

## PUGET SOUND ENERGY

**GAS QUALITY AGREEMENT  
SCHEDULE NO. 88R**

This Gas Quality Agreement ("Agreement") between Puget Sound Energy ("PSE") and \_\_\_\_\_ ("Customer") (together "Parties" or individually "Party") is for Biomethane received into the gas distribution system of PSE at \_\_\_\_\_ ("Customer's Location"), and is effective as of \_\_\_\_\_ ("Effective Date").

**WHEREAS**, Customer desires to deliver Biomethane (as defined in PSE's Schedule 88R) from Customer's Biomethane processing facility ("Customer's Facility") located at Customer's Location into PSE's gas distribution system pursuant to a Service Agreement between PSE and Customer under PSE's Rate Schedule 88R Interruptible Distribution System Biomethane Receipt Service; and

**WHEREAS**, the Biomethane will be delivered by Customer into PSE's gas distribution system where, depending on relative location and PSE operating conditions that may change from time to time, the Biomethane may displace natural gas and become the sole source of supply to individual end-use PSE customers, or may blend with natural gas and become diluted, reducing or eliminating otherwise unacceptable impacts on individual end-use PSE customers; and

**WHEREAS**, the Parties desire to ensure the Biomethane delivered by Customer is suitable for transportation on PSE's gas distribution system and suitable for physical delivery to end users; and

**WHEREAS**, the Parties have entered into this Agreement to ensure the Biomethane supplied by Customer meets Minimum Gas Quality as determined by PSE;

**NOW, THEREFORE**, in consideration of the mutual covenants and agreements herein contained, and subject to all of the terms and conditions set forth herein, the Parties agree as follows:

1. **Responsibility.** Customer shall establish, maintain and administer a gas quality monitoring program with the knowledge and cooperation of PSE to ensure that Biomethane supplied by Customer and received into the distribution system of PSE, pursuant to the Service Agreement, meets or exceeds the Minimum Gas Quality set forth in Section 9. The Minimum Gas Quality will be developed by PSE and may be modified by PSE as provided herein as necessary to properly maintain a safe and reliable gas distribution system and ensure no unacceptable impacts on end-use PSE customers. PSE shall share the bases for such modifications with Customer.
2. **Procedure.**
  - a. **Testing and Verification.** Customer shall undertake the testing described in Section 9 to ensure the quality of the Biomethane. If Customer cannot verify that its Biomethane meets the Minimum Gas Quality in Section 9, Customer shall take the appropriate steps described in Section 9 below. Customer shall provide testing data to PSE on an as-requested basis. In addition, tracking, archiving, and retention periods for the original data held by Customer will be consistent with Section 8.c below.
  - b. **Changes by Customer.** Changes to this Agreement, including to Section 9, may be made by Customer as warranted to fit changing production needs and/or conditions at Customer's Facility, provided that PSE approves such changes in writing prior to implementation of such change, and such approval shall not be unreasonably withheld. Other changes may be made to the Minimum Gas Quality in Section 9 if agreed to by the Parties in writing or as provided in Section 2.c.
  - c. **Changes by PSE.**
    - i. Changes to Section 9 of this Agreement may be made by PSE in its sole discretion based on: the gas quality specifications listed in the Northwest Pipeline, LLC FERC Gas Tariff or PSE's WUTC Natural Gas Tariff; recommendations by the American Gas Association or the Gas Technology Institute; documented changes to gas distribution system operating conditions or to meet new or revised generally accepted natural gas utility practices regarding gas quality or testing; or as ordered by a regulatory body having authority in the matter. PSE agrees to provide Customer, in writing, the reasons for such changes, and will provide a minimum of 24 months prior notice before changes are implemented to Section 9 of this Agreement.

