BLACK HILLS ENERGY BIOMETHANE SPECIFICATION AND QUALITY MANAGEMENT PROGRAM

Revision 3, Effective Date: 7/01/2023

1) SCOPE

The purpose of this document is to establish contract requirements for Biomethane quality, limits on constituents of concern, properties, testing requirements, and procedures for biomethane sourced RNG deliveries into Black Hills Energy's Receipt Points.

2) DEFINITIONS

a) ASTM: American Society for Testing Materials

b) QUALITY ASSURANCE PROGRAM ADMINISTRATOR (ADMINISTRATOR): The Administrator will verify compliance with Black Hills Energy Biomethane gas quality specification. The Administrator may be an employee of BHE or a representative contracted by BHE.

c) BIOGAS: Biogas refers to gas that is produced from the anaerobic decomposition of organic material. Biogas can be produced by a landfill gas management facility, wastewater treatment plant, anaerobic digester, or by other methods and sources. Biogas is a mixture of methane, carbon dioxide, and other constituents, and must be conditioned into Biomethane prior to receipt into the natural gas pipeline system.

d) BIOMETHANE: Biomethane refers to biogas that has been conditioned and conforms to the specifications contained herein for receipt into a common carrier pipeline. Biomethane must be free from bacteria, pathogens, and any other substance injurious to utility facilities, or other constituents that would cause the gas to be unmarketable. Biomethane must conform to all other tariffs and standard utility operating practices and guidelines.

e) BRITISH THERMAL UNIT (Btu): The standard unit for measuring a quantity of thermal energy.

f) Ccf: The standard unit for a volume of gas equivalent to one hundred cubic feet of gas under Standard Conditions.

g) CONSTITUENT: A chemical or compound that may impact the merchantability of gas.

h) CONTINUOUS TESTING: The use of onsite instruments and analyzers used for the measurement of constituents of concern, operating conditions, flow rates and gas properties performed in short term intervals without manual intervention.

i) DELIVERY POINT(S): The point(s) on BHE's pipeline system where BHE delivers natural gas that it has transported to the Customer.

j) EPA: United States Environmental Protection Agency

k) FEEDSTOCK: Raw material supply used to produce Biogas.

l) GRAIN: The standard unit of weight equivalent to one seven-thousandth of one pound.

m) HAZARDOUS WASTE LANDFILL: All contiguous land and structures, and other appurtenances and improvements, on the land used for the treatment, transfer, storage, resource recovery, disposal, or recycling of hazardous waste. The facility may consist of one or more treatment, transfer, storage, resource recovery, disposal, or recycling hazardous waste management units, or combinations of these units.

n) Mcf: The standard unit for a volume of gas equivalent to one thousand cubic feet of gas under Standard Conditions.

o) Maximum Daily Quantity (MDQ): The maximum daily quantity of RNG that may be delivered by Supplier and accepted by BHE at the Receipt Point. BHE may interrupt delivery and will not be required to accept delivery of RNG up to the MDQ if operational conditions or lack of customer demand and consumption exist that would restrict the amount of RNG that BHE's Receipt Point can accept.

p) MMcf: The standard unit for a volume of gas equivalent to one million cubic feet of gas under Standard Conditions.

q) Molar Mass: The apparent molecular weight of the gas measured as the mass in grams of 1 mole of gas.

r) PPMv (Parts Per Million by volume): The concentration of a gas constituent expressed as the number of parts of the constituent per one million parts of the gas, by volume, at standard conditions, on a dry gas basis.

s) PHF (Peak Hourly Flow): The maximum hourly flow rate of RNG that may be delivered by Supplier and accepted by BHE at the Receipt Point. BHE may interrupt delivery and will not be required to accept delivery of RNG up to the PHF if operational conditions or lack of customer demand and consumption exist that would restrict the amount of RNG that BHE's Receipt Point can accept.

t) RECEIPT POINT(S): The place(s) where Customer delivers, or has delivered on its behalf, natural gas into the BHE pipeline system.

