Emission Estimate Changes

PM lower---engines & flare significantly
VOC lower—engines slightly, flare more
NOx lower---engines & flare slightly
CO lower---engines & flare slightly

Emission Estimate Changes

- SO2 higher—engines significantly, flare slightly

SO2 Emission Factors

(lb/MMcf LFG)

Emission Source	Original Emission Factor	Average Emission Factor from Source Tests	Conservative Emission Factor
Engines	14.7	55.6	98.2
Enclosed Flare	35.5	55.6	98.2
Candlestick Flare	14.7	55.6	98.2

LFG Sulfur Levels (ppm)

Date	Hydrogen Sulfide	Dimethyl Sulfide	Methyl Mercaptan	Total Reduced Sulfur
EPA AP-42	32-35	0.14-7.8	1.4-2.5	34-49
March 2010	280	3.6	5.0	289
April 2011				310-450
Feb. 2012	260	4.2	7.4	272
April 2012	260	3.7	7.5	274
May 2012	260	3.4	6.5	270
June 2012	250	3.5	8.6	262
July 2012	430	4.8	9.0	443
August 2012	330	3.9	9.0	343
Sept. 2012	260	3.5	7.7	271
Oct. 2012	330	3.2	7.3	341
Average	**296**			

Projected SO2 Emissions

- Based on Average Source Tests---116.0 ton/yr
- Based on Conservative "worst case" Factor---203.8 ton/yr
  - Assumes flare and engines at 100% capacity as well as backup candlestick flare at 100% capacity
  - Assumes 590 ppm H2S in inlet gas, over twice what average data shows
- Existing permit limit---39 ton/yr

H2S Mitigation

1. Divert sulfur containing waste streams from Riverbend to other landfills
2. Segregate sulfur containing waste streams within landfill
3. Minimize water input into landfill

Permit Modification

- SO_2 Increased Plant Site Emission Limit from Source Tests
- $PM_{2.5}$ Newly Regulated Pollutant
- GHGs Newly Regulated Pollutant (greenhouse gases)

SO2 Modeling

- Required to show compliance with ambient health standards
- Modeled at conservative SO2 emission rate nearly twice what average emission rate is expected to be
- Results showed compliance with ambient health standards even with worst case emissions
- Actual anticipated ambient levels of SO2 would be less than half of standards

PM2.5 Modeling

- Required to show compliance with ambient health standards
- Modeled at anticipated PM2.5 emission rate but also includes secondary conversion of SO2 and NOx to PM2.5
- Results showed compliance with ambient health standards even with worst case SO2 emissions
- Actual anticipated ambient levels of PM2.5 would be even less

Greenhouse Gas Emissions

- Fugitive CH4 and CH4 and N2O from combustion of LFG only (CO2 not considered from biogenic sources such as landfills)
- Baseline year (2010) and projected GHG emissions
- Baseline = 75,500 tons CO2e
- Projected = 105,400 tons CO2e
- GHGs would be much higher if methane were not being combusted in engines and flare

Other Permit Changes

- New LFG generation/75% capture values
- Quarterly inlet sulfur sampling
- Semiannual Meetings in November in future

Riverbend Landfill Gas Collection

Year	**Average Cfm Collected**
2008	1436
2009	2147
2010	2582
2011	2961
Jan.--June 2012	3241
July—Oct. 2012	3183

Questions?

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