

Rule 30 Biomethane Gas Delivery Specifications LIMITS and ACTION LEVELS			
Parameters	Limits ¹ and/or Action Levels ²	Monitor and/or Sampling Method References	Test Method(s)
Water vapor content	7 lb/MMscf (or 20°F if P>800 psi)	Moisture Analyzer	GPA 2261, ASTM D1142/D5454/D3588, <i>Laser</i>
Hydrocarbon Dew point	45°F at 400 psi or P, if P<400 psi (or 20°F at 400 psi if P>800 psi)		ASTM D1142, GPA2286
Heating Value Wobbe Number, Major Components: C ₁ to C ₆ + CO ₂ , N ₂ , O ₂ , CO, H ₂	990 ≤HHV≤1150 Btu/cf 1279 ≤WNI≤1385 4% Inerts	Gas Chromatograph	ASTM D1945/D7164, GPA 2261
Oxygen	0.20%	O ₂ analyzer	<i>Electrochemical</i>
Carbon Dioxide	3%	CO ₂ analyzer (new)	<i>Laser, FTIR</i>
Hydrogen Sulfide, Mercaptan and Total Sulfur	0.25 gr. H₂S/100 scf 0.30 gr. S/100 scf 0.75 gr. S/100 scf	H ₂ S and Sulfur speciated analyzer	ASTM D4084/D6228/D4468 D5504/D7166
Dust and Gum	Free of	In-line filter	EPA Method 5, 0.1µm filters
Temperature	50°F ≤T≤ 105°F	Thermocouple	
Vinyl Chloride ³	1170 ppbv	Summa Canister, XAD-2	GC/MS, EPA8270C,B, EPA TO-14, 15
Aldehydes and Ketones, Formaldehyde	Spot <0.1 ppm _v	(sorbent tube)	EPA TO-11, HPLC
Ammonia	Spot <0.001%	OSHA ID-188 or cylinder sample	GC, NCD, OSHA ID 164 Modified
Biologicals	Spot < 0.2 micron	Filter, MIC Kits	MPN, qPCR, spore enumeration (NHB 5340.1D) and id, 2µm, 0.2µm filters
Halocarbons	Spot <0.1 ppm _v	Summa Canister or cylinder sample	EPA TO-14, 15 GC/ELCD
Hydrogen	Spot < 0.1%	cylinder sample	ASTM D1945/D7164
Mercury	Spot < 0.01 µg/m ³	Gold plated silica beads	AA, AFS ASTM D5954/D6350
Volatile Metals	Spot < 0.01 µg/m ³	Nitric acid and peroxide aqueous	ICP, AAS
PCBs	Spot < 0.1 ppbv	Mod NIOSH 5503 (XAD-2)	GC/ECD, GC/MS, GC/AED, EPA 8082
Pesticides	Spot < 1 ppbv	Mod NIOSH 5600/5601 (XAD-2)	GC/ECD, GC/MS, EPA 8081
Pharmaceuticals/ Animal care products	Spot < 1ppbv	Porapak-R	LC/MS, GC/MS
Siloxanes	Commercially free of (or ND<0.1 mg Si/m³ continuously⁴)	Impinger, tedlar bag, Summa Canister, XAD-2	EPA TO-14, 15 GC/ELCD, GC/AED, GC/MS
VOCs	Spot <0.1 ppm _v		GC/MS, EPA8270C,B, EPA TO-14, 15
SVOCs			EPA TO-13A
PAHs			
Volatile Fatty Acids (VFAs)	Spot < 0.01 ppm _v	(Silica Gel Tube)	EPA TO-17, GC/MS

Notes:

- Limits** are indicated in **BOLD** and are maximums, unless otherwise indicated.
- Values for spot are trigger levels for more action, NOT hazardous levels. If Spot samples are above action levels, then risk assessment is done, which may increase test frequency, require monitor installation, result in a producer warning, require the establishment of a limit and/or require monitoring of operating surrogates. Spot test frequency: Prior to receiving gas there will be two tests (raw and processed or receipt pt), during start up - another two tests; post-start-up, an established monitoring period will be determined. An established ongoing monitoring program could include periodic tests that are bi-weekly, monthly, quarterly, bi-annual, annually or continuous, depending upon previous test results.
- Vinyl Chloride Limit is from CPUC General Order 58A
- Continuously: on-line analyzer is not available yet, thus test method listed are for periodic spot tests.

