas in its supply portfolio. Additionally, Staff is aware that fugitive
 7 methane emissions, whether from fossil gas production and transmission, agriculture, or
 8 waste disposal, represent a negative environmental externality. Ultimately though, the

1 Staff believes that the appropriateness of charging customers a premium for these products
2 and recovering the costs associated with those premiums in the Company's purchased gas
3 cost filings is a policy issue for the Commission to consider and determine.

4 **Q. THE COMPANY IS REQUESTING AUTHORITY TO INCUR UP TO A 15%
5 INCREASE IN ITS PURCHASED GAS COSTS IN ORDER TO INCORPORATE
6 MORE OF THESE TWO COMMODITIES INTO ITS SUPPLY PORTFOLIO.
7 WHAT IS THE STAFF'S POSITION ON THE 15% ALLOWANCE?**

8 **A.** There are tangible costs that the ratepayers will incur because of the Company participating
9 in these markets. The Staff has a concern with the Company incurring additional costs for
10 NextGen Gas and RNG, and passing those costs onto its ratepayers, when there is no
11 regulatory requirement at either the Federal or State level for the Company to utilize these
12 products. At price parity, the Staff does not oppose the incorporation of either of these
13 commodities into the Company's supply portfolio. However, as stated above, the Staff
14 believes that charging customers a premium for these products is a policy question for the
15 Commission to determine.

16 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

17 **A.** Yes, it does.

ATTACHMENT ATB-1

220520159

Question No. 5

Please provide the supporting calculation in executable format of Microsoft Excel with formulas intact of the \$.50 average residential customer impact described on Page 27 of Witness Mello's Direct Testimony.

Response

Please see Line 29 of Company Exhibit No. ___, JMC Schedule 2, which provides the expected annual cost per residential customer of the program at the maximum annual allowed spend under the proposal. Attachment Staff Set 1(5) applies this same cost per residential customer per year assuming that the Company spends the maximum allowable under the proposal each year. The calculation on Line 29 of Company Exhibit No. ___, JMC Schedule 2 was extended by one year in order to confirm that the total cost rate begins to decline at the conclusion of the pilot program. The year 5 column shows the maximum residential customer cost of \$0.43 per month.

This response was prepared by or under the supervision of John M. Cogburn, Director of Rates, Tariffs, and Regulatory Planning, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 6

Page 15 of Witness Mello's Direct Testimony states that "RNG facilities typically produce smaller volumes than a traditional natural supply source." Please provide an estimate of the volumes to be produced by the RNG facilities contemplated by the Interconnection Allowance component of the proposed Program. Please provide these estimated volumes produced by facility and/or production type.

Response

VNG has evaluated multiple third-party RNG interconnection requests since 2019. The table below includes estimated production volumes provided by individual RNG producers by feedstock type.

Feedstock	Estimated MMBtu/Year
Landfill	766,500
Landfill	1,058,500
Agricultural Waste	98,988
Landfill	1,462,920
Landfill	876,000
Waste-Water Treatment Plant	164,250

This response was prepared by or under the supervision of Robin Lanier, Director of Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

20250117

Question No. 15

Please explain how VNG intends to use the EAs received from RNG producers.

- a) Are EAs traded in a market and if so, how, and where? (i.e. is there a trading platform similar to PJM's Generation Tracking System for RNG EAs?)
- b) Are there any legal or regulatory requirements for VNG to acquire EA's?
- c) Are there any legal or regulatory requirements for Southern Company to acquire EA's?
- d) Please explain the accounting for the EAs at the point of acquisition and retirement/sale.
- e) Will the retirement/sale of EAs create credits to all VNG customers? If so, please explain the nature of the credit, timing, amount, etc.