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- ii. Changes to this Agreement, including to Section 9 for reasons other than those listed in Section 2.c.i, may be made by PSE, provided that Customer approves such changes in writing and such approval shall not be unreasonably withheld.
  - iii. If Customer is unable to comply with PSE's changes to Section 9, then Customer may terminate this Agreement at no cost or liability to Customer, except for amounts owed at the time of termination.
- d. Special Tests. PSE may request special testing at any time with reasonable advance notice if PSE has a specific concern with the Biomethane quality or sampling results or methods. Upon a request for special testing, Customer shall promptly provide PSE a Biomethane sample and PSE shall have that Biomethane sample analyzed by an independent certified third party laboratory (ELAP certified where applicable). The cost of such testing will be borne by Customer if such testing demonstrates that the contaminant or constituent of special concern exists in a concentration (i) above the level provided in Section 9.b, or (ii) at a level that would require testing of the contaminant or constituent at the next higher level of testing in Section 9.j. If, after such testing, the contaminants or constituents are determined to exist in concentrations below the levels provided in Section 9.b or below the level that would require testing at the next higher level in Section 9.j, then the cost of testing shall be borne by PSE.
- e. Operational Issues. Customer shall develop operational procedures that will include planned and automatic shut-down conditions, measures and procedures to ensure the prompt and safe shutdown of Biomethane deliveries from Customer's Facility to PSE's distribution system. Customer shall make a copy of such operational procedures available to PSE. PSE shall have the option to require and witness a scheduled planned shut-down exercise and a scheduled automatic shut-down exercise intended to verify proper response to an instrument detecting that the Biomethane does not meet the gas quality specifications identified in Section 9.b, on an annual basis during the Term of this Agreement. Such exercises shall be coordinated among the Parties, so as to minimize impact on operations. Customer's facilities shall be designed and maintained to automatically suspend delivery of Biomethane to PSE facilities when the equipment monitoring the gas quality specifications identified in Section 9.b detects a deviation from the specification.
3. Emergencies, Planned Maintenance and Suspension of Receipts by PSE.
- a. PSE Emergencies and Planned Maintenance. PSE may interrupt Biomethane receipts as necessary for purposes of carrying out emergency repairs or reasonable planned maintenance to its distribution system. PSE shall provide maximum feasible notice of emergency interruptions and at least thirty (30) days' prior written notice of interruptions for planned maintenance. Interruptions for planned maintenance should be minimized, with the intent of not exceeding five (5) days in any 12 month period. PSE will coordinate, whenever possible to incorporate scheduled maintenance of its facilities during planned shut-down or maintenance of Customer's Facility.
  - b. Customer Emergencies and Planned Maintenance. Customer may interrupt Biomethane receipts at no cost to Customer in order to carry out emergency repairs or planned maintenance to its Facility. Customer shall provide at least ten (10) days' prior written notice of interruptions for planned maintenance. Customer shall not be required to give prior notification to PSE of routine increases or decreases in supply. Customer shall provide telephone notification to PSE prior to interrupting supply, except in an emergency, and before restarting Biomethane deliveries.
  - c. Suspension of Receipts by PSE. PSE shall have the right at any time during the Term, without incurring any liability therefor to Customer, to interrupt, suspend or curtail (through manual operation, automatic operation or otherwise) receipt or acceptance of delivery of Biomethane from Customer's Location, if PSE reasonably determines that the failure to do so may:
    - i. endanger any person or property, or PSE's natural gas system, or any natural gas system with which PSE's system is interconnected or any other PSE customer's natural gas equipment;
    - ii. cause or contribute to an imminent significant disruption of natural gas service to PSE customers;
    - iii. interfere with any construction, installation, inspection, testing, repair, replacement, improvement, alteration, modification, operation, use or maintenance of, or addition to, PSE's natural gas system or other property of PSE; or
    - iv. interfere with the performance, system capacity, integrity, reliability or stability of PSE's natural gas system or any system or PSE customer's equipment with which PSE's natural gas system is interconnected.

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PSE shall promptly notify Customer of the reasons for any such interruption, suspension or curtailment. PSE shall use reasonable efforts to mitigate and limit the duration of any such interruption, suspension or curtailment. If the Biomethane otherwise meets the Minimum Gas Quality in Section 9 of this Agreement, and the period of interruption, suspension or curtailment by operation of this Section 3.c exceeds forty-eight (48) hours in a calendar month, upon request of Customer, PSE shall pro-rate charges to Customer for that month.

4. Term. The term of this Agreement shall commence on the Effective Date and shall terminate upon the later of (a) termination or expiration of the Service Agreement, (b) the permanent disconnection of the Customer's Facility from the PSE distribution system (the "Term"), or (c) termination of this Agreement by Customer pursuant to Section 2.c.(iii).
5. Possession of Gas and Responsibility; Release and Indemnity.
  - a. Possession of Gas. Customer shall be deemed to be in control and possession of the Biomethane until such Biomethane shall have been delivered to the Point of Receipt (at or upstream of the PSE distribution system), after which PSE shall be deemed to be in control and possession of the Biomethane. PSE shall have no responsibility with respect to any Biomethane until it is received by PSE at the Point of Receipt, or on account of anything which may be done, happen or arise with respect to such Biomethane before such receipt, and Customer shall have no responsibility with respect to any Biomethane after its receipt by PSE at the Point of Receipt, or on account of anything which may be done, happen or arise with respect to such Biomethane after such receipt.
  - b. Customer releases and shall defend, indemnify and hold harmless each of the Indemnitees from and against all claims, losses, harm, suits, liabilities, obligations, damages, penalties, costs and expenses (including, but not limited to, reasonable attorneys' fees and any incremental taxes payable by PSE on the amount of any indemnities paid by Customer to PSE pursuant to this Section 5) of whatsoever kind and nature (including, without limitation, relating to the injury to or death of any person, including employees of Customer)(collectively "Claims") to the extent caused by or resulting from: Customer's negligent operation or maintenance of Customer's Facility; the interconnection of Customer's Facility with PSE's natural gas distribution system; or negligent delivery of Biomethane from Customer to the PSE natural gas distribution system. However, Customer shall not be required to so defend, indemnify or hold harmless such Indemnitee from any claim, loss, harm, liability, damage, cost or expense to the extent caused by or resulting from the negligence or concurrent negligence of such Indemnitee or its directors, officers, employees, agents or representatives.

Notwithstanding the other provisions of this Section 5, as between Customer and PSE, Customer shall be liable for any Claim to the extent such Claim arises from the failure of any Biomethane received by PSE from Customer to meet the gas quality requirements in Section 9. Customer's indemnification liabilities pursuant to this Agreement shall not be limited to the extent of its insurance coverages.