u) RENEWABLE NATURAL GAS (RNG): Renewable natural gas is any pipeline compatible gaseous fuel derived from biogenic or other renewable sources that has lower lifecycle CO2e emissions than geological natural gas. Biomethane is one category of gases considered RNG.

v) SHUT-IN: The action of not allowing the Supplier to deliver Biomethane into the BHE Receipt Point.

w) STANDARD CONDITIONS: Conditions of temperature and pressure that

are used as a basis for volumetric measurement of a gas equivalent to 60 degrees Fahrenheit and 14.73 PSIA.

x) BIOMETHANE SUPPLIER (SUPPLIER): A Supplier of Biomethane seeking to deliver gas to the BHE Receipt Point.

y) TESTING ACTION LEVELS:

i) Delayed Shut-in Level (DSL): The Delayed Shut-in Level is a point used to screen Biomethane during testing. Shut-in will occur if the measured quantity remains beyond the DSL for a period of time.

ii) Instantaneous Shut-In Level (ISL): The Instantaneous Shut-in Level establishes the point at which an immediate Shut-in of the Biomethane occurs.

z) BIOMETHANE TESTING LABORATORY (TEST LAB): An independent and certified laboratory, selected by the Supplier and approved by BHE, capable of testing the Biomethane for all constituents identified in these specifications.

3) QUALITY OF GAS

a) Gas delivered to Black Hills Energy (BHE) for transportation to the Delivery Point(s) shall conform to the following Quality specifications. In cases of interstate pipeline delivery, the stricter of the BHE gas specification or the Interstate pipelines gas specification will govern on a per constituent basis.

i) Carbon dioxide: The gas shall contain no more than two percent by volume basis of carbon dioxide.

ii) Oxygen: The gas shall contain no more than 0.2 percent by volume basis of oxygen.

iii) Hydrogen sulfide: The gas shall contain no more than 4 PPMv basis of hydrogen sulfide.

iv) Total Sulphur: The gas shall contain no more than 20* grains of total sulfur, measured as sulfur, per one hundred standard cubic feet.

*Wyoming/Colorado: Total Sulphur: 5 grains per one hundred standard cubic feet.

v) Water vapor: The gas shall contain no more than 128 PPMv of water vapor.

vi) Hydrocarbon dew point: The gas shall have a hydrocarbon dew point of no more than minus 40 degrees Fahrenheit.

vii) Liquids: The gas shall contain no liquids at, or immediately downstream of, the Receipt Point(s).

viii) Merchantability: The gas shall not contain objectionable odors, solid matter, dust, gums and gum-forming constituents, biologicals, heavy metals, or any other substance which might interfere with the marketability of the gas, or cause injury to or interference with proper operation of the lines, meters, regulators, or other appliances through which it flows.

ix) Temperature: The maximum gas temperature at the receipt point shall be determined on an application specific basis. Typical temperature limits are approximately 80 degrees Fahrenheit for gas entering plastic mains plastic and approximately 120 degrees Fahrenheit for gas entering steel mains.

x) Pressure: The gas pressure at the receipt point will be determined on an application basis and shall be at pressures sufficient to enter BHE's pipeline system, but in no event in excess of the maximum allowable operating pressure.

xi) Flow Rate: The flowrate of the gas shall be uniform without significant swings in flow. At no time with the flowrate of the gas exceed the Peak Hourly Flow (PHF).

xii) Heating value: The gas shall have a gross (higher) heating value of greater than or equal to 950* Btu per standard cubic foot.

*Arkansas: Minimum Heating Value: 975 Btu per standard cubic foot

xiii) Total Organic Silicon: The gas shall contain no more than 4 mg Si/m^3

xiv) Hydrogen: The gas shall contain no more than 1000 PPMv of hydrogen.

xv) Ammonia: The gas shall contain no more than 10 PPMv of ammonia.

xvi) P-dichlorobenzene: The gas shall contain no more than 10 PPMv of P-dichlorobenzene.

xvii) Vinyl Chloride: The gas shall contain no more than 4 PPMv of vinyl chloride.

xviii) Toluene: The gas shall contain no more than 5000 PPMv of toluene.

