

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guideline

Source Category

Source:	IC Engine – Digester Gas Fired	Revision:	2
		Document #:	96.5.2
Class:	> 50 Hp Output	Date:	5/14/2009

Determination

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Archived in Practice	TYPICAL TECHNOLOGY
POC	1. 0.6 g/bhp-hr ^a 2. 1.0 g/bhp-hr ^a	1. n/s ^a 2. Lean Burn Technology ^a
NO_x	1. 1.0 g/bhp-hr ^a 2. 1.25 g/bhp-hr ^{a, c}	1. n/s ^a 2. Lean Burn Technology ^a
SO₂	1. n/s ^a 2. 0.3 g/bhp-hr ^a	1. Digester gas treatment w/ > 80% H ₂ S removal ^a 2. Digester gas pretreatment to remove H ₂ S ^{a, f}
CO	1. 2.1 g/bhp-hr ^a 2. a) Initial Standard ^{b, c, e, f} : 2.65 g/bhp-hr. b) Not to Exceed (NTE) Standard ^{d, e, f, h, i} : 3.77 g/bhp-hr c) CO emissions based/minimum overhaul schedule. ^{d, e, f, h, i}	1. n/s ^a 2. Lean Burn Technology ^a
PM₁₀	1. n/d ^a 2. n/s ^a	1. n/d ^a 2. Digester gas pretreatment ^{a, f}
NPOC	1. n/a ^a 2. n/a ^a	1. n/a ^a 2. n/a ^a

References & Notes

- a. BAAQMD Published Waste Gas IC Engine BACT Determination, 6-2-1995, Revision 3.
- b. BAAQMD Permit Application #16907, 1-29-2008.
- c. Source test required within 60 days of engine startup after baseline maintenance event.
- d. Ongoing compliance demonstrated by monthly ppm monitoring (with handheld analyzer for NOx and CO:
 - NOx Limit: 1.25 g/bhp-hr (as NO₂) = 86 ppm @ 15% oxygen
 - Action CO Level: 3.45 g/bhp-hr = 392 ppm @ 15% oxygen
 - Not To Exceed (NTE) Level: 3.77 g/bhp-hr = 429 ppm @ 15% oxygen

If the action level of 3.45 g/bhp-hr (392 ppm @ 15% oxygen) is exceeded, engine must be shutdown for maintenance within 12 months of the CO excursion.

Exceeding the CO NTE of 429 ppm @ 15% oxygen triggers either

- 1) Full compliance source test to determine g/bhp-hr NOx and CO emissions (note: if the compliance source test demonstrates engine CO emissions exceed 3.77 g/bhp-hr the District has cause to issue a violation notice and the engine must be shutdown as soon as practicable for maintenance event), or
- 2) Operator must shutdown engine within 30 days for maintenance.

Notes:

- 1) ppm to g/bhp-hr conversions based on DG methane content of 60% and engine mechanical efficiency of 31% (gross heat input to shaft horsepower). The owner or operator may request a revised ppm equivalent level based on site specific engine and digester gas characteristics.
 - 2) Analytical accuracy of monitoring and testing methods is ten percent.
- e. Minimum engine maintenance frequency-facilities without siloxane removal systems: Engine baseline maintenance event to return the engine to initial CO standard may be deferred until 26,000 hours or 36 calendar months of operation after the most recent source test, whichever comes first, if all standards are met, and CO emissions do not exceed the action level.
 - f. Minimum engine maintenance frequency-facilities with siloxane removal systems (carbon adsorption or equivalent): Engine baseline maintenance event to return the engine to initial CO standard may be deferred until 43,000 hours or 60 calendar months of operation after the most recent source test, whichever comes first, if all standards are met, and CO emissions do not exceed the action level.
 - g. Digester gas pretreatment: Ferric chloride injection into wastewater and/or addition of iron salts to digester sludge and/or iron sponge filtration of digester gas.
 - h. White Paper, Concerning BACT: CO Emissions From Digester Gas Fired Lean Burn Engines, BAAQMD, 1-24-2008.
 - i. Addendum to White Paper: Concerning BACT: CO Emissions From Digester Gas Fired Lean Burn Engines, BAAQMD, 5-14-2009.