In connection with any action to enforce this Section 5, each Party hereby waives any immunity, defense or protection under any workers' compensation, industrial insurance or similar laws (including, but not limited to, the Washington Industrial Insurance Act, Title 51 of the Revised Code of Washington ("RCW")). This section 5 shall not be interpreted or construed as a waiver of either Party's right to assert any such immunity, defense or protection directly against any of its own employees or such employee's estate or other representatives.

6. Governing Law. The laws of the State of Washington shall govern the interpretation and application of this Agreement, without regard to such State's choice of law principles.
7. Definitions.
  - a. "**Biogas**" is a product of anaerobic digestion of biomass and may be further processed to meet Biomethane specifications. Biogas includes gases derived from landfills, wastewater treatment plants and dairy and farm wastes as set forth in RCW 43.325.010.
  - b. "**Biomethane**" is generally extracted from Biogas through cleanup and conditioning. Biomethane, also known as Renewable Gas, is considered suitable for many end-user applications and may be considered suitable for inclusion in natural gas pipeline systems.
  - c. "**Indemnitees**" means PSE, its successors and assigns, and the respective directors, officers, shareholders, employees, agents and representatives of PSE and its successors and assigns.

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- d. **"Minimum Gas Quality"** means the specifications set forth in Section 9 of this Gas Quality Agreement which shall be established for the Biomethane received into PSE's distribution system from Customer.
- e. **"Point Of Receipt"** means the point at which custody of the Biomethane passes from Customer to PSE and, unless otherwise agreed by Customer and PSE, the Point of Receipt will be delineated by a receipt meter.
- f. **"Standard Cubic Feet" or "Scf"** means the quantity of gas under standard conditions of 60 degrees F and 14.73 psi.

8. Miscellaneous.

- a. Limitation on Liability. A Party's liability for breach of any provision of this Agreement shall be limited to direct actual damages. Such direct actual damages shall be the sole and exclusive remedy of any Party with respect to breach of this Agreement by the other Party and all other remedies at law or equity are hereby waived and no Party shall be liable for consequential, incidental, punitive, exemplary or indirect damages, lost profits or other business interruption damages, by statute, in tort or contract, or otherwise.
- b. Assignment. This Agreement shall be fully assignable by Customer, subject to the written consent of PSE, which consent shall not be unreasonably withheld, provided the proposed assignee is capable of performing this Agreement in accordance with its terms. Notwithstanding the preceding sentence, this Agreement shall be fully assignable by Customer without the consent of PSE if such assignment is in connection with an assignment of all or any part of Customer's rights or obligations under this Agreement as collateral security for amounts payable under any financing arrangement in connection with the Customer's Facility. This Agreement shall be fully assignable by PSE, subject to the provisions in RCW 80.12.020, and provided the proposed assignee is capable of performing this Agreement in accordance with its terms. Subject to the foregoing restrictions on assignment, this Agreement shall inure to the benefit of, and shall be binding upon, the respective successors and assigns of the Parties.
- c. Access to Records. Customer and PSE shall maintain books, records, documents and other accounts relating to the performance of this Agreement. PSE or its duly authorized representative shall have access to Customer's books, records, documents and accounts as relate to matters covered by this Agreement for purposes of inspection, review and copying for a period of three (3) years after completion of the work or services that are the subject of such books, records, documents and accounts.
- d. Notice. Any notice required by this Agreement to be given to a Party shall be effective when it is received by such Party, and in computing any period of time related to such notice, such period shall commence at 12:01 p.m. prevailing time at the place of receipt on the date of receipt of such notice.

All notices required or appropriate under this Agreement shall be given in writing by hand, by overnight courier, by first-class postage prepaid mail return receipt requested, by registered or certified mail return receipt requested, or by e-mail or facsimile which are confirmed by first class mail addressed to the applicable Party, directed to the following addresses, as may be amended by written notice:

CUSTOMER:

\_\_\_\_\_  
 \_\_\_\_\_,  
 \_\_\_\_\_, WA \_\_\_\_\_  
 Attention: \_\_\_\_\_  
 Facsimile No.: \_\_\_\_\_  
 PUGET SOUND ENERGY  
 P.O. Box 97034 PSE  
 Bellevue, WA 98009-9734  
 Attention: Rates  
 Facsimile No.: (425) 462-3414

- e. Severability. If any article, paragraph, clause or provision of this Agreement shall be finally adjudicated by a court of competent jurisdiction to be invalid or unenforceable, the remainder of this Agreement shall be unaffected by such invalidity or unenforceability and all the remaining provisions of this Agreement shall remain in full force and effect as if such article, paragraph, clause or provision or any part thereof so adjudicated had not been included herein, and the Parties shall exercise their best efforts to correct the article, paragraph, clause or provision giving rise to such invalidity or unenforceability and substitute appropriate agreements and contractual arrangements to achieve the intent of this Agreement.