xix) Ethylbenzene: the gas shall contain no more than 60 PPMv of ethylbenzene.

xx) n-Nitro-di-n-propylamine: The gas shall contain no more than .06 PPMv n-Nitro-di-n-propylamine.

xxi) Methacrolein: The gas shall contain no more than 4 PPMv of methacrolein.

xxii) Biologicals: The gas shall contain no more than $4X10^4$ of bacteria per standard cubic foot.

xxiii) Molar Mass: The molar mass of the gas shall not exceed 18.0 g/mol

and shall not deviate by more than 0.6 g/mol from the rolling average.

b) The Biomethane shall be tested for the Quality specifications at the Receipt Point

i) The gas quality and measurement of the Biomethane delivered by Supplier shall be calculated solely from the quality and measurement recorded at the Receipt Point by BHE.

(1) Any gas quality testing conducted by BHE shall control over any disputed variation from and similar or duplicative testing conducted by Supplier.

ii) BHE will determine the testing requirements, methodology, frequency, and equipment used for testing the Biomethane.

(1) Appendix A contains the limits, testing methods and frequency of testing as adopted by BHE.

iii) BHE reserves the right to approve and adopt other gas quality testing requirements, testing methods, frequency of testing, and testing equipment, now or as may be changed from time to time in the future. Approving and adopting changes to this quality specification are within the sole determination of BHE. Subject to provision 3(b)(iv) immediately below, BHE may approve and adopt changes to the specification for reasons including but not limited to the following:

(1) Regulatory Mandates;

(2) Constituents of concern that either are new to the biomethane industry or have been found to present increased risks to natural gas infrastructure or customers; and/or

(3) Gas quality standards or best practices developed by Natural gas industry associations or groups and adopted by BHE.

iv) BHE will communicate the effective date of such prospective changes, if any, to Supplier. In addition, BHE will coordinate with Supplier in an effort the reduce any negative impact of any imposed change to gas quality testing requirements, testing methods, frequency of testing, and testing equipment, on Supplier's existing operations. The cost of any additional equipment needed by Supplier to implement to gas quality testing requirements, testing methods, frequency of testing, and testing equipment shall be borne by Supplier.

c) BHE reserves the right to Shut-In a Supplier whose Biomethane repeatedly violates this specification until such time Supplier can provide evidence that the Biomethane consistently meets this specification.

d) BHE will not accept Biomethane form a hazardous waste landfill or from a

Supplier using production methods that create an environmental, pipeline, or safety hazard.

4) TESTING

a) Responsibility for Testing

i) BHE Responsibilities:

(1) Own, operate, maintain, calibrate, and replace equipment used for continuous testing of the Biomethane that is delivered to the Receipt Point.

(2) Provide the Supplier access to the results of the continuous testing.

(a) Results will be made available to the Supplier via a read only data connection provided at the Receipt Point.

(b) The Supplier is responsible for providing all parts, labor and equipment associated with accessing this data connection for their use.

(c) The test results and other shared data will not to be used for the purpose of process control by the Supplier.

(3) Approval or rejection of the suppliers proposed Test Lab.

(4) Provide Supplier with most recent maintenance and testing records when requested in writing by the Supplier.

(5) Perform an additional validation of the testing and measurement equipment outside of the routine maintenance schedule if requested in writing from the Supplier. The Supplier is responsible for all costs associated with the validation.

ii) Administrator Responsibilities:

(1) Verify the supplier is in compliance with this specification.

(2) Verify the Test Lab has proper and current certifications and/or accreditation as required by BHE.

(3) Provide BHE recommendations on the approval or rejection of the Supplier’s Test Lab of choice.

(4) Review laboratory testing results for compliance with this specification, provide results and reports to BHE.

(5) Maintain strict confidentiality of laboratory test results and all other Supplier information and data. The results, information and data collected by the Administrator may only be used for the purpose of compliance with this specification unless granted written permission from both BHE and the Supplier.

iii) Supplier Responsibilities:

(1) Select a Test Lab prior to pre-delivery testing and provide the name and contact information to the Administrator. The Test Lab must be approved by BHE.

