

**STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH**

DOCKET NO. G-9, SUB 698

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of		
Application of Piedmont Natural Gas Company, Inc., for Approval of Appendix F to its North Carolina Service Regulations)	ORDER APPROVING
)	APPENDIX F AND ESTABLISHING
)	PILOT PROGRAM

BY THE COMMISSION: On December 6, 2016, Piedmont Natural Gas Company, Inc. (Piedmont or the Company), filed a petition in the above-captioned docket requesting approval of proposed Appendix F, Statement of Alternative Gas Requirements, to its Service Regulations (Initial Version). Proposed Appendix F sets forth the terms and conditions under which Piedmont will accept Alternative Gas¹ into its system and deliver or redeliver it to Piedmont's customers. Piedmont states that the need for establishing such terms and conditions has arisen due to the potential for sourcing supplies of methane from non-traditional suppliers, including landfills, swine waste-to-energy facilities, and poultry waste-to-energy facilities.

On December 6, 2016, in Docket No. G-9, Sub 699, Piedmont filed an Application for Approval of a Receipt Interconnect Agreement between Piedmont and C2e Renewables NC (C2e), which relates to the construction of new natural gas distribution lines and facilities to receive Alternative Gas supplies from C2e at a designated receipt point.

Between December 20, 2016 and February 3, 2017, timely petitions to intervene were received and granted for the North Carolina Pork Council (NCPC); North Carolina Sustainable Energy Association (NCSEA); Enerdyne Power Systems, Inc. (Enerdyne); and the Coalition for Renewable Natural Gas (RNG).

¹ "Alternative Gas" is defined in Appendix F as:

gas capable of combustion in customer appliances or facilities which is similar in heat content and chemical characteristics to natural gas produced from traditional underground well sources and which is intended to act as a substitute or replacement for Natural Gas (as that term is defined in Piedmont's North Carolina Service Regulations). Alternative Gas shall include but not be limited to biogas, biomethane, and landfill gas, as well as any other type of natural gas equivalent produced or manufactured from sources other than traditional underground well sources. For purposes of the application of Piedmont's rate schedules and its Service Regulations, Alternative Gas shall be treated in a manner equivalent to "Gas" or "Natural Gas" except to the extent that this Statement of Alternative Gas Requirements specifies more restrictive obligations applicable to Alternative Gas, in which case the provisions of this Statement of Alternative Gas Requirements shall control.

On January 12, 2017, the Commission issued an Order Requesting Comments that (1) initiated an investigation of Piedmont's request to amend its Service Regulations; (2) directed that Public Service Company of North Carolina, Inc. (PSNC); Frontier Natural Gas Company (Frontier); Toccoa Natural Gas; the Public Staff-North Carolina Utilities Commission (Public Staff); and the North Carolina Attorney General be deemed to be parties to this proceeding; and (3) established a schedule for further interventions and for the Public Staff and other parties to file comments and reply comments.

On January 24, 2017, in Docket No. G-9, Sub 701, Piedmont filed an Application for Approval of a Receipt Interconnect Agreement between Piedmont and Optima KV, LLC (Optima KV), which relates to the construction of new natural gas distribution lines and facilities to receive Alternative Gas supplies from Optima KV at a designated receipt point.

On February 20, 2017, comments were filed by the Public Staff, PSNC, NCPC, Enerdyne, NCSEA, and RNG.

On March 13, 2017, reply comments were filed by Piedmont, PSNC, NCPC, Enerdyne, NCSEA, and RNG.

On March 13, 2017, Duke University filed a Petition to Intervene Out-of-Time. On March 14, 2017, the Commission issued an Order granting Duke University's request to intervene out of time.

On May 4, 2017, the Commission issued an Order Requiring Collaborative Meetings, Reports and Additional Information. In summary, that Order made clear that, after careful consideration of the parties' positions evidenced through comments and reply comments, good cause existed for the Commission to request that the parties engage in further discussions to attempt to resolve remaining issues. That Order directed the Public Staff to convene and facilitate meetings of the parties for the purpose of discussing the remaining unresolved issues. Additionally, that Order directed the Public Staff to file reports informing the Commission of the status of the collaborative process and the progress made in developing Alternative Gas standards for Piedmont. Further, that Order directed that the Public Staff's reports include responses to questions posed by the Commission, which were set forth in Attachment A to that Order and which were intended to supplement the record in this proceeding with information related to existing standards for quality and testing of natural gas and Alternative Gas in effect in other states, how well those standards are working, and whether those standards may be applicable in North Carolina.

On May 10, 2017, the Commission issued an Order Approving Agreements with Conditions in Docket No. G-9, Subs 699 and 701, conditionally approving the Receipt Interconnect Agreements between Piedmont and C2e, and Piedmont and Optima KV, respectively, as amended. The Commission directed Piedmont and C2e and Piedmont and Optima KV to comply with Appendix F, as proposed by Piedmont and being considered by the Commission in this docket. The Commission made clear that the Agreements between Piedmont and C2e and Piedmont and Optima KV are to be subject

to any revisions to Appendix F that may be made by the Commission, as well as any applicable amendments to the Commission's Rules and Regulations.

On June 28, 2017, July 31, 2017, August 30, 2017, and October 3, 2017, the Public Staff filed reports on the meetings of the parties facilitated by the Public Staff to discuss Piedmont's proposed Appendix F and the parties' responses to the Commission's questions.

On October 26, 2017, Piedmont filed a revised Appendix F, amended to reflect discussions had during the collaborative process (Revised Version). Piedmont represented to the Commission that the revised version of Appendix F had been reviewed by the parties to the collaborative process and that, to the best of Piedmont's knowledge, there were no remaining objections to the Alternative Gas standards.