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- f. Independent Contractors. Each Party shall furnish its own facilities, contractors and employees to fully perform its obligations under this Agreement. No Party shall, by virtue of this Agreement, have any responsibility for the payment or performance of any obligations of any other Party. Further, no Party shall have, by virtue of this Agreement, any right, power or authority to act as the agent of, to enter into any contract, to make any representation or warranty or to incur any obligation or liability of any other Party. This Agreement shall not be interpreted or construed to create any association, joint venture or partnership between the Parties or to impose any partnership obligation or liability upon any of the Parties.
- g. No Third-Party Beneficiaries. This Agreement is for the benefit of, and will be enforceable by, the Parties only. This Agreement is not intended to confer any right or benefit on any third party (including, but not limited to, any employee of any party). No action may be commenced or prosecuted against a Party by any third party claiming as a third-party beneficiary of this Agreement or any of the transactions contemplated by this Agreement.
- h. Interpretation. This Agreement will be construed without regard to any presumption or other rule regarding construction against the Party causing this Agreement to be drafted.
- i. Entirety of Agreement. This Agreement supersedes all prior negotiations, representations and agreements between the Parties relating to the subject matter hereof and constitutes the entire Agreement regarding gas quality between the Parties.
- j. Counterparts. This Agreement may be executed in two counterpart copies, each of which when so executed shall be considered for all purposes an original.
9. Biomethane Delivery Specifications. The Minimum Gas Quality and the protocol for monitoring and periodic testing of the Biomethane shall be determined in PSE's sole judgment based on the location of the Biomethane receipt relative to minimum expected system gas flow, system design and the Daily Contract Volume to be received.
- a. All Biomethane delivered for receipt into PSE's system shall conform to the "non-quantifiable quality specifications" in this Section 9.a. at the time of delivery, except as reflected in Exhibit A (if applicable):
- i. Merchantability: The Biomethane shall not contain dust, sand, dirt, gums, oils or other substances at levels that would be injurious to PSE's facilities or that would cause gas in PSE's system to be unmarketable.
- ii. Liquids: The Biomethane shall contain no liquids at or immediately downstream of the receipt point.
- b. Biomethane Delivery. Biomethane delivered for receipt into PSE's system shall conform to the following quantifiable quality specifications at the time of delivery. For each specification listed in this Section 9.b, the actual value corresponding to the characteristic of the Biomethane being tested will be measured, calculated, evaluated, and enforced either on a continuous basis, or at a frequency based on the normal cycling time of the applicable instrument(s). Each instrument must have a normal measurement frequency of not less than once every eight minutes.
- i. Heating Value: The minimum heating value is nine hundred and eighty-five (985) Btu (gross) per Standard Cubic Feet on a dry basis. The maximum heating value is one thousand one hundred fifty (1150) Btu (gross) per Standard Cubic Feet on a dry basis. Prior to the execution of this Gas Quality Agreement, PSE in its sole discretion may specify a higher minimum and/or a lower maximum heating value based on the specific physical location of the receipt point on the PSE system.
- ii. Moisture Content or Water Content: For Biomethane delivered at or below a pressure of eight hundred (800) psig, the Biomethane shall have a water content not in excess of seven (7) pounds per million Standard Cubic Feet.
- iii. Hydrogen Sulfide: The Biomethane shall not contain more than twenty-five hundredths (0.25) of one (1) grain of hydrogen sulfide, measured as hydrogen sulfide, per one hundred (100) Standard Cubic Feet. The Biomethane shall not contain any entrained hydrogen sulfide treatment chemical (solvent) or its by-products in the Biomethane stream.
- iv. Mercaptan Sulfur: The Biomethane shall not contain more than three tenths (0.3) grains of mercaptan sulfur, measured as sulfur, per hundred Standard Cubic Feet.