(2) Grant the Test Lab permission to share the results of Biomethane testing directly with the Administrator and BHE.

(3) Provide the Administrator details on the sampling location on the Biomethane process piping used for compliance with this specification for review and approval by BHE.

(4) Ensure proper gas sampling techniques and shipping procedures are followed.

(5) The Supplier will notify the Administrator a minimum of 48 hours prior to collecting a gas sample so the Administrator or BHE has the ability to schedule a representative to observe and/or audit the collection of the gas sample.

(6) The Supplier will provide the Administrator gas sampling procedures.

(7) The Supplier is responsible for all labor and costs associated with collecting, shipping, and laboratory analysis of the gas samples.

(8) Sampling must be conducted on a day such that no more than two days pass before the samples are received by the Test Lab.

(9) The Supplier must contact the Administrator immediately if this shipping procedure cannot be completed per this Section.

(10) The date, time, and name of individual collecting the gas sample must be documented.

(11) The Supplier will notify the Administrator in writing of any changes in feedstock that may significantly affect the concentrations of constituents of concern a minimum of 30 days prior to producing Biomethane from the new feedstock and a written explanation of the expected impact to the quality.

(12) The Supplier will notify the Administrator in writing of any changes in operating conditions and/or processes that may

significantly affect the quality of the Biomethane and a written explanation of the expected impact to the quality.

b) Pre-Delivery Raw Biogas Testing

i) If required, Supplier will conduct testing on the raw Biogas for all constituents listed in Appendix B. These gas quality tests will be performed using the Test Lab and results shared directly with the Administrator and the Supplier.

c) Pre-Delivery Biomethane Testing Procedure

i) Supplier will conduct testing on the Biomethane for all constituents listed in Appendix A. These gas quality tests will be performed using the Test Lab and results shared directly with the Administrator and the Supplier.

ii) If during the pre-delivery Biomethane testing, all Constituents listed in Appendix A are within the Delayed Shut-in Level, the Biomethane may be Delivered into the Receipt Point subject to the Biomethane Start-up Procedure and Periodic Testing.

iii) If any constituent concentration is beyond the Delayed Shut-in Level, the Supplier shall make necessary modifications to maintain the constituent concentration within the Delayed Shut-in Level and repeat the pre-delivery Biomethane testing.

d) Biomethane periodic testing

i) Supplier will conduct testing on the Biomethane for all Constituents listed in Appendix A. These gas quality tests will be performed per the indicated frequency and using the Test Lab. The results will be shared directly with the Administrator and the Supplier.

ii) The Supplier shall make necessary modifications to maintain Constituent concentration within Delayed Shut-in Level.

iii) All PASS/FAIL decision points are determined by a simple comparison of the Test Lab results to BHE's defined DSL or ISL for each Constituent regardless of the measurement uncertainty.

iv) If the tested Constituents are within the DSL as defined in Appendix A, the sample(s) is considered a PASS. The Administrator will provide a report per approved communication protocols with concentrations and comparisons to DSL and ISL.

v) If Supplier fails to conduct periodic testing or acceptable results are not shared with the Administrator and BHE as outlined in this document, the Biomethane at the sole discretion of BHE will be Shut-In and delivery into the Receipt Point refused. Biomethane will not be accepted until the Supplier conducts lab testing and acceptable results are shared with the Administrator and BHE.

e) Relaxation of Periodic Testing

i) Supplier must first submit a written request to the Administrator and then receive written approval from BHE prior to relaxation of any periodic testing requirements.

ii) BHE may reduce the frequency of periodic laboratory-based gas quality testing from monthly to quarterly (but not to exceed 100 days) provided:

(1) Supplier's Biomethane facility has been in service for a minimum of six months.

(2) Periodic laboratory tests from the previous six-month period are in compliance with this specification.

iii) BHE may reduce the frequency of the laboratory-based gas quality testing for biologicals from monthly to once per calendar year (but not to exceed 14 months) provided:

(1) The Supplier installs a product gas filter to prevent biologicals from entering the BHE Receipt Point.