On October 31, 2017, the Public Staff filed the final report as provided for in the Commission's May 4, 2017 Order (Public Staff Final Report), which included the parties' responses to the questions set forth in Attachment A to that Order.

Discussion

This docket was opened upon the filing by Piedmont of a request for approval by the Commission of proposed Appendix F to Piedmont's Service Regulations, denominated as the Statement of Alternative Gas Requirements. Appendix F sets forth the terms and conditions under which Piedmont proposes to accept and receive "Alternative Gas" onto its system and pursuant to which it will continue to accept and redeliver such gas to customers receiving service from Piedmont.

In conjunction with its proposal of Appendix F, Piedmont submitted to the Commission two Receipt Interconnect Agreements (Agreements) between Piedmont and third party Alternative Gas suppliers. Those Agreements, one with C2e and the other with Optima KV, have been designated by Piedmont as confidential, consistent with N.C. Gen. Stat. § 132-1.2, and, thus, are not part of the public record of this proceeding.

Because the proposed injection and delivery of Alternative Gas into Piedmont's system raises potential service quality and operational concerns, the Commission initiated an investigation to consider such issues and directed that PSNC, Frontier, Toccoa Natural Gas, the Public Staff, and the North Carolina Attorney General were deemed to be parties to the proceeding. NCPC, NCSEA, Enerdyne, RNG and Duke University were allowed to intervene in the proceeding as parties. The Commission requested that the Public Staff and other parties file comments and reply comments on Piedmont's proposed Appendix F.

After careful consideration of the parties' comments and reply comments filed in this docket, the Commission concluded that good cause existed to direct the parties to engage in further discussions to attempt to resolve the remaining issues related to Appendix F and Piedmont's receipt of Alternative Gas. As a result, the Commission

issued an order directing the Public Staff to convene and facilitate meetings of the parties for the purpose of discussing the remaining unresolved issues. In addition, the Commission sought to supplement the record by requiring the parties, as a part of the collaborative process, to answer specific questions related to service quality and operational concerns that remained for the Commission after having reviewing the comments and reply comments filed in the docket.

The Commission appreciates Piedmont's initial proposal for guidelines governing the acceptance of Alternative Gas. In addition, the Commission appreciates the time and effort of the Public Staff to facilitate and report on the collaborative process. The Commission recognizes the effort the parties have made to work toward consensus on Appendix F.

The Commission recognizes the advantages to the State of making use of Alternative Gas. Those advantages include the general benefits of utilizing renewable resources; developing a potential in-state gas supply; the development of an Alternative Gas industry in the State with its associated tax base and jobs; providing a cost-effective and environmentally sound way for North Carolina swine and poultry producers to manage animal waste; providing landfill operators another option for the sale of the methane that they are required to collect; providing electric utilities, including Piedmont's affiliates, Duke Energy Progress and Duke Energy Carolinas, with an option for complying with the statutory requirement that they generate a set percentage of their electricity with poultry and swine waste; and allowing third parties to purchase and utilize a renewable gaseous fuel with which, for example, to generate electricity and earn Renewable Energy Credits. Thus, the Commission supports Piedmont's efforts to introduce additional sources of renewable energy to its North Carolina customers. However, the Commission must ensure that Piedmont provides adequate, reliable and economical service to its customers and that Piedmont's decision to receive Alternative Gas does not jeopardize the Company's ability to do so.

As stated in the May 4, 2017 Order:

While there are clear benefits to the State to accommodating the receipt of Alternative Gas into the local distribution systems, the Commission is not persuaded that there is an obligation, particularly in the sense of a common carrier obligation, for LDCs to accept Alternative Gas. The LDCs' distribution systems were built to receive natural gas from the interstate pipeline system and deliver it to customers. The system has been paid for by the LDCs' customers.² Alternative Gas producers and other interests are asking to use the natural gas distribution system for a purpose for which it was not intended. If that can be done while holding natural gas customers harmless, then every effort should be made to accommodate interconnections with Alternative Gas providers. However, the standards for delivery of Alternative Gas must be set to require delivery into the natural

² A more accurate statement is that the system was paid for by the LDC's investors, and the investors are being repaid by customers over time through rates.

gas distribution system without degrading the quality of service to natural gas customers, particularly those customers just downstream from Alternative Gas projects.

May 4, 2017 Order, p. 15.

After consideration of the record in this proceeding, and the revisions made to Appendix F subsequent to the collaborative process, the Commission has determined that it would be premature to approve unconditionally Piedmont's Appendix F, in light of the Commission's ongoing concerns related to potential service quality and operational issues. Instead, the Commission approves the Revised Version of Appendix F, as further modified in this order, as a pilot program for a period of three (3) years. During the pilot period, Piedmont will report to the Commission, as detailed below, to provide information regarding the impact of Alternative Gas on its system operations and, ultimately, its customers. Piedmont and/or other Alternative Gas suppliers may apply to the Commission to participate in the pilot program; however, it must be demonstrated to the Commission that such additions will be useful in gathering the information and data sought by the Commission. At the end of the three (3) year period, the Commission will consider additional modifications to Appendix F, based on the experience gained during the pilot period.

The specific revisions made to Appendix F subsequent to the collaborative process are addressed below, in addition to the Commission's ongoing service quality and operational concerns, several of which do not pertain to specific revisions.