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- v. Total Sulfur: The Biomethane shall not contain more than five (5) grains of total sulfur compounds, measured as sulfur, per one hundred (100) Standard Cubic Feet. This includes but is not limited to carbonyl sulfide, carbon disulfide, hydrogen sulfide, mercaptans and mono, di and poly sulfides.
- vi. Carbon Dioxide: The Biomethane shall not have a total carbon dioxide content in excess of two percent (2%) by volume.
- vii. Oxygen: The Biomethane shall not have an oxygen content in excess of two-tenths of one percent (0.2%) by volume, and Customer will make every reasonable effort to keep the Biomethane free of oxygen.
- viii. Inerts: The Biomethane shall not contain in excess of three percent (3%) total inerts (the total combined carbon dioxide, nitrogen, oxygen and any other inert compound) by volume.
- ix. Hydrocarbons: For Biomethane delivered at a pressure between 100 and 1000 psia, the Biomethane hydrocarbon dew point is not to exceed 15 degrees F at delivery pressure.
- x. Delivery Temperature: The Biomethane delivery temperature is not to be below 40 degrees F or above 120 degrees F.
- xi. Interchangeability: The Biomethane shall have a minimum Wobbe Number of 1305 and shall have a Wobbe Number not greater than 1400. The Wobbe Number will be calculated using the Btu (gross) content and specific gravity of the Biomethane. The Biomethane shall meet American Gas Association's Lifting Index, Flashback Index and Yellow Tip Index interchangeability indices for high methane gas relative to a typical composition of gas in PSE's system serving the area. Acceptable specification ranges are:
- Lifting Index (IL)  
IL <= 1.06
  - Flashback Index (IF)  
IF <= 1.2
  - Yellow Tip Index (IY)  
IY >= 0.8
- xii. Specific Gravity: All Biomethane not subject to enrichment by any non-methane hydrocarbons, shall have a specific gravity no greater than 0.577. For all Biomethane subject to enrichment by any non-methane hydrocarbons, the specific gravity shall be determined on a case-by-case basis.
- c. Biomethane Refusal. Customer shall not deliver, and PSE shall refuse to accept any Biomethane tendered for transportation by Customer if such Biomethane does not meet the specifications at the time of delivery as set out in Section 9.a and 9.b above.
- d. Biomethane Deviations. PSE may grant specific deviations to the Minimum Gas Quality specifications defined in Section 9.b above, if such Biomethane will not have a negative impact on system operations or end-use customer equipment. Any such deviation must be approved by PSE at or prior to the time of delivery.
- e. Health Protective and Pipeline Integrity Protective Constituents. In addition to the specifications set out in Sections 9.a and 9.b above, Biomethane must not contain constituents described below at concentrations which would prevent or restrict the normal marketing of biomethane, be at levels that would be injurious to pipeline facilities, or be at levels that would present a health and/or safety hazard to PSE employees and/or the general public.
- i. Health Protective Constituents are constituents that may impact human health and include two types of constituents ("Type A Constituents") and ("Type B Constituents").
  - ii. Pipeline Integrity Protective Constituents are constituents that may impact PSE pipeline system integrity or end-use customer equipment.

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- f. Biomethane Testing Costs. Customer shall be responsible for costs associated with Biomethane testing requirements defined in Section 9, and shall not be responsible for PSE's discretionary Biomethane testing or monitoring, except as identified in Section 2.d.
- g. Biomethane Constituent Testing shall be based on the Biomethane source:
- i. Biomethane from landfills shall be tested for all Health Protective Constituents and the Pipeline Integrity Protective Constituents.
  - ii. Biomethane from dairies shall be tested for Ethylbenzene, n-Nitroso-di-n-propylamine, Mercaptans, Toluene, and the Pipeline Integrity Protective Constituents.
  - iii. Other organic waste sources, including Biomethane from publicly owned treatment works (i.e., water treatment and sewage treatment plants) shall be tested for p-Dichlorobenzene, Ethylbenzene, Mercaptans, Toluene, Vinyl Chloride, and the Pipeline Integrity Protective Constituents.
- h. Biomethane Constituents. Biomethane to be accepted and transported in the PSE pipeline system shall be subject to periodic testing and monitoring based on the biogas source as described in Section 9.g. The Trigger Level is the level where additional periodic testing and analysis of the constituent is required. The Lower Action Level, where applicable, is used to screen Biomethane during the initial Biomethane quality review and as an ongoing screening level during the periodic testing. The Upper Action Level, where applicable, establishes the point at which the immediate shut-off of the Biomethane supply occurs.

Constituent	Trigger Level mg/m <sup>3</sup> (ppmv) (*)	Lower Action Level mg/m <sup>3</sup> (ppmv)	Upper Action Level mg/m <sup>3</sup> (ppmv)
<b>Health Protective Constituent Levels</b>			
<u>Type-A Constituents</u>			
Arsenic	0.019 (0.006)	0.19 (0.06)	0.48 (0.15)
p-Dichlorobenzenes	5.7 (0.95)	57 (9.5)	140 (24)
Ethylbenzene	26 (6.0)	260 (60)	650 (150)
n-Nitroso-di-n-propylamine	0.033 (0.006)	0.33 (0.06)	0.81 (0.15)
Vinyl Chloride	0.84 (0.33)	8.4 (3.3)	21 (8.3)
<u>Type-B Constituents</u>			
Antimony	0.60 (0.12)	6.0 (1.2)	30 (6.1)
Copper	0.060 (0.02)	0.6 (0.23)	3 (1.2)
Lead	0.075 (0.009)	0.75 (0.09)	3.8 (0.44)
Methacrolein	1.1 (0.37)	11 (3.7)	53 (18)
Toluene	904 (240)	9000 (2400)	45000 (12000)
Alkyl Thiols (mercaptans) (**)	(12)	(120)	(610)

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Constituent	Trigger Level mg/m <sup>3</sup> (ppmv) (*)	Lower Action Level mg/m <sup>3</sup> (ppmv)	Upper Action Level mg/m <sup>3</sup> (ppmv)
<b>Pipeline Integrity Protective Constituent Levels (**)</b>			
Siloxanes	0.01 mg Si/m <sup>3</sup>	-	-
Ammonia	0.001%	-	-
Hydrogen	0.10%	-	-
Mercury	0.08 mg/m <sup>3</sup>	-	-
Biologicals	4 x 10 <sup>4</sup> /scf (qPCR per APB, SRB, IOB group) and commercially free of bacteria of >0.2 microns (****)	-	-