(2) The filter must have a nominal efficiency of 99.98% at 0.2 micron.

(3) The piping configuration does not allow for bypassing the filter.

iv) BHE may remove the laboratory-based biological testing requirements for Suppliers provided:

(1) The conditions of the section 4.e(iii) are met and the filter is monitored to detect filter failure, or the filter element is replaced annually.

v) BHE may remove the laboratory-based biological testing requirements for Suppliers using membrane gas separation processes.

vi) BHE may remove the laboratory-based gas quality testing requirements for constituents of concern that are not present in the raw biogas at concentrations greater than 20% of gas quality specification limits provided:

(1) Raw biogas is tested once per calendar year not to exceed 14 months.

(2) This provision does not apply to siloxane testing.

vii) Hydrocarbon Dew Point testing is only required when more than 2% of the energy content of the Biomethane is from a non-methane source, based on gross heating value.

5) BIOMETHANE START-UP PROCEDURE

a) The Biomethane start-up shall be scheduled with the Administrator and BHE.

i) Proof of operations must be demonstrated prior to scheduling startup. BHE requires a minimum of 24 hours of continuous

operation and production of biomethane that meets the requirements of this specification to prove the upgrading plant is operational.

ii) BHE Load Control and Engineering shall be notified a minimum of forty-eight (48) hours prior to delivery of the Biomethane into the Receipt Point.

b) The Supplier shall have performed pre-delivery testing after 24 hours of continuous operation and no more than Thirty (30) days prior to start-up.

c) BHE will conduct continuous testing on the Biomethane. All Quality specifications shall be within the Delayed Shut-in for a minimum of two (2) readings or ten (10) minutes prior to accepting delivery of the Biomethane into the Receipt Point.

6) SHUT-IN

a) BHE will conduct continuous testing on the Biomethane. If the testing equipment fails or otherwise is inoperable the Biomethane shall be Shut-In and delivery into the Receipt Point refused.

b) If any Constituent concentration that is tested on a continuous basis is beyond the Delayed Shut-in Level during two (2) subsequent tests or for five (5) minutes, the Biomethane shall be Shut-In and delivery into the Receipt Point refused.

c) If any Constituent concentration that is tested on a continuous basis is beyond the Delayed Shut-in Level and causes Shut-Ins of the Receipt Point exceeding 3 times in a 24 hour period or 10 times in a 30 day period, the Biomethane shall be Shut-In and delivery into the Receipt Point refused. Supplier must make the necessary modifications to maintain Constituent concentration within the Delayed Shut-in Level prior to acceptance of biogas to the receipt point. Supplier must provide evidence to Administrator and BHE that the modifications will ensure Constituent concentration will remain below the Delayed Shut-in Level.

d) If any Constituent concentration that is tested on a periodic basis is beyond the Delayed Shut-in Level, the sample(s) will be considered PROBATIONARY. BHE will receive a report from the administrator and notify the supplier.

i) The supplier will retest the concentration of the probationary Constituent(s). The sample for retest shall be taken no more than 30 days from the date the sample that was considered Probationary was taken. The Administrator and the Supplier will be notified about the results as soon as possible.

(1) If the sample(s) for retesting is not taken within 30 days or the test results are beyond the Delayed Shut-in Level for the Probationary Constituent, the Administrator, BHE and the Supplier will be notified, the test will be considered a FAIL and

the Biomethane shall be Shut-In and delivery into the Receipt Point refused.

ii) The Biomethane shall remain Shut-In and delivery into the Receipt Point refused. Periodic sampling and testing will resume once BHE accepts the Biomethane again.

iii) The retested sample may be used to satisfy Periodic testing requirement if all required periodic tests are performed and the test results are within the Delayed Shut-in Level.

e) If any Constituent concentration is at or beyond the Instantaneous Shut-in Level, the test will be considered a FAIL. BHE will receive a report from the administrator and notify the supplier. The Biomethane shall be immediately Shut-In and delivery into the Receipt Point refused.