Testing Requirements

In general, Piedmont's proposed testing regimen is designed to test Alternative Gas prior to its initial receipt by Piedmont, on a periodic basis following initial receipt by Piedmont, when the process or compounds used to produce Alternative Gas change, and before the reinstitution of deliveries in circumstances where receipt has been disrupted as a result of non-compliance with Piedmont's standards. Appendix F includes a testing regimen consisting of five types of testing: 1) Initial, 2) Subsequent, 3) Quarterly, 4) Supplemental, and 5) Alternative Gas Source, required if a supplier determines to alter its source of production or take action that might change the character or constituents of its gas. The comments and reply comments included extensive discussion of the proposed testing requirements. Piedmont justified its proposal by explaining that if it were going to accept Alternative Gas, "third-party producers desiring to supply Alternative Gas to North Carolina customers through LDC facilities have the obligation to establish that their Alternative Gas will meet the requirements of Commission Rule R6-30." Piedmont Reply Comments, at p. 9. Commission Rule R6-30 requires that "[a]ll gas supplied to customers shall be substantially free of impurities which may cause corrosion of mains or piping, or form corrosive or harmful fumes when burned in a properly designed and adjusted burner." Duke University commented that there are a limited number of laboratories capable of analyzing the full suite of compounds listed in Appendix F and that for some tests, on-site sampling by a dedicated laboratory technician is required to

ensure sample integrity and successful testing. Moreover, Duke University considered the testing costs, at approximately \$21,000 per sample for the full suite of compounds, as not insignificant and, therefore, having the potential to materially affect biogas development by substantially increasing testing complexity and costs. Duke University commented that the lack of capable laboratories together with the high cost of testing, particularly in instances in which multiple tests may be required or in which quantities injected are small in comparison to the flow in the pipeline, could present an overly burdensome barrier to Alternative Gas development in North Carolina. Public Staff Final Report, p. 4.

Subsequent to the collaborative process, Piedmont made five revisions to the testing regimen established in Appendix F. First, with regard to Initial Testing, the Initial Version required the supplier to provide Piedmont with the results of two consecutive independent laboratory tests, performed no less than seven days apart, demonstrating that the Alternative Gas conforms to the Appendix F standards. The Revised Version requires the supplier to submit one independent laboratory test before the initial receipt of gas and a “laboratory test” on a second sample taken at least seven days and no more than fourteen days after the initial test sample. The Revised Version allows the supplier to deliver gas to Piedmont’s system after the results of the first test have been provided to Piedmont and makes clear that the second test must be made on a second sample. The Initial Version called for two tests, no less than seven days apart. The Revised Version clarifies that receipt of Alternative Gas may begin after the first test and adds that the second test must occur within fourteen days. Appendix F requires that, after the initial receipt of Alternative Gas by Piedmont, three additional consecutive tests be conducted at least thirty days apart, and the results be provided to Piedmont. The clarification that the initial receipt of gas may begin after the results of the first test are provided to Piedmont means that the test conducted seven to fourteen days after the first test qualifies as the first of the three consecutive tests. In other words, the Initial Version required a total of five tests; as clarified, the Revised Version requires four tests.

Second, Subsequent Testing is required if receipt of supplier’s Alternative Gas is interrupted or suspended. Similar to the requirements for Initial Testing, the Initial Version required the submittal of two consecutive independent laboratory tests, performed no less than seven days apart, demonstrating compliance with Appendix F standards. The Revised Version requires the supplier to submit one independent laboratory test before the resumption of the receipt of gas and a “laboratory test” on a second sample taken at least seven days and no more than fourteen days after the first test sample. The Revised Version allows the supplier to deliver to Piedmont’s system after the results of the first test have been provided to Piedmont and makes clear that the second test must be made on a second sample. The Revised Version also clarifies that Subsequent Testing is required only when Piedmont exercises its option to stop receiving Alternative Gas and does not apply to disruptions that occur in the normal course of business.

The Commission concludes that the first two revisions to the testing protocols amount to simple and reasonable clarifications and, therefore, are accepted.

The third revision involves the Quarterly Testing requirements. Appendix F requires Quarterly Testing, pursuant to which the supplier must provide, on no less than a quarterly basis, the results from independent laboratory tests demonstrating compliance with Appendix F standards. The Revised Version allows Piedmont, at its own discretion, to waive Quarterly Testing where the percentage of Alternative Gas at a specific point is immaterial and the receipt of Alternative Gas at that point will not have a detrimental impact on Piedmont's system, its operation, or its customers.

The Commission interprets this waiver to be conditional. If the flow on Piedmont's system changes and the percentage of Alternative Gas at a specific receipt point is no longer immaterial and may have a detrimental impact on Piedmont or its customers, then the Commission expects that Quarterly Testing would again be required of the supplier. Subject to this understanding, the Commission concludes that the waiver provision is reasonable and should be accepted.

Appendix F requires a supplier to promptly notify Piedmont of a decision to alter its source of production or take action that might otherwise change the characteristics of its gas stream. Appendix F provides that Piedmont shall have no obligation to receive Alternative Gas from a supplier under these circumstances until it has been provided with the results of two consecutive independent laboratory tests, performed no less than seven days apart, indicating compliance with Appendix F standards. The Revised Version allows a supplier to request that Piedmont waive testing for one or more constituents, "where certified field testing equipment satisfactory to Piedmont is available to test for those components."

As noted by Duke University, the testing requirements included in Appendix F are expensive. Reducing the number of constituents in a "full suite of compounds" to be submitted for laboratory tests could reduce costs. Ultimately, it is Piedmont's responsibility to ensure that its system is operated in a safe and reliable manner; however, the use of field testing equipment in lieu of laboratory testing, in those instances acceptable to Piedmont, appears to be a reasonable measure that would provide Piedmont with the evidence it requires as to gas quality and that might also reduce costs for the supplier. The Commission concludes that Piedmont should be allowed to waive laboratory testing requirements where certified field testing equipment satisfactory to Piedmont is available.