Notes: (\*) The first number in this table are in milligrams per cubic meter (mg/m<sup>3</sup>), while the second number ( ) is in parts per million by volume (ppmv). (\*\*) Methyl mercaptan, Ethyl mercaptan, i-propyl mercaptan, n-propyl mercaptan, t-butyl mercaptan, 1-butanethiol, 1-pentanethiol, 2-butanethiol, 2-methyl-1-propanethiol, 2-propene-1-thiol, amyl mercaptan, heptanethiol and n-hexanethiol. (\*\*\*)The Pipeline Integrity Protective Constituent Lower and Upper Action Limits not provided above will be established at a later date. Until that time, Biomethane supplies that contain Pipeline Integrity Protective Constituents exceeding the Trigger Level, but lacking a Lower or Upper Action Level, will be analyzed and addressed on a case-by-case basis based on the Biomethane's potential impact on pipeline system integrity. (\*\*\*\*) qPCR – Quantitative polymerase chain reaction; APB – Acid producing Bacteria; SRB – Sulfate-reducing Bacteria; IOB – Iron-oxidizing Bacteria.

- i. Cumulative Health Risk. If any Health Protective Constituents are found at or above the Trigger Level, the risk from Type-A and Type-B Constituents must be calculated by summing the risk for each Health Protective Constituent above the Trigger level. The calculation is described in Section 9.j.v below.

<b>Total Risk from Type-A and Type-B Constituents</b>			
Risk Management Levels	Risk from Type-A Constituents	Hazard Index from Type-B Constituents	Action
Trigger Level <sub>1</sub>	≥ 1.0	≥ 0.1	Periodic Testing Required
Lower Action Level <sub>2</sub>	≥ 10.0	≥ 1.0	Supply shut-in after three exceedances in 12-month period in which deliveries occur
Upper Action Level <sub>3</sub>	≥ 25.0	≥ 5.0	Immediate supply shut-in
1. For any Health Protective Constituent. 2. Sum of the Health Protective Constituents exceeding the trigger level. 3. Any individual Health Protective Constituent or the sum of any Health Protective Constituents exceeding the trigger level.			

- j. Biomethane Periodic Testing.
  - i. Group 1 Constituent means any constituent with a concentration below the Trigger Level.
  - ii. Group 2 Constituent means any constituent with a concentration at or above the Trigger Level.



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- iii. Group 1 Constituent Testing:
  - (a) A Group 1 Constituent shall be tested once every 12-month period in which deliveries occur. Thereafter, if the Group 1 Constituent is found below the Trigger Level during two consecutive annual periodic tests, the Group 1 Constituent may be tested once every two-year period in which deliveries occur.
  - (b) A Group 1 Constituent will become a Group 2 Constituent if testing indicates a concentration at or above the Trigger Level.
- iv. Group 2 Constituent Testing:
  - (a) A Group 2 Constituent shall be tested quarterly (at least once every three-month period in which deliveries occur).
  - (b) A Group 2 Constituent will become a Group 1 Constituent if testing indicates a concentration below the Trigger Level during four consecutive tests.
- v. Total risk from Type-A and Type-B Constituents:
  - (a) The total risk from Type-A and Type-B Constituents shall be calculated for all Health Protective Group 2 Constituents.
    - (i) Type-A Risk: The potential Type-A risk for Group 2 compounds can be estimated by summing the individual potential risk for each Type-A constituent of concern. Specifically, the Type-A risk can be calculated using the ratio of the concentration of the constituent in the Biomethane to the health protective ("trigger") concentration value corresponding to one in a million risk for that specific Type-A constituent and then summing the risk for all the Group 2 constituents. (For reference, see the Flowchart in Exhibit C.)
    - (ii) Type-B Risk: The potential Type-B risk can be calculated using the ratio of the concentration of the constituent in Biomethane to the health protective concentration value corresponding to a hazard quotient of 0.1 for that specific Type-B constituent, then multiplying the ratio by 0.1, and then summing the Type-B chronic risk for these Group 2 constituents. (For reference, see the Flowchart in Exhibit C.)
  - (b) If four consecutive quarterly tests demonstrate that the total risk from Type-A or Type-B Constituents is below the Lower Action Level, monitoring can be reduced to once every 12-month period in which deliveries occur.
  - (c) If annual testing demonstrates that total risk from Type-A or Type-B Constituents is at or above the Lower Action Level, then testing for the Type-A or Type-B Constituents will revert to quarterly.
- k. Biomethane Shut-Off and Restart Procedures.
  - i. Quantifiable Quality Specifications. Biomethane deliveries shall be automatically shut-off by Customer when any on-line gas quality monitoring instrument, or any calculated value from an on-line gas quality monitoring instrument, indicates the Biomethane does not meet Minimum Gas Quality.
  - ii. Quantifiable Quality Specifications. Biomethane deliveries shall be manually shut-off by Customer when any on-line gas quality monitoring instrument is known to not be providing current and accurate measurements, unless PSE provides written notice in advance of delivery that it will accept delivery.
  - iii. Quantifiable Quality Specifications. Notwithstanding other provisions in this Agreement, Biomethane deliveries following an automatic or manual shut-off as described in Sections 9.k.i or 9.k.ii above, may restart when the instrument is verified to be operating properly, by calibration or other means necessary, and the Biomethane meets Minimum Gas Quality.
  - iv. Health protective and pipeline integrity constituents. Biomethane deliveries from Customer may be shut-off when there is a change in the biogas source at the facility or the gas processing equipment that PSE or Customer determines will potentially increase the level of any constituent listed in Section 9.h or the cumulative health risk in Section 9.i over the previously measured baseline levels; including, among others, a shutdown of Customer's facility that exceeds 6 months.

