Biomethane Standards and Monitoring Discussion

April 10, 2013

Sacramento, CA

AB 1900 Requirements

- ARB shall identify "…reasonable and prudent monitoring, testing, reporting, and recordkeeping requirements, separately for each source of biogas, that are sufficient to ensure compliance with the health protective standards…"

Discussion Topics

- Potential approach-structure of the health standards
- Preliminary constituents of concern (CoCs) and necessary detection levels
- CoC test methods
- Potential monitoring frequency
- Dilution of biomethane in pipeline
- Open discussion and wrap-up

Potential Approach-Biomethane Standards

- One set of health protective standards for all sources
- Compound-specific health protective limits
- Not to exceed limits
- Recommended monitoring frequency
- Frequency determined by levels of CoCs found during monitoring
- Use Rule 30 biomethane test methods where possible

Preliminary CoCs and Necessary Detection Levels

Proposed CoCs	Necessary Detection Levels (Estimated)	Risk Type
Metals	ppb	
Lead*	10-20 ppb	Chronic HQ
Manganese*	100-150 ppb	Chronic HQ
Antimony	100-150 ppb	Chronic HQ
Arsenic	10-20 ppb	Cancer Risk/Chronic HQ/Acute HQ
Copper*	10-20 ppb	Chronic HQ
Nitroso Compds	ppb	
n-Nitroso-di-n-propylamine	5-15 ppb	Cancer Risk
Sulfur Compds	ppm	
Hydrogen Sulfide	15-30 ppm	Chronic HQ/Acute HQ
Methyl Mercaptan	10-20 ppm	Chronic HQ/Acute HQ
i-Propyl Mercaptan	10-20 ppm	Chronic HQ
SVOCs	ppm	
Dichlorobenzenes (as p-Dichlorobenzene)	0.5-2 ppm	Cancer Risk
VOCs	ppm/ppb	
Benzene	0.5-2 ppm	Cancer Risk
Vinyl Chloride	0.1-1 ppm	Cancer Risk
Methacrolein	0.1-1 ppm	Chronic HQ
Alkyl Benzenes	ppm	
Ethylbenzene	5-10 ppm	Cancer Risk
Toluene	200-300 ppm	Chronic HQ

*Some metals may be removed from list: reportedly found in the field blanks so their presence in collected samples may not be statistically significant or may be a contaminant

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Potential Test Methods for CoCs