The fourth and fifth revisions pertain to the testing requirements for Alternative Gas Sources. In general, Appendix F requires a supplier to provide advance notice to Piedmont of any decision to alter source of production of Alternative Gas or otherwise take action that might change the characteristics or constituent components of its gas stream. Piedmont has no obligation to receive such gas until it has been provided with the results of two consecutive independent laboratory tests, performed no less than seven days apart, demonstrating that the gas meets the standards set forth in Appendix F. The fourth revision allows Piedmont to consider requests for waivers of the requirement to test for one or more constituent compounds, if two consecutive laboratory tests demonstrate non-detectable levels of the constituent. The fifth revision allows Piedmont to consider

requests for waivers of the requirement to test for constituent compounds if two consecutive laboratory tests demonstrate non-detectable levels of the constituent. Piedmont may grant or deny any such request, subject to the requirement that Piedmont must state the basis for the decision in sufficient detail to facilitate review of that decision by the Commission.

Various parties provided comments on whether testing of certain constituents should be required. NCPC noted that vinyl chloride and siloxanes are not in swine waste, and, therefore, testing for those should not be required. NCSEA, commenting on California's biogas standards, stated that the California legislature has directed state agencies to revisit rules and to study specific issues relating to, among other things, maximum siloxane specifications. RNG commented on the "Constituents of Concern" in the Initial Version of Appendix F. It argued biomethane does not include p-Dichlorobenzene, n-Nitroso-do-n-propylamine,³ antimony lead, and methacrolein and requested that, if tests for these constituents were required, the testing not be required after a showing that the biomethane does not contain them. RNG also commented that arsenic has not been found in biogas sources at milligram levels and that vinyl chloride was an issue only at one California hazardous waste landfill.

The revision to allow waivers of the testing requirements related to constituent compounds is supported by the comments of various parties that some Alternative Gas would not contain all of the constituent compounds included in the testing required by in the Initial Version of Appendix F. In addition, the revision is supported by Piedmont's willingness to adapt to experience gained. Specifically, in its Reply Comments, Piedmont noted that experience may demonstrate that certain types of Alternative Gas or individual constituents in such gas may not be problematic, and commented that if experience, either in the form of testing or actual operations, demonstrates that it is appropriate to modify the standards and/or testing regimen set forth in Appendix F, then Piedmont would expect that appropriate adjustments would be made to Appendix F.

Thus, the Commission concludes that these revisions respond to the concerns expressed by some of the parties as to whether constituents identified in Appendix F are found in biogas sources, implement Piedmont's explicit acknowledgement that experience may allow for reduced testing requirements, and, for this reason, are acceptable.

The Commission approves the testing requirements as set forth in the Revised Version with the expectation that experience and information gained during the pilot period will elucidate whether the testing requirements are barriers to entry for additional Alternative Gas suppliers and the appropriate testing regimen going forward.

The Commission recognizes that the testing requirements set forth in Appendix F are critical to Piedmont's ensuring the safe and reliable operation of its system. In response

³ RNG referenced "n-Nitroso-do-n-propylamine." Both versions of Piedmont's Appendix F included "n-Nitroso-di-n-propylamine" in its table of "Constituents of Concern."

to a question from the Commission regarding what action would be taken if Piedmont's system were damaged by the receipt of Alternative Gas, Piedmont responded:

Piedmont does not believe, based upon the information it is currently aware of, that the total exclusion of Alternative Gas is necessary but it does believe that prudent and cautious provisions regarding how and under what conditions such gas should be received should be adopted – at least until more experience with this new product is gained. If Alternative Gas is ultimately allowed onto the systems of North Carolina LDCs and damage to customer equipment or distribution/transmission facilities occurs, then that damage will be required to be repaired and the impacted facilities repaired or replaced. Delivery of the offending Alternative Gas should also be curtailed in those circumstances until additional mitigation measures are put into place to ensure no further damage to or degradation of equipment occurs as a result of the injection of Alternative Gas into LDC systems. Ultimately, changes to the provisions governing gas quality characteristics of Alternative Gas may need to be made.

Public Staff Final Report, pp. 15-16.

In the event of any damage to its system attributable to its receipt of Alternative Gas, Piedmont, not its customers, shall bear the risks of such damage. The Commission takes note of the fact that Piedmont has indicated that “[i]f Piedmont’s proposed Alternative Gas standards, as revised on October 26, 2017, are approved, without modification, then Piedmont will accept responsibility for adverse customer impacts resulting from Alternative Gas received by Piedmont that is in compliance with those standards.” Public Staff Final Report, p. 21. As such, the Commission expects Piedmont to ensure that a sufficient and appropriate testing regimen is required of suppliers in order to manage such risk.

Alternative Gas Quality Standards

Piedmont, in its Reply Comments, explained that Appendix F is targeted at ensuring: 1) the interchangeability of Alternative Gas with the geologic natural gas Piedmont has historically received from Transco and other upstream interstate natural gas pipelines; and 2) that the injection of Alternative Gas directly into Piedmont’s system does not harm Piedmont’s facilities, its customers’ equipment, the public health, or the continuing reliability of service to Piedmont’s customers. Piedmont Reply Comments, pp. 13-14. To this end, Appendix F establishes Alternative Gas Quality Standards with which any Alternative Gas delivered to Piedmont must comply.

With respect to gas quality, Piedmont is proposing to receive Alternative Gas into a distribution system that is currently fed by interstate pipelines. Natural gas, as it is produced from underground wells, is not a homogeneous fuel. It is a “soup” of short-chain hydrocarbons, with methane as the “broth.” Other hydrocarbons, inert gases, and other constituents in the gas stream impact both the heat content and the ability of any particular

“recipe” of gas to flow through the orifices in a burner. Interstate pipelines collect gas that is almost exclusively from underground wells, blend gas of varying constituents and quality, and deliver it to customers, including local distribution companies and their customers. The gas quality standards of interstate pipelines are set to accommodate a wide range of gas quality with the understanding that the gas will be blended before ultimately delivering a much more homogeneous product to the end user.