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- v. Health protective and pipeline integrity constituents. Biomethane deliveries from Customer shall be shut-off when testing indicates a constituent listed in Section 9.h or the cumulative health risk in Section 9.i exceeds allowable concentration levels in the following situations:
  - (a) The total risk from Type-A or Type-B Constituents is found at or above the Lower Action Level three times in a 12-month period in which deliveries occur.
  - (b) The total risk from Type-A or Type-B Constituents is found at or above the Upper Action Level.
  - (c) If applicable, a Pipeline Integrity Protective Constituent is found at or above the Lower Action Level three times in a 12-month period in which deliveries occur.
  - (d) Immediate shut-off if the level of an individual constituent is found above the Upper Action Level.
  - (e) The Biomethane contains constituents at concentrations which prevent or restrict the normal marketing of Biomethane, are at levels that are injurious to pipeline facilities, or are at levels that present a health and/or safety hazard to PSE employees and/or the general public.
- vi. In order to restart Biomethane deliveries following a shut-off pursuant to Sections 9.k.iv or 9.k.v, Customer shall test the Biomethane using independent certified third party laboratories (ELAP certified where applicable). Deliveries can then resume, subject to the periodic testing requirements in Section 9.j, if the test indicates: (1) the Biomethane complies with the Minimum Gas Quality specifications contained in Section 9.b of this Agreement; (2) the total risk from Type-A and Type-B Constituents is below the Lower Action Level; and, if applicable, (3) the Pipeline Integrity Protective Constituents are below the Lower Action Level. Thereafter, constituents shall be reevaluated by PSE for eligibility for less frequent testing.
- i. Testing Procedures. Customer shall collect samples upstream of the PSE meter. Samples will be analyzed by independent certified third party laboratories (ELAP certified where applicable). Customer shall provide notice to PSE at least 2 business days in advance of scheduled Biomethane sample extractions, in order to allow PSE an opportunity to observe the procedure. PSE will confirm with Customer whether PSE will observe the procedure within 1 business day of such notification. If PSE confirms it will observe the procedure, Customer will provide a more specific window of time for the procedure. Sample testing results will be available and will be transmitted to PSE within 2 weeks of testing or other time period as agreed in writing in advance of the testing. Customer will notify PSE in advance in the event Customer intends to undertake sampling procedures that will require more than 2 weeks for processing.

Company:

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By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Customer:

\_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Issued: November 12, 2015  
Effective: February 12, 2016  
Attachment "B" to Schedule 88R, Page 11

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**BIOMETHANE RECEIPT SERVICE GAS QUALITY AGREEMENT**  
**Exhibit "A"**  
**Addenda to Gas Quality Agreement**

This Exhibit A is an addenda to the Biomethane Receipt Service Gas Quality Agreement (Agreement) between PSE and \_\_\_\_\_ ("Customer").

Issued: November 12, 2015  
 Effective: February 12, 2016  
 Attachment "B" to Schedule 88R, Page 12

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**BIOMETHANE RECEIPT SERVICE GAS QUALITY AGREEMENT  
 Exhibit "B"  
 Authorized Interruptible Personnel List**

PSE Business Account Services:

(425) 462-3111

Fax: (425) 462-3496

<i>Office Use Only</i>
<b>Customer ID:</b>
Interruptible Maximum: _____ Therms/Day _____ Therms/Hour

**Customer Name:** \_\_\_\_\_

**Mailing Address:**

\_\_\_\_\_  
 \_\_\_\_\_

**Service Address:**

\_\_\_\_\_  
 \_\_\_\_\_

**Curtailment / Entitlement Personnel**

Below are listed the names of people authorized to receive the notice of Curtailment/entitlement of interruptible Gas Service. Each of them understands that service may be interrupted at any time during the day or night and each is authorized to handle all Curtailment operations of the above named organization under the terms and conditions of the Gas Quality Agreement and Schedule 88R. Please prioritize your personnel list below, and report any changes affecting this list to Puget Sound Energy at once.

<b>Person to notify</b>	<b>Work Phone - Ext</b>	<b>Fax</b>	<b>Cell Phone</b>	<b>Home Phone</b>
«ContactPerson1»	«WorkNumber1»	«FaxNumber1»	«CellNumber1»	«HomeNumber1»
«ContactPerson2»	«WorkNumber2»	«FaxNumber2»	«CellNumber2»	«HomeNumber2»
«ContactPerson3»	«WorkNumber3»	«FaxNumber3»	«CellNumber3»	«HomeNumber3»
«ContactPerson4»	«WorkNumber4»	«FaxNumber4»	«CellNumber4»	«HomeNumber4»
«ContactPerson5»	«WorkNumber5»	«FaxNumber5»	«CellNumber5»	«HomeNumber5»
<b>E-Mail Addresses:</b> «EmailAddress1» «EmailAddress2» «EmailAddress3» «EmailAddress4» «EmailAddress5»				