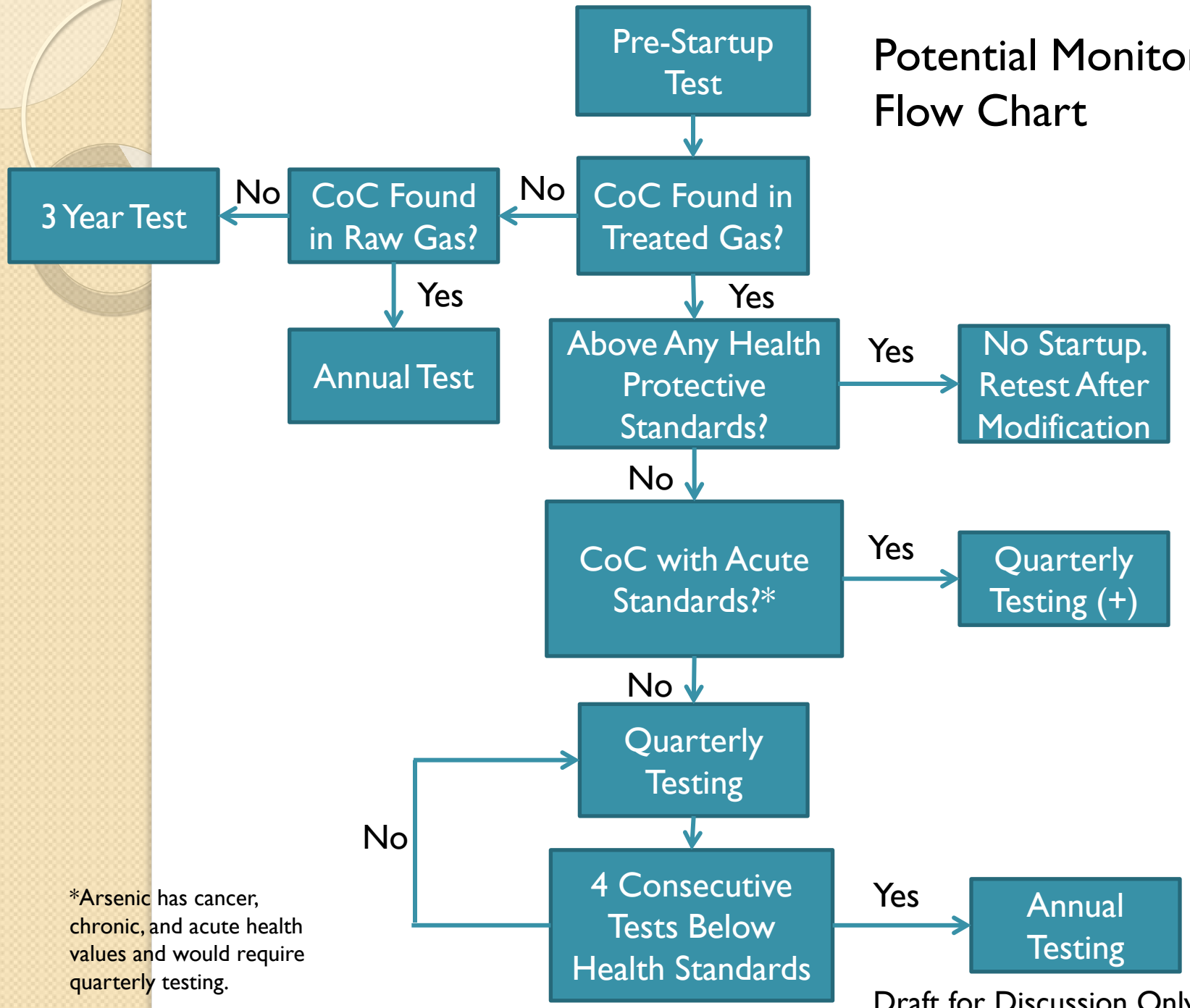
Proposed CoCs	Necessary Detection Levels (Estimated)	Risk Type	Proposed Test Method
Metals	ppb		
Lead*	10-20 ppb	Chronic HQ	EPA Method 29 (AAS and/or ICP)
Manganese*	100-150 ppb	Chronic HQ	EPA Method 29 (AAS and/or ICP)
Antimony	100-150 ppb	Chronic HQ	EPA Method 29 (AAS and/or ICP)
Arsenic	10-20 ppb	Cancer Risk/Chronic HQ/Acute HQ	EPA Method 29 (AAS and/or ICP)
Copper*	10-20 ppb	Chronic HQ	EPA Method 29 (AAS and/or ICP)
Nitroso Compds	ppb		
n-Nitroso-di-n-propylamine	5-15 ppb	Cancer Risk	EPA 8270 (GC/MS)
Sulfur Compds	ppm		
Hydrogen Sulfide	15-30 ppm	Chronic HQ/Acute HQ	ASTM D4084 Lead Acetate Reaction Method (online monitoring?) GTI used ASTM D6228
Methyl Mercaptan	10-20 ppm	Chronic HQ/Acute HQ	GTI used ASTM D6228
i-Propyl Mercaptan	10-20 ppm	Chronic HQ	GTI used ASTM D6228
SVOCs	ppm		
Dichlorobenzenes (as p-Dichlorobenzene)	0.5-2 ppm	Cancer Risk	TO-15 (canister or multisorbent tubes, GC/MS)
VOCs	ppm/ppb		
Benzene	0.5-2 ppm	Cancer Risk	TO-15 (canister or multisorbent tubes, GC/MS)
Vinyl Chloride	0.1-1 ppm	Cancer Risk	TO-15 (canister or multisorbent tubes, GC/MS)
Methacrolein	0.1-1 ppm	Chronic HQ	TO-11 (Determination of Formaldehyde, Adsorbent Cartridge (HPLC))
Alkyl Benzenes	ppm		
Ethylbenzene	5-10 ppm	Cancer Risk	TO-15 (canister or multisorbent tubes, GC/MS)
Toluene	200-300 ppm	Chronic HQ	TO-15 (canister or multisorbent tubes, GC/MS)

*Some metals may be removed from list: reportedly found in the field blanks so their presence in collected samples may not be statistically significant or may be a contaminant

Test Method Discussion Items

- Technical feasibility
  - Consider detection limit
- In field, continuous or send to lab
- Cost impacts
- Coordination with existing testing procedures
- How will representative sample for testing be taken?

Potential Monitoring Flow Chart



*Arsenic has cancer, chronic, and acute health values and would require quarterly testing.

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Possible Approaches to Address Dilution

- Should dilution be built into the standards?
- Percentage based vs. pipeline based

Dilution Ratio (Biomethane to Natural Gas	Multiplication Factor for Biomethane Standards
10%	10x
25%	4x
50%	2x
75%	1.3x
100%	1x

Pipeline Type	Multiplication Factor for Biomethane Standards
Transmission Lines	4x
Distribution Lines	2x
End of Distribution Lines	1x

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Open Discussion & Wrap-up

- Other discussion items
  - Recordkeeping and reporting options
  - Other?
- Wrap-up and Summary
- Next Steps