Comments presented in this docket made clear how little variation is seen in the blended gas delivered to Piedmont by its primary interstate supplier. As was shown in Piedmont’s response to NCPC’s Data Request No. 1, Piedmont’s primary interstate pipeline supplier, Transco, typically shows a heat content with slight variations. NCPC Comments, Attachment 2. Likewise, the content by volume of nitrogen and carbon dioxide of gas on Transco was shown to be well below the maximum volumetric standards proposed by Piedmont in its Initial Version of Appendix F. The fact that the blended gas delivered by the interstates is more homogeneous allows local distribution companies like Piedmont to deliver a product to its customers that can be fairly billed on the basis of heating value and that burns in gas-fired equipment in an acceptably consistent manner. The Commission is concerned, in general, that Alternative Gas delivered to Piedmont would be consistently lower in quality than the blended gas delivered to Piedmont by Transco. As noted by Piedmont, “unlike larger interstate pipelines with ample sources of supply throughout their systems, Piedmont has very little ability to blend Alternative Gas with pipeline-delivered natural gas” Piedmont Reply Comments, p. 19.

Piedmont’s modeling for the two Alternative Gas interconnection arrangements indicates that some customers may receive up to 100% Alternative Gas under certain operating conditions. Piedmont Reply Comments, fn. 8. In this situation and to the extent additional Alternative Gas suppliers request receipt agreements from Piedmont, the potential for the delivery of low-quality gas and associated risks to customers increases.

Subsequent to the collaborative process, four revisions to the Alternative Gas Quality Standards included in Appendix F were proposed.

The first revision involves the standard for the heating value of Alternative Gas. The Initial Version established a standard of between 980 and 1100 Btu/SCF at dry gas conditions. While the Revised Version maintains this standard, it allows Piedmont, at its own discretion, to receive gas with a heating content as low as 960 Btu/SCF. The Revised Version requires that any variance from the minimum level of 980 Btu/SCF must be granted on a non-discriminatory basis and must be set forth in a written waiver describing the scope and duration of the allowed variance.

The Initial Version established a heating value standard by relying on Transco’s heating standard range of 980 Btu/SCF to 1100 Btu/SCF. Piedmont commented that a review of historical gas chromatograph data from Transco indicated that the average heat content of natural gas delivered to Piedmont has been very consistently measured at or near 1030 Btu/SCF and that, for this reason, Piedmont could have reasonably proposed that Alternative Gas delivered directly into its system match the heat content of the natural

gas it has actually received from Transco. Piedmont Reply Comments, p. 19. Piedmont's response to NCPC's Data Request No. 1 summarized information on gas quality from Transco's Station 150 from October 1, 2016, through December 13, 2016. NCPC Comments, Attachment 2. That response shows a heating value range of 1027 Btu/SCF to 1051 Btu/SCF, with an average of 1031 Btu/SCF. The Commission itself monitors the gas quality information on Transco's 1Line electronic bulletin board and agrees that that range shown during the period described above is representative of the narrow range of heating values actually delivered by Transco after blending all of the gas it receives.

Piedmont maintains eleven "common gas areas" (CGAs) with different heat factors according to the heat content of the gas in those regions. The Public Staff suggested that Piedmont may want to implement "sub areas" if the injection of Alternative Gas begins to significantly change the heat content of a particular CGA. The Public Staff concluded that the CGAs (and possible sub areas) employed by Piedmont maintain reasonable accuracy for customer billing purposes. Public Staff Final Report, pp. 23, 29. According to Piedmont, CGAs are periodically evaluated, including when new receipt points are added. Piedmont plans to continue monitoring and evaluating its CGAs with the addition of receipt points for Alternative Gas supplies and will modify its CGAs as necessary to ensure that no customers are adversely impacted as Alternative Gas receipt points are added. Public Staff Final Report, p. 24.

The Heating Value standard established in the Revised Version is not representative of the heat content of gas actually delivered to Piedmont by Transco. Comments in this docket make it clear that it is economically burdensome for Alternative Gas suppliers to reach the 980 Btu/SCF minimum, much less surpass that level. The Commission is concerned with Piedmont's agreeing to accept gas with a lower heating value. Nevertheless, the Commission accepts the Heating Value standard set forth in the Revised Version, with the understanding that the pilot program will allow for the collection of data related to the actual heating value of the Alternative Gas delivered as well as any potential impacts to customers, and that Piedmont plans to continue monitoring and evaluating its CGAs with the addition of receipt points for Alternative Gas supplies and will modify its CGAs as necessary to ensure that no customers are adversely impacted as Alternative Gas receipt points are added.

The Commission is not prepared to accept, at this time, Piedmont's right to allow a variance to the minimum heating value standard as low as 960 Btu/SCF. Piedmont commented that in the professional judgment of its engineers, who are responsible for safely and reliably operating Piedmont's transmission and distribution system, a heat content for Alternative Gas lower than 980 Btu/SCF would pose an unacceptable risk of operational problems with customer equipment. Piedmont Reply Comments, p. 19. In addition, comments received in this proceeding make clear that the processes used to raise Alternative Gas to 980 Btu/SCF are expensive. Granting Piedmont the authority to pick and choose which Alternative Gas suppliers are allowed to avoid that expense raises a fundamental question of fairness. If a compelling case can be made to allow an exception to the 980 Btu/SCF minimum standard, then it should be brought before the Commission for review and approval. For the reasons discussed above, the Commission

concludes that the provision to grant Piedmont authority to waive the minimum Heating Value standard is not accepted.