Signed: \_\_\_\_\_

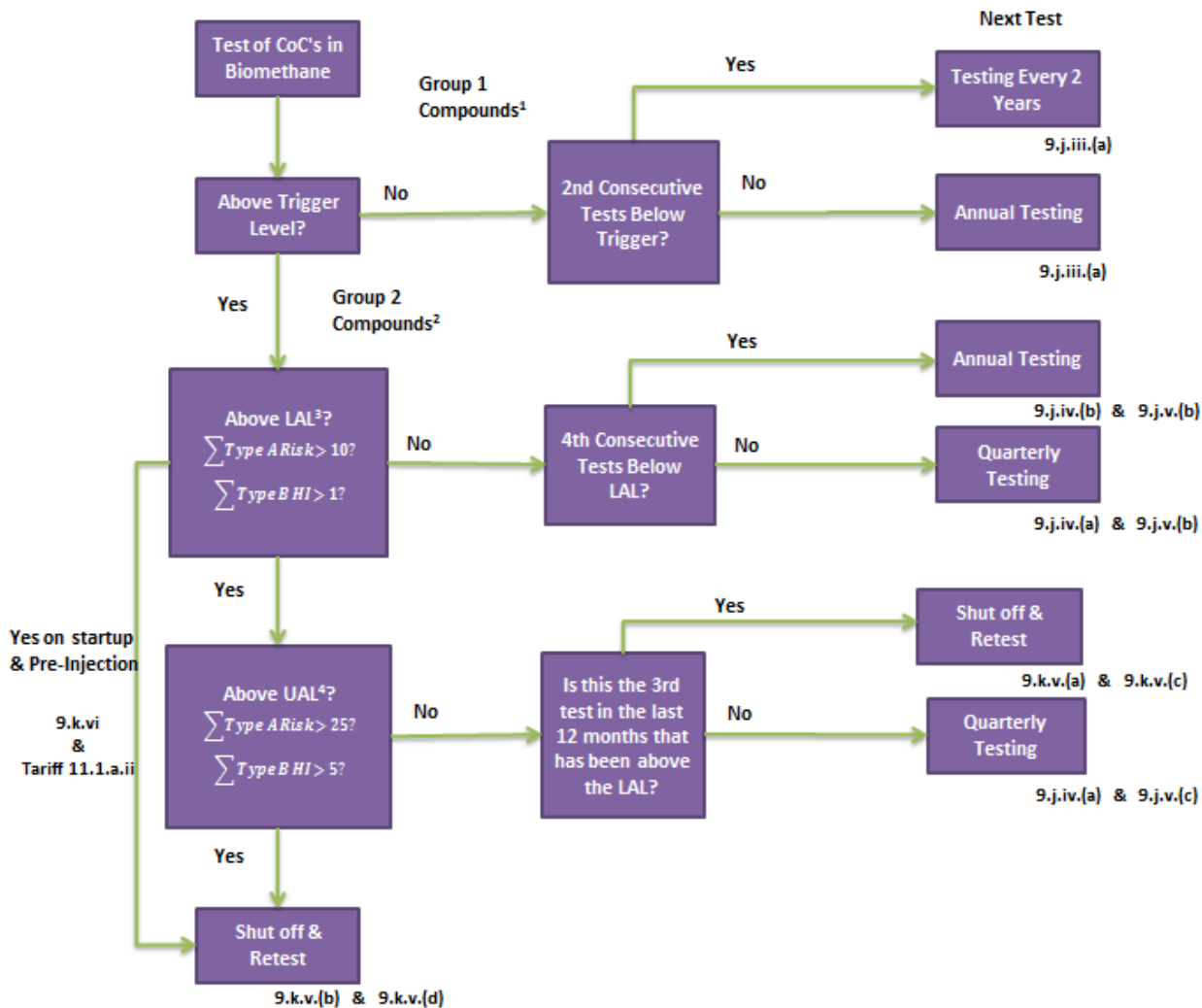
Title: \_\_\_\_\_

Date: \_\_\_\_\_

PUGET SOUND ENERGY

**BIOMETHANE RECEIPT SERVICE GAS QUALITY AGREEMENT**  
**Exhibit "C"**  
**Health Related Constituents Testing Frequency Flowchart**

All biomethane producers are required to periodically analyze the concentrations of their health related Constituents of Concern (CoC) in order to determine the required frequency of testing and potential for shutoff. The flowchart is a visual representation of the process as outlined in Sections 9.j. and 9.k. of the Gas Quality Agreement.



<sup>1</sup> Group 1 Compounds are tested on an individual basis  
<sup>2</sup> Group 2 Compounds are tested collectively for a total Type A risk and Type B Hazard Index. Group 2 Compounds can move to Group 1 after four consecutive tests below the trigger level  
<sup>3</sup> Lower Action Level (LAL)  
<sup>4</sup> Upper Action Level (UAL)

**Note:** Upon request, PSE can provide a supplemental calculation tool. This tool will analyze batch test data in order to determine testing frequency and if immediate facility shutdown is required.