i) The Biomethane shall remain Shut-In and delivery into the Receipt Point refused. Periodic sampling and testing will resume once BHE accepts the Biomethane again.

f) If unexplained internal corrosion is identified in BHE piping or equipment the Supplier may be shut-in and delivery into the Receipt Point refused until a determination of the cause is found and resolved.

g) Notification

i) If Shut-In occurs as a result of the BHE Continuous testing, Supplier shall be immediately notified. The notification may be provided via the data connection used to share the results of the BHE's testing.

ii) If Shut-In occurs as a result of Periodic testing, BHE will receive a report from the Administrator. BHE will then notify the supplier. The Biomethane shall be immediately Shut-In and delivery into the Receipt Point refused.

7) BIOMETHANE RESTART

a) If Shut-In of the Biomethane was caused by Constituent concentration that is tested on a continuous basis being beyond the Delayed Shut-in Level:

i) The Supplier shall make necessary modifications to maintain Constituent concentration within the Delayed Shut-in Level.

ii) The Constituent concentration must be within the Delayed Shut-in Level for two (2) subsequent tests or a minimum of ten (10) minutes before Biomethane delivery into the Receipt Point will be allowed to resume.

b) If Shut-In of the Biomethane was caused by Constituent concentration that is tested on a periodic basis being at or beyond the Instantaneous Shut-in Level:

i) The Supplier shall make necessary modifications to maintain Constituent concentration within the Delayed Shut-in Level.

ii) The Constituent concentrations that are tested on a periodic basis must be tested no more than 30 days prior and all constituent concentrations shall be within the Delayed Shut-in Level before Biomethane delivery into the Receipt Point will be allowed to resume: and

iii) The Constituent concentrations that are tested on a continuous basis must be within the Delayed Shut-in Level for two (2) subsequent tests or a minimum of ten (10) minutes before Biomethane delivery into the Receipt Point will be allowed to resume.

c) If Shut-In of the Biomethane was caused by any other issue not related to the Quality specifications:

i) The Constituent concentrations that are tested on a periodic basis must be tested no more than the periodic testing interval prior and all constituent concentrations shall be within the Delayed Shut-in Level before Biomethane delivery into the Receipt Point will be allowed to resume; and

ii) The Constituent concentrations that are tested on a continuous basis must be within the Delayed Shut-in Level for two (2) subsequent tests or a minimum of ten (10) minutes before Biomethane delivery into the Receipt Point will be allowed to resume.

8) COMMUNICATION PROTOCOL

a) It is imperative that good communication pathways are established and maintained between all Parties involved in the testing process.

i) The Supplier will provide a phone number and email address that are monitored 24/7/365.

ii) BHE will provide a group email address and the phone number of BHE Load Control.

iii) The Test Lab will provide appropriate contact information.

iv) The Administrator will provide appropriate contact information.

b) BHE Continuous Testing

i. The Supplier must notify BHE immediately of any substantive expected changes to the raw gas quality or upgrading process that have the potential to impact Biomethane quality and an explanation of the expected impact to the Biomethane quality.

ii. BHE will notify Supplier immediately that Shut-In of the Biomethane has occurred. The notification may be provided via the data connection

used to share the results of the BHE's testing. If Shut-In occurs due to Supplier testing, Supplier will notify BHE Load Control and Engineering immediately.

c) Test Lab Monthly Testing

i. The Administrator will notify BHE and Supplier as per Sections 3 and 5.