The second revision involves the Interchangeability standard, which is intended to ensure that the Alternative Gas received by Piedmont is interchangeable with the geologic natural gas Piedmont has historically received from Transco and other upstream interstate natural gas pipelines. The Initial Version established a standard of “WOBBE 1290 and 1370.” The Revised Version requires that the Alternative Gas received from any single supplier “stay within a WOBBE variance range equal to or less than 4%.”

Although the Initial Version established a standard of two discrete Wobbe numbers of 1290 and 1370, the Commission interpreted this standard to be a range of acceptable Wobbe numbers. The Commission understands a Wobbe number range as representing a range within which any Wobbe number achieved would not require adjusting gas-fired equipment. The mid-point of a Wobbe number range from 1290 to 1370 is 1330. The variance from the mid-point to 1290 and 1370 is about 3%. In effect, that is the percent tolerance that Piedmont represented to the Commission would be appropriate in the Initial Version.

Without explanation or justification, the Revised Version proposes a Wobbe number variance range of 4%. The Revised Version does not establish a Wobbe number range or reference point for the variance. Enerdyne included in its comments a whitepaper published by the Gas Technology Institute that referenced a “proposed acceptable variation of Wobbe Index of +/- 4% from historical values and the upper limit of 1400 BTU/SCF.” Enerdyne Comments, EPS Exhibit 2, p. 13. However, the Public Staff’s Final Report does not explain why a 4% variation of Wobbe numbers lacking any reference point should be adopted in place of Piedmont’s Wobbe number range included in the Initial Version.

The Commission concludes that a range from a minimum Wobbe number to a maximum Wobbe number should be included in Appendix F and that the range should be such that customers’ burners will not require adjustment. The Commission, therefore, directs Piedmont to clarify whether the listing of two discrete points instead of a range in the Initial Version was an oversight. If so, and if such a range allows for interchangeability, then an Interchangeability standard of “WOBBE from 1290 to 1370” is appropriate. If not, the Commission directs Piedmont to revise the Interchangeability standard to a range of Wobbe numbers that will allow for interchangeability and will ensure that it meet its responsibilities under Commission Rules R6-18(2) and R6-34(c). If Piedmont submits a Wobbe number range that is lower than 1290 and/or higher than 1370, the Commission directs Piedmont to provide a detailed explanation for its basis for widening the range.

Additionally, given Piedmont’s lack of experience in receiving Alternative Gas, the Commission directs Piedmont to amend Appendix F to require that heat content and Wobbe numbers be reported daily to Piedmont by Alternative Gas suppliers.

The third and fourth revisions involve the Nitrogen and Total Inerts standards. The Initial Version established a Nitrogen standard of 2% by volumetric basis. The Revised

Version eliminates the Nitrogen standard. The Initial Version established a Total Inerts standard of 3.2% by volumetric basis. The Revised Version increases the Total Inerts standard to 4.8% by volumetric basis. Neither the Initial Version nor the Revised Version defines what is meant by “Total Inerts.”

As is made clear in the comments, nitrogen affects the quality of the gas – the higher the concentration of nitrogen, the lower the heating value and efficiency of combustion. Piedmont Reply Comments, p. 24. Piedmont noted that the percentage of nitrogen in the gas stream Piedmont has received from Transco historically has been very low, which contributes to the variance between the heat content of gas actually received from Transco and the 980 Btu/SCF standard proposed by Piedmont. Further, Piedmont noted that increasing tolerance levels of nitrogen would make it that much more difficult to attain appropriate heat content levels. Piedmont Reply Comments, p. 24. In response to NCPC’s Data Request No. 1, Piedmont provided the gas quality composition at Transco’s Station 150 between October 1, 2016, and December 13, 2016. NCPC Comments, Attachment 2. Although Transco has no Nitrogen standard, NCPC’s Data Request No. 1 also showed that the maximum nitrogen composition of Transco’s gas for the period was only 0.823%, with a minimum of 0.356% and an average composition of 0.649%. The maximum nitrogen composition of Transco’s gas delivered during the period, therefore, was less than half of Piedmont’s initial proposed standard of 2% by volumetric basis.

Various parties to the proceeding deemed the Nitrogen and Total Inerts standards included in the Initial Version to be arbitrary and capricious and pointed to the Nitrogen and Total Inerts standards of interstate pipelines to support of their positions calling for more liberal standards. For example, NCPC made note of the fact that the Atlantic Coast Pipeline’s standard for Nitrogen is 4% and for Total Inerts, 5%. Public Staff Final Report, p. 52. However, the Commission notes that the interstate pipeline system is fundamentally different from that of a local distribution system. Interstate pipelines blend lower quality gas with higher quality gas and deliver gas to LDCs like Piedmont within a narrow quality range. Further, as noted above, Piedmont has indicated that there may be certain conditions under which its customers receive 100% Alternative Gas. Thus, the Commission notes that increased concentrations of nitrogen, as would be allowed under the Revised Version, in the situation where a customer is receiving 100% Alternative Gas would result in that customer’s receiving an even lower quality gas. Piedmont generally defended the standards set forth in the Initial Version as being reasonable and prudent at this time in comparison to other gas quality standards applicable to Alternative Gas, particularly with regard to its lack of experience with Alternative Gas. Piedmont advised that the Commission should err on the side of caution in approving such standards in order to preserve the integrity, reliability, and safety of Piedmont’s continuing service in North Carolina. Piedmont Reply Comments, pp. 23-25.

Various parties to the proceeding commented on the expense associated with reducing concentrations of these constituents in Alternative Gas. For example, when discussing the cost associated with decreasing the nitrogen content of Alternative Gas, RNG indicated that while nitrogen rejection units are one solution to increasing heating

content and decreasing nitrogen concentration in product gas, such technology is not commonly deployed in the context of Alternative Gas projects because it adds to project complexity, cost (\$3-10 million in CAPEX, and as much as 30% more power consumption), and methane loss (as much as 15% or more of a project's methane is lost), which translates to revenue loss. Public Staff Final Report, p. 11.