Response

- a) Environmental Attributes ("EAs") are a bundled product that is generally comprised of variety of attributes associated with the environmental benefits of a particular product, in this case renewable natural gas ("RNG"). Such environmental benefits can include, but are not limited to, avoided emissions, water use, and waste disposal. EAs as a bundled product are generally traded in bilateral transactions using commercial agreements between the parties (e.g., NAESB agreements), rather than on particular exchanges, and they are generally not entered into particular trading platforms. There are emerging methods of tracking environmental attributes through block chain technologies as well as trading platforms being developed by private companies, however, to our knowledge these are not in widespread use at this time. Individual environmental credits may be generated on particular elements of the bundle of EAs, and such credits can be subsequently traded in the voluntary markets, or the compliance markets such as California's Low Carbon Fuel Standard ("LCFS") Credits or Renewable Identification Numbers ("RINs") under the Federal Renewable Fuel Standard ("RFS") when RNG is used as transportation fuel. LCFS Credit generation and trading is entered in the California Air Resources Board's LCFS Report Tool and Credit Bank and Transfer System ("LRT-CBTS"). RIN Credit generation and trading is entered in the Environmental Protection Agency's ("EPA's") Electronic Moderated Transaction System ("EMTS"). The Midwest-Renewable Energy Tracking System ("M-RETS") is an emerging platform that facilitates the generation and tracking of Renewable Energy Credits ("RECs") when RNG is used for electricity generation or thermal applications.
- b) No.
- c) No.
- d) The Company will use an inventory approach for the financial accounting of EAs. The value paid for the attributes, if any, will be recorded in an EA inventory account. When an attribute is retired or sold, the value assigned to the attribute, if any, that has not already been expensed or subject to recovery will be expensed. All credits are expected to be retired, rather than sold, by the Company thus offsetting greenhouse gas emissions.

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- e) As proposed, VNG will receive a negotiated amount of RNG EAs on an annual basis over the term of the Interconnection Agreement and subject to the per project and program cost cap that correlates with the amount of investment made by VNG and the type of RNG production facility. The exact number of EAs is currently unknown and cannot be projected at this time. Retiring these EAs provides environmental benefits to customers.

This response was prepared by or under the supervision of Robin Lanier, Director Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 16

Section 3.2 of the Interconnection Agreement states that "title to the Renewable Gas delivered to the Renewable Gas Service Interconnect shall not pass from the Renewable Gas Producer to the Company, but shall pass from the Renewable Gas Producer to the third-party purchaser based upon the terms of purchase of such Renewable Gas." Please explain.

- a) Does the Company expect there to be specific purchase agreements between individual customers and these RNG producers connecting to VNG's system and benefitting from the Interconnection Allowance?
- b) If so, please describe these customers.
- c) Please describe any previous or ongoing discussions with potential third-party purchasers of RNG.

Response

- a) Yes. The Company anticipates these sales and purchases will have their own purchase agreements for the physical gas, similar to the agreements that transportation service customers enter into for their current natural gas supply. As stated on Page 24 of Company Witness Mello's Direct Testimony, "[t]he RNG Producer would manage the RNG produced and will sell the physical pipeline quality gas from RNG facilities to third parties, for subsequent resale to VNG customers or directly to VNG as part of VNG's gas supply." The physical gas sales will be limited to deliveries made to parties physically located on the VNG distribution system; there are no planned off-system sales that would be delivered into the interstate pipeline system. No parties located outside of the VNG service territory would benefit from the Interconnection Allowance provided to facilitate delivery and receipt of such gas.
- b) The potential parties are limited to transportation service customers and retail marketers who sell natural gas supply to transportation service customers. These two groups currently arrange for the purchase of their own upstream natural gas supply that they deliver to the VNG distribution system for the transportation service customers' use.
- c) The Company has not yet engaged in discussions with third-party purchasers of RNG.

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2205201956

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 51

Please refer to page 14 of Company witness Mello's Schedule 3, section 5.4 "Environmental Attributes".

- a) Does the Company intend to have a producer supply all of the environmental attributes that would be associated with the RNG annually produced at a facility? If yes, explain the reasons for structuring the contract in this manner. If no, please explain what the expected percentage of EAs the producer would still have economic rights to after the contracted amount has been supplied to the Company.

- b) Please provide a narrative description of the relationship between the interconnection allowance the company would disburse to a producer, and the environmental attributes that would be returned to the Company.

Response

No, the Company does not intend to have a producer supply all the environmental attributes that would be associated with a participating RNG facility under the interconnection program.