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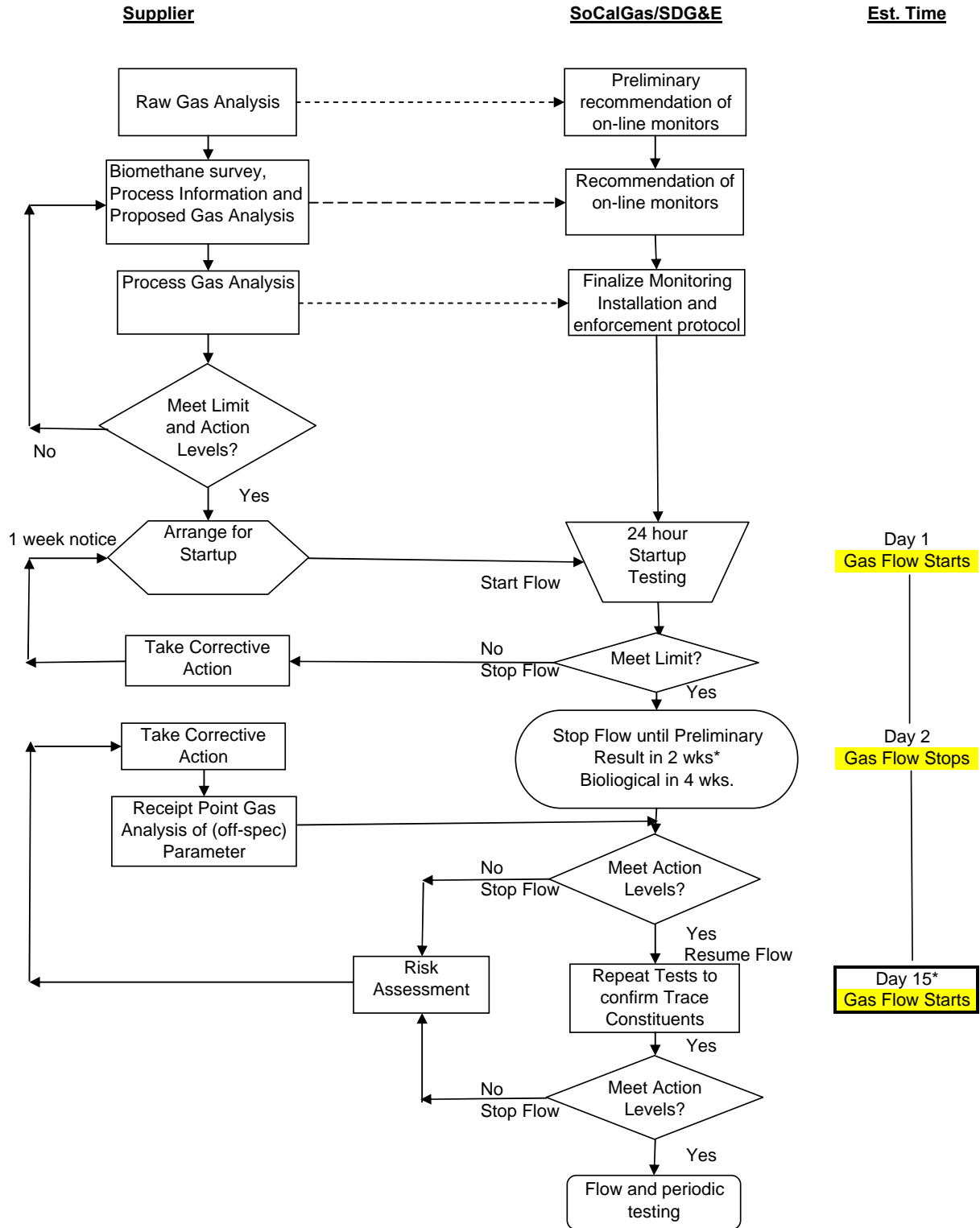
Abbreviations for Parameters:

PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
SVOCs	semi-volatile organic compounds
VFAs	volatile fatty acids
VOCs	volatile organic compounds

Abbreviations for Sampling and Test Methods:

AA	atomic absorption
AAS	atomic absorption spectrometry
AED	atomic emissions detector
AFS	atomic fluorescence spectrometry
ASTM	American Society for Testing and Materials
ECD	electron capture detector
ELCD	electrolytic conductivity detector
EPA	Environmental Protection Agency
FTIR	Fourier transform infrared spectroscopy
GC	gas chromatography
GPA	Gas Processors Association
HPLC	high performance liquid chromatography
ICP	inductively coupled plasma
LC	liquid chromatography
MIC	Microbiologically Influenced Corrosion
MPN	Most Probable Number determination of total live bacteria
MS	mass spectrometry
MVA	mercury vapor analyzer
NCD	nitrogen chemiluminescence detector
NHB	NASA Handbook
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety & Health Administration
qPCR	Quantitative Polymerase Chain Reaction
XAD-2	sorbent tube

Rule 30 Biomethane Gas Quality Review Flowchart



Note:

Estimated time is the shortest possible time assuming that gas meets all specifications and limits

*If Preliminary results (available in 2 weeks) meet action levels, including zero bacteria count and no solid particles in filter, then flow can resume prior to receiving final Biological (biological ID) results in 4 weeks.

Constituent(s) / Property(ies)	On-site Sample and Test (Hours)	Dewpoint	HHV, Gas Comp	Sulfur	Aldehydes	Ammonia	Biological	Halocarbons	Hydrogen	Metals	PCBs	Pesticides	Pharma	Halocarbons, VOCs, SVOCs, PAHs	Siloxanes	Volatile Fatty Acids	Year One ¹	
Test		ASTM D1142	ASTM D1945	ASTM D4084	EPA TO-11	OSHA ID 164		EPA TO-14	D1945	EPA 29	EPA 8082	EPA 8081	LCMS	Niosh 5515		EPA TO-17		
PreStartup²																		\$30,000
Raw Gas Analyses			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Proposed Gas Composition		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Processed Gas Analyses		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Startup³																		\$50,000
Start up Testing	24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Biweekly or Second Month	8				1	1	1	1	1	1	1	1	1	1	1	1	1	
PreStartup & Startup Count # Tests Subtotal	32	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	\$80,000
Ongoing^{3, 4}																		
Continuous		1	1	1														
Monthly		1																
Annually																		
Total Year 1																		\$ 80,000
Notes:																		
1 - Estimated Cumulative Laboratory Test Cost which excludes sampling and shipping and Ongoing costs assuming compliant gas, i.e. cost estimate only includes laboratory costs																		
2 - Supplier to conduct PreStartup Raw and Processed Gas sampling and analyses																		
3 - Startup and Ongoing tests and frequency are a function of Supplier's gas quality with frequency herein assuming compliant gas																		
4 - Ongoing identified tests costs are included in the roughly \$3,000-\$3,500 monthly point of receipt operation and maintenance fee																		
<p>The Utility has provided the estimated costs for the convenience of the Interconnector and has based those costs on similar work performed under favorable conditions. Due to unforeseen factors, the actual cost may be considerably different than the estimated costs. Therefore, the Utility does not represent or warrant that the estimated costs are the same as actual costs, and the Interconnector shall be responsible for actual costs.</p>																		