The Nitrogen and Total Inerts standards were modified in the Revised Version to be more liberal, consistent with the requests of the parties involved in the promotion and expansion of the use of various forms of Alternative Gas. These revisions were made with no explanation by Piedmont, in spite of the concerns it expressed regarding lack of experience with Alternative Gas and the need to proceed with caution when setting gas quality standards.

The Commission also takes note of the fact that the both the C2e project and the Optima KV project are subject to the Nitrogen and Total Inerts standards set forth in the Initial Version. Thus, at least these two suppliers determined that compliance with the standards set forth in the Initial Version is feasible.

For these reasons, the Commission concludes that the Nitrogen and Total Inerts standards set forth in the Revised Version are not acceptable. The Commission concludes that Appendix F should include the Nitrogen and Total Inerts standards set forth in the Initial Version, which Piedmont defended as being reasonable in light of its lack of experience with Alternative Gas. Additionally, the Commission concludes that Appendix F should be amended to include a definition of "Total Inerts."

Service Quality and Operational Concerns, Not Related to Specific Revisions to Appendix F

Change in Character of Service

Commission Rule R6-18 addresses changes in character of service and establishes the procedure to be followed in the event of a material change in the character of gas service. The rule draws a distinction between whether or not a material change is under the utility's control. Under Rule R6-18(1), changes under the utility's control can only be made with the approval of the Commission, and after adequate notice to the customers. Under Rule R6-18(2), in the context of changes that are not under the utility's control, the utility "shall maintain the proper combustibility of the gas supplied at the heating valve and specific gravity existing at the customers' meters."

The Commission is concerned that if the quality of gas to downstream customers – particularly the heat content – materially changes as a result of Piedmont decision to receive Alternative Gas, such change represents a "change under the control of the utility" within the meaning of Rule R6-18(1).

Both Piedmont and the Public Staff take the position that Piedmont's receipt of Alternative Gas, if done in compliance with Appendix F, would not constitute a change under the control of the utility. Public Staff Final Report, pp. 9, 27. Notwithstanding the

position of the Public Staff and Piedmont, the Commission is concerned that a change in the composition of gas in a pipeline from geologically-derived pipeline gas with a heating value of 1030 Btu/SCF to 100% Alternative Gas at Appendix F's lower limit of 980 Btu/SCF might constitute a "material" change.

However, the Commission concludes that the impact on the customer is key to determining whether a material change has occurred. If Piedmont takes effective steps to bill the customer for the actual heat content of gas that they receive, and if the lower-heat-content gas does not adversely impact the performance of the customer's equipment and appliances, then an argument can be made that the impact on the customer is not material. Therefore, in order to evaluate impact on customers, the Commission directs Piedmont to provide written notice to customers located on its distribution pipeline that could be impacted by Alternative Gas with respect to the impact that Alternative Gas could have on them. Such notice should include what to look for as an indication that the customer's equipment and appliances may need adjustment and how to contact Piedmont to obtain additional information. Piedmont should work with the Public Staff to develop an appropriate form for such public notice.

Piedmont's Right to Terminate Obligation to Receive

Both the Initial Version and the Revised Version of Appendix F include a provision allowing Piedmont to interrupt or suspend its receipt of Alternative Gas. Generally speaking, Piedmont may interrupt or suspend its receipt of Alternative Gas if the Alternative Gas proffered for delivery fails to meet the specifications of Appendix F until such Alternative Gas conforms to the standards set forth in Appendix F as verified by an "independent certified third-party laboratory satisfactory to Piedmont" Additionally, Piedmont has the right to interrupt or suspend its receipt of Alternative Gas under defined circumstances related to risk to public health or Piedmont's facilities until such time as correction of the problem has occurred as determined by Piedmont in the exercise of its discretion.

The Commission notes that interrupting or suspending receipt of Alternative Gas is a severe penalty, but also recognizes that Piedmont must have the right to suspend its receipt under certain circumstances, particularly where there is risk to public health or the system. The Commission is concerned, though, that, if rigorously enforced, the provision could unfairly penalize Alternative Gas suppliers. Specifically, the Commission is concerned that in the event of simple non-conformity with Appendix F standards, such as Heating Value or Interchangeability, verification from a laboratory is unnecessarily burdensome. Therefore, the Commission directs Piedmont to revise Appendix F to include a more moderate provision to address minor variances from the Heating Value, Interchangeability, and such other basic standards that do not reasonably require verification by an independent laboratory. Such provision should both ensure, to the extent possible, that customers are not harmed by an Alternative Gas supplier's failing to meet the standards of Appendix F and should provide strong encouragement for Alternative Gas suppliers to consistently meet the standards.

Impact on LNG Facilities

The Commission is aware that Piedmont's liquefied natural gas (LNG) facilities may be impacted by poor quality gas. Piedmont stated that the flow on the main 8-inch and 10-inch pipeline through Duplin County can flow south to north. Public Staff Final Report, p. 25. Piedmont's Barragan LNG facility in Bentonville is not far from that part of its system. The Commission directs Piedmont to inform the Commission of the possible impact that its receipt of Alternative Gas that is in compliance with the standards set forth in Appendix F, as amended and accepted in this Order, may have on the functioning of its LNG facilities.