As described on Page 7, Section 19, of VNG's Application for Approval, "For RNG projects that receive an interconnection allowance as part of the RNG Interconnection Allowance Pilot, VNG will receive a level of environmental attributes from participating facilities commensurate with the Company's capital investment. The Company will negotiate a set number of environmental attributes to be assigned to VNG on an annual basis. The environmental attributes will be negotiated on a per-project basis and a schedule to receive those attributes will be included in the Renewable Natural Gas Interconnection Agreement."

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

2021-02-25

Question No. 14

Page 25 of witness Melo's Testimony states, "the physical gas and associated environmental attributes ("EAs") from the RNG facility will be transported through VNG's infrastructure for use by and to the benefit of all customers." Please explain in detail how all customers will benefit from:

- a) RNG supplied by facilities receiving an Interconnection Allowance; and
- b) EA's negotiated and received by VNG.

Response

- a) RNG utilizes methane that otherwise may be released into the atmosphere or non-beneficially flared. VNG is committed to reducing direct and indirect emissions through the consideration of investments that can be made to reduce greenhouse gas emissions ("GHG"). With the components included in this filing, these efforts, among other benefits, have the potential to reduce VNG's customers' exposure to increased GHG policy costs. In addition, the development of RNG facilities can bring local benefits to communities, customers, and the environment. The RNG Coalition, which advocates for sustainable development, deployment, and utilization of RNG, estimates that in 2021 RNG Production Facilities will have attracted over \$2.6 billion in investment and created approximately 22,600 direct and indirect jobs. The Sustainable Gas Program and the proposed Interconnection Allowance Pilot offered to RNG Producers is intended to incentivize RNG producers to develop projects and keep the associated gas supply in the Commonwealth of Virginia. Furthermore, there are also benefits that can be derived from keeping the physical gas supply local to Virginia. As stated on page 29 of Company Witness Mello's Testimony, "...locally sourced RNG projects provide supply diversity with the potential to reduce upstream shipping and transportation costs." These benefits – from emissions reductions to local economic benefits – have the opportunity to create benefits not only for VNG customers, but for the entire Commonwealth of Virginia.
- b) The unbundled EAs that VNG will receive from participating RNG Producers are a key component of this filing and will be utilized in a way that helps reduce greenhouse gas emissions for VNG and its customers. Ownership of these attributes allows VNG to demonstrate the commitment to reduce greenhouse gas emissions for customers and the environment through the investment in interconnection facilities. As stated on Page 29 of Joanne Mello's Testimony, "[t]he environmental attributes VNG obtains through the RNG Schedule represent the reduction of GHG otherwise emitted into the atmosphere, providing an environmental benefit to customers."

This response was prepared by or under the supervision of Robin Lanier, Director Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

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20252015

Question No. 44

Staff's understanding is that RNG can be purchased either bundled with the associated renewable attributes, or as an unbundled commodity, is the Staff's understanding correct? If not, please clarify which point is incorrect and why.

Response

Yes. RNG can be purchased bundled with attributes and physical gas, or the product can be unbundled with separate transactions on the RNG environmental attributes versus physical gas from the facility.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 45

Staff's understanding is that unbundled RNG costs approximately competitive to the market price of geologic natural gas, is that correct?

Response

The physical gas from an RNG facility is priced similarly to the market price of geologic natural gas; however, once the physical gas is unbundled from the environmental attribute(s), the physical gas is no longer considered "RNG".

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 46

Staff's understanding is that RNG bundled with the associate attributes is sold at a higher price than standard geologic gas, correct?

Response

Yes, RNG bundled with the associate attributes is typically offered at a higher price than most geologic natural gas prices.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

22052010575

Question No. 7

Page 7 of witness Cogburn's Testimony shows estimates of 3% and 2% for O&M and administrative costs respectively. Please provide support for these estimated percentages.

Response

The percentage of total capital cost expected for O&M and administrative are based on historic experience and expectations of the cost to maintain facilities and administer programs like the Sustainable Gas Program.