APPENDIX A
PRODUCT GAS CONSTITUENTS, ACTION LEVELS, TESTING METHODS AND FREQUENCY

Constituent	Limit Type	Delayed Shut-in Level	Instantaneous Shut-in Level	Test method[4]	Frequency[1]
Carbon dioxide	Maximum	2.00%	2.50%	On-site analytical instrument Laboratory testing per ASTM D1946	Continuous Monthly
Oxygen	Maximum	0.20%	0.30%	On-site analytical instrument Laboratory testing per ASTM D1946	Continuous Monthly
Hydrogen sulfide	Maximum	4 PPMv	5 PPMv	On-site analytical instrument Laboratory testing per ASTM D5504	Continuous Monthly
Total Sulphur	Maximum	20 grains/100 SCF	24 grains/100 SCF	Laboratory testing per ASTM D5504	Monthly
		5 grains/100 SCF	7 grains/100 SCF	Wyoming/Colorado Projects Only	
Water vapor	Maximum	128 PPMv	170 PPMv	On-site analytical instrument	Continuous
Hydrocarbon dew point [2]	Maximum	-40 F	-20 F	Calculation based Laboratory analysis	Monthly
Liquids	Yes/No	Liquids Present	N/A	Observation at the filter separator	Monthly
Temperature	Maximum	Site Specific	Site Specific	On-site temperature sensor	Continuous
Heating value	Minimum	950 Btu/SCF	940 Btu/SCF	On-site analytical instrument laboratory testing per ASTM D1946, ASTM D3588	Continuous Monthly
		975 Btu/SCF	965 Btu/SCF	Arkansas Projects only	
Total Organic Silicon as Si	Maximum	4 mg Si/m^3	5 mg Si/m^3	Laboratory testing per ASTM D8230	Monthly
Hydrogen	Maximum	1000 PPMv	1500 PPMv	Laboratory testing per ASTM D1945/1946	Monthly
Ammonia	Maximum	10 PPMv	15 PPMv	Laboratory testing by gas chromatography with nitrogen chemiluminescence detection	Monthly
p-Dichlorobenzene	Maximum	10 PPMv	25 PPMv	Laboratory testing per EPA TO 15	Monthly
Vinyl Chloride	Maximum	4 PPMv	8 PPMv	Laboratory testing per EPA TO 15	
Toluene	Maximum	5000 PPMv	10000 PPMv	Laboratory testing per EPA TO 15	Monthly
Ethylbenzene	Maximum	60 PPMv	150 PPMv	Laboratory testing per EPA TO 15	Monthly
n-Nitro-di-n-propylamine	Maximum	0.06 PPMv	0.15 PPMv	Laboratory testing per EPA TO 15	Monthly
Methacrolein	Maximum	4 PPMv	18 PPMv	Laboratory testing per EPA TO 15	Monthly
Biologicals[3]	Maximum	$4X10^4$/SCF	$8X10^4$/SCF	Laboratory testing per approved procedure	Monthly
Molar Mass	Maximum	None	18 g/mol	On-site analytical instrument	Continuous
	Offset	None	.6 g/mol		

1. Monthly tests must be performed each calendar month but not to exceed forty (40) days between tests. If relaxation of testing frequency is granted per Section 4.e of this specification each monthly test shall be performed each quarter but not to exceed one hundred (100) days between tests.
2. Hydrocarbon Dew Point testing is only required when more than 2% of the energy content of the Biomethane is from a non-methane source.
3. Biological testing may be relaxed or waved per Section 4.e of this specification.
4. Other methods of testing may be accepted by BHE with prior written approval.

APPENDIX B
RAW GAS CONSTITUENT TESTING AND METHOD

Constituent	Test method[4]
Hydrogen	Laboratory testing per ASTM D1946
Oxygen	Laboratory testing per ASTM D1946
Nitrogen	Laboratory testing per ASTM D1946
Carbon Dioxide	Laboratory testing per ASTM D1946
Hydrocarbons	Laboratory testing per ASTM D1946
Heating value	Calculated per ASTM D3588
Relative Density	Calculated per ASTM D3588
Hydrogen sulfide	Laboratory testing per ASTM D5504
Total Sulfur	Laboratory testing per ASTM D5504
Trace Halocarbons and VOCs	Laboratory testing per EPA TO-15
Total Organic Silicon	Laboratory testing per ASTM D8230

1. Raw gas testing may be required prior to startup and commissioning, then once per calendar year not to exceeded 14 months.
2. Raw Gas testing may be required for reducing the periodic testing frequency.
3. It is assumed that all raw gas will be saturated with water and contain bacteria.
4. Other methods of testing may be accepted by BHE with prior written approval.