Ongoing Reporting Requirements

In order that the Commission be kept apprised of the impact to customers of Piedmont's receipt of Alternative Gas and to gain understanding as Piedmont gains experience, the Commission directs Piedmont to report regularly to the Commission as follows:

- 1) Piedmont shall file a detailed report of each complaint received from any customer regarding Piedmont's receipt of Alternative Gas and the actions taken by Piedmont to resolve the complaint(s) no more than ten (10) business days from the date on which the complaint is received by Piedmont.
- 2) Piedmont shall file a report on April 1 and November 1 each year during the pilot period that includes the following information: i) the number of suppliers of Alternative Gas; ii) the monthly volume of Alternative Gas received during the previous 6-month period; iii) a detailed report of any complaints received from customers regarding Piedmont's receipt of Alternative Gas during the period, and the actions taken by Piedmont to resolve the complaint(s); and iv) the costs incurred by Piedmont to receive Alternative Gas that are not otherwise recovered under any receipt interconnection agreement.
- 3) In addition to the semi-annual report, Piedmont shall file in this docket, each month during the pilot period no later than fourteen (14) business days after the end of the month, a report documenting daily quantity, heat content and Wobbe numbers reported daily to Piedmont by Alternative Gas suppliers.

Conclusion

In summary, the Commission concludes that Piedmont's lack of experience with the receipt of Alternative Gas, in concert with Piedmont's fundamental obligation to provide safe and reliable service to its customers, dictate that the Revised Version of Appendix F, as modified herein, should not be approved unconditionally, but rather approved as a time-limited pilot program. The pilot program will allow Piedmont to gain experience with the receipt of Alternative Gas. If experience, either in the form of testing

or actual operations, demonstrates that it is appropriate to modify the standards and/or testing regimen set forth in Appendix F, then the Commission will consider such modifications at the end of the pilot period. Therefore, the Commission approves the Revised Version of Appendix F, as modified in this order, as a pilot program for a period of three years. During the pilot period, the Commission directs Piedmont to file, semi-annually, a report providing information regarding the impact of Alternative Gas on its system operations and, ultimately, its customers. Piedmont and/or other Alternative Gas suppliers may apply to the Commission to be approved to participate in the pilot program; however, it must be demonstrated to the Commission that such additions will be useful in gathering the information and data sought by the Commission. At the end of the three-year period, the Commission will consider modifications to Appendix F based on the experience gained during the pilot period.

IT IS, THEREFORE, ORDERED as follows:

1. That Piedmont shall file with the Commission within sixty (60) days from the date of this Order a revised version of Appendix F that complies with the requirements of this Order as follows:

- a. With respect to the Heating Value standard, strike Piedmont's authority to allow a variance to the minimum heating value standard as low as 960 Btu/SCF;
- b. With respect to the Interchangeability standard, revise to include an appropriate range of Wobbe numbers, with detailed explanation as directed in this Order;
- c. With respect to the Heating Value standard and the Interchangeability standard, revise to require that heat content and Wobbe numbers be reported daily to Piedmont by Alternative Gas suppliers;
- d. With respect to the Nitrogen standard, revise to the standard included in the Initial Version;
- e. With respect to the Total Inerts standard, revise to define "Total Inerts" and revise to the standard included in the Initial Version; and
- f. With respect to the Termination of Obligation to Receive Gas section, revise to include provision to address minor variances from the Heating Value, Interchangeability, and such other basic standards that do not reasonably require verification by an independent laboratory;

2. That the Revised Version of Appendix F, as amended herein, is approved for use as a pilot program for a three-year pilot period, beginning on the date of the Commission's order accepting Appendix F to be filed by Piedmont in compliance with this Order;

3. That the C2e and the Optima KV projects shall be allowed to participate in the pilot program and that additional Alternative Gas suppliers shall be allowed to participate in the pilot program upon a showing to the Commission that any such project will aid in the information and data sought to be gathered through the pilot program;

4. That Piedmont shall file with the Commission within sixty (60) days from the date of this Order a detailed explanation of how it plans to monitor and evaluate its CGAs with the addition of receipt points for Alternative Gas supplies and modify its CGAs as necessary to ensure that no customers are adversely impacted;

5. That Piedmont shall file with the Commission within sixty (60) days from the date of this Order, after working with the Public Staff to develop an acceptable format, a notice to be provided to customers located on its distribution pipeline that could be impacted by Alternative Gas with respect to the impact that Alternative Gas could have on them;

6. That Piedmont shall file with the Commission sixty (60) days from the date of this Order a detailed explanation of the possible impact that its receipt of Alternative Gas that is in compliance with the standards set forth in Appendix F, as amended and accepted in this Order, may have on the functioning of its LNG facilities;

7. That Piedmont shall file a detailed report of any complaints received from customers regarding Piedmont's receipt of Alternative Gas during the pilot period and the actions taken by Piedmont to resolve the complaint(s) no more than ten (10) business days from the date on which the complaint is received by Piedmont;

8. That Piedmont shall file with the Commission, beginning sixty (60) days from the date of this Order and monthly thereafter, after working with the Public Staff to develop an acceptable format, a report documenting daily quantity, heat content and Wobbe numbers reported daily to Piedmont by Alternative Gas suppliers; and

9. That Piedmont shall file a report on April 1 and November 1 each year during the pilot period that includes the following information: i) the number of suppliers of Alternative Gas; ii) the monthly volume of Alternative Gas received during the previous 6-month period; iii) a summary of any customer complaints received during the reporting period related to the receipt of Alternative Gas and any actions taken by Piedmont to resolve the complaints; and iv) the costs incurred by Piedmont to receive Alternative Gas that are not otherwise recovered under any receipt interconnection agreement.

ISSUED BY ORDER OF THE COMMISSION.

This the 19th day of June, 2018.

NORTH CAROLINA UTILITIES COMMISSION

A handwritten signature in dark ink, appearing to read "Janice H. Fulmore", is written over a light blue horizontal line.

Janice H. Fulmore, Deputy Clerk

Commissioner Charlotte A. Mitchell did not participate in this decision