This response was prepared by or under the supervision of John M. Cogburn, Director of Rates, Tariffs, and Regulatory Planning, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 8

Page 20 of witness Mello's Direct Testimony states that the Company already purchases NextGen gas from the existing receipt points associated with the Company's interstate pipeline transportation capacity. If this is true, please explain why the Company seeks approval to add NextGen gas to its approved list of sources in Section XX of Terms and Conditions.

Response

The Company's previous purchases of NextGen Gas were completed as part of its normal purchases of natural gas supply at a cost that was comparable to its purchases of standard geologic production. However, most sources of NextGen Gas that are currently available at the receipt points where VNG sources supply are priced with an incremental cost that is approximately \$0.02 to \$0.10 per MMBtu above standard geologic production. This request by the Company for approval to recover the commodity costs and any potential incremental costs associated with NextGen Gas may result in purchases that are separate and apart from the Company's purchases of standard geologic production. The Company seeks to add NextGen Gas as a separate component to its approved list of sources in Section XX of Terms and Conditions so that these specific NextGen Gas purchases, which may include their own unique incremental costs, can be correctly differentiated from the Company's purchases of standard geologic production.

This response was prepared by or under the supervision of Kenneth Yagelski, Director of Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 12

Please provide an estimate of the impact on an average residential customer's monthly bill of the incremental costs associated with RNG and/or NextGen Gas limited to 15% of the total annual projected comparable gas cost for traditional geologic production.

- a) Provide the impact if limited to 15% (as proposed);
- b) Provide the impact if limited to 10%; and
- c) Provide the impact if limited to 5%.

(please provide all three calculations in Microsoft Excel with formulas intact)

Response

Please see Attachment Staff Set 1(12).

This response was prepared by or under the supervision of John M. Cogburn, Director of Rates, Tariffs, and Regulatory Planning, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 13

Please provide an estimate of the percent of the Company's total gas portfolio to be constituted by RNG and/or NextGen gas under the same scenarios as question 12 (please fully explain whether the provided calculations take into account any RNG or NextGen gas already included in the Company's gas supply (i.e. question 8 above).

- a) If incremental cost is limited to 15% (as proposed);
- b) If limited to 10%; and
- c) If limited to 5%.

Response

Please see Attachment Staff Set 1(12).

This response was prepared by or under the supervision of John M. Cogburn, Director of Rates, Tariffs, and Regulatory Planning, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

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220520145

Question No. 52

Does the Company intend to provide a specific break out of NextGen gas and RNG in its quarterly PGAs?

- a) Does the Company plan to provide a specific breakout of both the premium paid for NextGen gas and RNG as well as the commodity cost?

Response

The Company will maintain records of the gas purchase volumes and prices in sufficient detail to delineate both the commodity cost and any premiums paid. The Company will report those details in quarterly PGA filings as directed by the Commission.

This response was prepared by or under the supervision of John Cogburn, Director, Rates, Tariffs, and Regulatory Planning, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

22052010159

Question No. 30

Staff's understanding is that gas that has been certified as "NextGen" gas is certified to have emitted less than 0.02% methane along the supply stream from the wellhead to the delivery point on VNG's system, is the Staff's understanding correct? If not, please clarify which point is incorrect and why.

Response

There is no standard definition for low-methane emission intensity natural gas. Most NextGen Gas offerings are characterized by the certification of the environmental performance of the natural gas production, not the delivered supply. The Company has previously defined "NextGen" Gas on page 17 of the pre-filed Direct Testimony of Joanne A. Mello, as "geologic natural gas that is differentiated from traditional geologic natural gas production through the assessment and verification of environmental performance criteria across the natural gas value chain, with a particular focus on reduced methane emission intensity during production and processing."

The Company's current approach is to utilize the goal for the production sector for Our Nation's Energy Future ("ONE Future") as a benchmark to evaluate NextGen Gas supply offerings from suppliers and seeks offerings of geologic natural gas production that demonstrate a certified methane emissions intensity of less than 0.28 percent or better utilizing the Natural Gas Sustainability Initiative ("NGSI") framework developed by the American Gas Association ("AGA") and Edison Electric Institute ("EII").

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 31

Does the Company have any comparison of the methane emission profile of standard geologic gas compared to NextGen gas?

Response

Please see Attachment Staff Set 4(31), which contains the report from the U.S. Department of Energy ("DOE") National Energy Technology Laboratory ("NETL") publication titled, *Industry Partnerships & Their Role in Reducing Natural Gas*. Specifically, please refer to the table on Page 43. The NETL analysis reports the average methane emission intensity for natural gas production in the United States is 0.454 percent.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 34

Staff's understanding is that a certification is attached with the bulk purchase of NextGen gas rather than on a per unit basis (such as per MMBTU), is that correct? If not, please clarify which point is incorrect and why.

Response

The methane emission intensity certification required by the Company is attached to the purchase and sale for the total volume for the term of the confirmed transaction.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 35

Staff's understanding is that there are multiple methodologies employed to certify NextGen gas, is the Staff's understanding correct?

- a) Please explain how direct measurement of methane emissions would be conducted.
- b) Has the Company purchased any NextGen gas certified under this methodology?
- c) Please explain how indirect measurements of methane emissions would be conducted. For example, are there engineering formulas for gas extraction and transportation equipment that would provide an estimate of the expected volume of methane leakage?
- d) Has the Company purchased any NextGen gas certified using these indirect methodologies?
- e) Are there any other predominant methodologies the Company is familiar with, and has the Company purchased any NextGen gas certified in those manners?
- f) Has any particular methodology been broadly adopted by certifiers?
- g) Has the Company seen a price differential between gas certified by one methodology vs another?
- h) Is there any organization or governmental body either State or Federal that is charged with organizing standards for methane emission verification?
- i) Is there any organization or governmental body either State or Federal that is charged with the authority to license NextGen gas certifying bodies?

Response

Yes. There are several methane emission intensity certification providers in operation, and each employs a different proprietary methodology for determining methane emission intensity. The providers attest to the accuracy of their own process.

- a) – f) VNG does not have detailed information of the various analysis methodologies being used by methane emission intensity certification providers.

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20210404

- g) Yes. VNG has observed differences in premiums associated with NextGen Gas, but it is not certain what factors may be determining those differences.
- h) The Company is unaware of any current State or Federal effort that has jurisdiction over VNG to standardize methane emission intensity verification.
- i) The Company is unaware of any current government, or other, authority that licenses methane emission intensity certification providers.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 36

Please refer to the Company's response to Staff Interrogatory 1-9.

- a) Please provide an update for Q1 Dec. 2021 – Feb 2020, if available.
- b) For NextGen gas purchased during the 8 quarters listed in Response to 1-9, did the Company pay an incremental premium for the certifications associated with these purchases and, if so, please describe.
- c) Were any of the purchases of NextGen gas during the 8 quarters listed in response to 1-9 made at above market price?
- d) If so, please identify which purchases, the specific price paid per MMBTU, the price of the certification paid per MMBTU, and a comparison to the prevailing market price at the time.

Response

- a) Q1, Dec 2021 – Feb 2022, 0.4 percent

The NextGen Gas activity for this quarter is comparatively low because of market factors outside of VNG's control.

- b) No. While the Company has not paid a premium to the prevailing market price for natural gas when purchasing NextGen Gas, the total cost of the Company's purchases of NextGen Gas have included itemized expenses for Certification. Please refer to the table below for a breakdown of the purchase cost for the NextGen Gas purchases made by VNG for the eight quarters listed in Response 1-9.

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Question No. 9

Please provide the percent of the total volume of gas delivered to the VNG system per quarter over the last eight quarters that was NextGen gas.

Response

Q1	Dec 2019-Feb 2020	17%
Q2	Mar - May 2020	21%
Q3	Jun - Aug 2020	28%
Q4	Sep - Nov 2020	26%
Q1	Dec 2020-Feb 2021	12%
Q2	Mar - May 2021	22%
Q3	Jun - Aug 2021	34%
Q4	Sep - Nov 2021	24%

These percentages of total volume of gas per quarter that was NextGen Gas are based on VNG's purchases and not deliveries. Deliveries do not accurately reflect NextGen Gas amounts because all purchases are comingled in storage inventory and VNG is not able to determine what volume of storage withdrawals are NextGen Gas supply that is delivered to the VNG system.

This response was prepared by or under the supervision of Miguel Figueiredo, Manager of Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

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- g) Yes. VNG has observed differences in premiums associated with NextGen Gas, but it is not certain what factors may be determining those differences.
- h) The Company is unaware of any current State or Federal effort that has jurisdiction over VNG to standardize methane emission intensity verification.
- i) The Company is unaware of any current government, or other, authority that licenses methane emission intensity certification providers.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 36

Please refer to the Company's response to Staff Interrogatory 1-9.

- a) Please provide an update for Q1 Dec. 2021 – Feb 2020, if available.
- b) For NextGen gas purchased during the 8 quarters listed in Response to 1-9, did the Company pay an incremental premium for the certifications associated with these purchases and, if so, please describe.
- c) Were any of the purchases of NextGen gas during the 8 quarters listed in response to 1-9 made at above market price?
- d) If so, please identify which purchases, the specific price paid per MMBTU, the price of the certification paid per MMBTU, and a comparison to the prevailing market price at the time.

Response

- a) Q1, Dec 2021 – Feb 2022, 0.4 percent

The NextGen Gas activity for this quarter is comparatively low because of market factors outside of VNG's control.

- b) No. While the Company has not paid a premium to the prevailing market price for natural gas when purchasing NextGen Gas, the total cost of the Company's purchases of NextGen Gas have included itemized expenses for Certification. Please refer to the table below for a breakdown of the purchase cost for the NextGen Gas purchases made by VNG for the eight quarters listed in Response 1-9.

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<u>Period</u>	<u>Total Cost</u>	<u>Commodity Cost</u>	<u>Itemized Certification Expense</u>
Q1 Dec 2019 – Feb 2020	\$ 2,934,750	\$ 2,859,675	\$ 75,075
Q2 Mar 2020 – May 2020	\$ 2,967,000	\$ 2,891,100	\$ 75,900
Q3 Jun 2020 – Aug 2020	\$ 2,967,000	\$ 2,891,100	\$ 75,900
Q4 Sep 2020 – Nov 2020	\$ 2,934,750	\$ 2,859,675	\$ 75,075
Q1 Dec 2020 – Feb 2021	\$ 2,902,500	\$ 2,828,250	\$ 74,250
Q2 Mar 2021 – May 2021	\$ 3,810,765	\$ 3,729,375	\$ 81,390
Q3 Jun 2021 – Aug 2021	\$ 4,590,780	\$ 4,506,600	\$ 84,180
Q4 Sep 2021 – Nov 2021	\$ 4,958,482	\$ 4,878,667	\$ 79,815

- c) No.
- d) Not applicable, please see above.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 37

Please refer to the Company's response to Staff Interrogatory 1-9. In Q3 of 2021, 34% of the Company's purchases were of NextGen gas. With the understanding the company may be constrained by the prudence of supply diversity, is there sufficient supply of NextGen gas in the market today to cover:

- a) Some of, to mean approximately 30% annually,
- b) Most of, to mean 60% annually, or;
- c) All of, meaning 100% of the Company's annual commodity purchases?

Response

VNG cannot reasonably predict the specific volume of NextGen Gas that may be available in future periods.

However, responses to previous requests for proposals to provide NextGen Gas suggest that there is a growing volume of NextGen gas available for purchase at the Company's pipeline transportation capacity receipt points to meaningfully increase volumes previously purchased if the Company could recover the cost premiums associated with the certification of the methane emission intensity.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.



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Question No. 38

Staffs understanding of the Company's position is that while there is some amount of NextGen gas supply available in the market that is cost competitive with standard geologic production, the 15% increase in the Company's application would cover the incremental premium associated with NextGen gas that is available above market price, is the Staff's understanding correct? If not, please clarify which point is incorrect and why.

- a) Additionally, Staff's understanding is that using the 15% increase, the Company would endeavor to maximize the amount of NextGen gas in its total fuel supply, is the Staff's understanding correct? If not, please clarify which point is incorrect and why.

Response

While there is occasionally a limited amount of NextGen Gas available in the market that is cost comparable with standard geologic production, the ability to recover an incremental amount of the total annual gas costs would allow VNG to award offers for sales of NextGen Gas that are greater than the next highest offer for standard geologic production.

- a) If the Company is allowed to recover an incremental amount of the total annual gas costs for NextGen Gas, VNG would make reasonable efforts to maximize the volume of NextGen Gas purchased.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 39

Would gas that escapes the production and transportation system between the wellhead and the Company's delivery point represent an economic loss to the Company?

Response

VNG makes purchases for a specific volume of natural gas (either standard geologic production or NextGen Gas) to be received into the transportation pipeline. The volume that is delivered to the interconnection at the Company's distribution system is less due to losses along the path, compressor fuel retainage, and potential meter accuracy error. The Company's sales customers pay for the purchased receipt volume, so any losses are detrimental to the customer. VNG does not financially benefit from reducing these losses. Any improvement will benefit the sales customers' cost of gas.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

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Question No. 47

Please describe the price difference per MMBTU of a contract for bundled RNG and standard geologic gas, organized by feedstock (i.e. Wastewater treatment, livestock waste, landfill etc.)

Response

RNG purchase costs are variable and depend on many factors, such as contract term lengths, type, location, commercial operations date (COD), volume, CI score, etc. The table below provides an estimated cost per MMBtu of each potential feedstock for the unbundled environmental attributes of RNG for the voluntary (non RFS/LCFS) market. These costs are estimated, not guaranteed, and generally assume the presence of a long-term (>10 year) offtake agreement.

Please see the Company’s response to Question 45 in Staff set 4 for price information for the physical gas from an RNG facility.

The following table highlighted in yellow is entirely confidential and is being provided pursuant to the protections set forth in 5 VAC 5-20-170, the Hearing Examiner’s Protective Ruling dated February 18, 2022, any subsequent protective order or ruling that may be issued for confidential or extraordinarily sensitive information in this proceeding, and the Agreements to Adhere executed pursuant to any such orders or rulings.

[TABLE ENTIRELY CONFIDENTIAL]

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission’s Rules of Practice and Procedure as the person providing this response.

Question No. 48

What is the process to certify the environmental attributes associated with RNG?

Response

Renewable fuels and any associated environmental attributes can be applied to a claim of renewable energy only once. The process for RNG certification varies based on the intended end use, whether in compliance markets (Federal Renewable Fuels Standard, or RFS, or a state Low Carbon Fuel Standard like California’s LCFS market) or in voluntary

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markets. Whether in a compliance or voluntary market, independent qualified auditor(s) and/or verifier(s) conduct verification in accordance with end-use procedures.

Additionally, electronic tracking systems can be used to facilitate production facility registration/validation, the documentation of fuel production, and chain-of-custody tracking requirements.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 49

What specifically do the environmental attributes associated with RNG represent?

Response

As described on page 13 of the pre-filed Direct Testimony of Joanne A. Mello, "Environmental attributes are the bundle of "non-energy" attributes of RNG, including all avoided emissions, environmental benefits, and other aspects associated with the production, combustion, use, and transport of RNG when compared to geologic natural gas. These RNG environmental attributes are a form of environmental claims associated with RNG." Another potential environmental attribute, or benefit, of RNG is that it can, under certain circumstances, generate methane capture offsets that can be applied to offset GHG emissions associated with other activities.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 50

Staffs understanding of the Company's position is that some portion of the proposed 15% increase in the Company's application would cover the incremental premium associated with RNG, is the Staff's understanding correct? If not, please clarify which point is incorrect and why.

- a) Does the Company have any specific plans to convert a specific percentage of its supply portfolio to RNG?

Response

The ability to recover an incremental amount of the total annual gas costs, would allow VNG to award offers for sales of RNG that are greater than the costs for standard geologic production.

- a) No.

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Question No. 41

Please provide a copy of the Certification associated with a specific purchase of NextGen gas that the Company made within the last 8 months.

Response

Please see Confidential Attachment Staff Set 4(41) for an example of the methane emission intensity certification associated with a purchase of NextGen Gas.

Confidential Attachment Staff Set 4(41) is entirely confidential and is being provided pursuant to the protections set forth in 5 VAC 5-20-170, the Hearing Examiner's Protective Ruling dated February 18, 2022, any subsequent protective order or ruling that may be issued for confidential or extraordinarily sensitive information in this proceeding, and the Agreements to Adhere executed pursuant to any such orders or rulings.

This response was prepared by or under the supervision of Kenneth Yagelski, Director Gas Supply, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 42

Does the Company have any specific experience with executing a purchase contract for Renewable Natural Gas ("RNG")?

Response

Yes. Southern Company Gas (VNG's parent company) has experience executing a purchase contract for Renewable Natural Gas from its Renewco Meadow Branch Facility in Athens, Tennessee where Southern Company Gas is the seller of RNG.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 43

Has the Company made any purchases of RNG over the last eight quarters?

Response

No.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

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Question No. 66

Please refer the Excel spreadsheet provided in response to Staff Interrogatories 1-12 and 1-13.

- (a) What is the unit of measurement for the figure in cell D3: "30,000,000"
- (b) Does this unit represent only the Residential class' annual throughput?

Response

- (a) The unit of measurement is thousands of cubic feet (MCF) of natural gas. Additionally the unit of measurement for the column entitled "Prevailing Market Price/DTH" is also MCF, not Dekatherms (DTH), so it should be labeled "Prevailing Market Price/MCF."
- (b) The 30,000,000 MCF of natural gas is the approximate total sales volume for the Company.

This response was prepared by or under the supervision of John Cogburn, Director, Rates, Tariffs, and Regulatory Planning who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 67

In Interrogatory Response 4-49, the Company states " In some circumstances, methane offsets can be derived from RNG".

- (a) Please explain how these methane offsets are created and when and how they are generally used.

Response

Offsets are used to document claims for voluntary emission reductions from qualifying activities, including methane capture and beneficial use from certain RNG facilities. Offsets are created by complying with scientific peer-reviewed standards or protocols that outline emission reduction quantification, monitoring and reporting, and quality assurance and control procedures. Once quantified, the emissions reductions are verified by an independent third party review to substantiate the claim. If the claim is verified, offsets credits are issued to document the emissions reduction.

This response was prepared by or under the supervision of Robin Lanier, Director Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 44

Staff's understanding is that RNG can be purchased either bundled with the associated renewable attributes, or as an unbundled commodity, is the Staff's understanding correct? If not, please clarify which point is incorrect and why.

Response

Yes. RNG can be purchased bundled with attributes and physical gas, or the product can be unbundled with separate transactions on the RNG environmental attributes versus physical gas from the facility.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 45

Staff's understanding is that unbundled RNG costs approximately competitive to the market price of geologic natural gas, is that correct?

Response

The physical gas from an RNG facility is priced similarly to the market price of geologic natural gas; however, once the physical gas is unbundled from the environmental attribute(s), the physical gas is no longer considered "RNG".

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

Question No. 46

Staff's understanding is that RNG bundled with the associate attributes is sold at a higher price than standard geologic gas, correct?

Response

Yes, RNG bundled with the associate attributes is typically offered at a higher price than most geologic natural gas prices.

This response was prepared by or under the supervision of Robin Lanier, Direct Renewable Gas, who is so designated pursuant to Rule 260 of the Commission's Rules of Practice and Procedure as the person providing this response.

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ATTACHMENT ATB-2

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Question No. 47

Please describe the price difference per MMBTU of a contract for bundled RNG and standard geologic gas, organized by feedstock (i.e. Wastewater treatment, livestock waste, landfill etc.)

Response

RNG purchase costs are variable and depend on many factors, such as contract term lengths, type, location, commercial operations date (COD), volume, CI score, etc. The table below provides an estimated cost per MMBtu of each potential feedstock for the unbundled environmental attributes of RNG for the voluntary (non RFS/LCFS) market. These costs are estimated, not guaranteed, and generally assume the presence of a long-term (>10 year) offtake agreement.

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