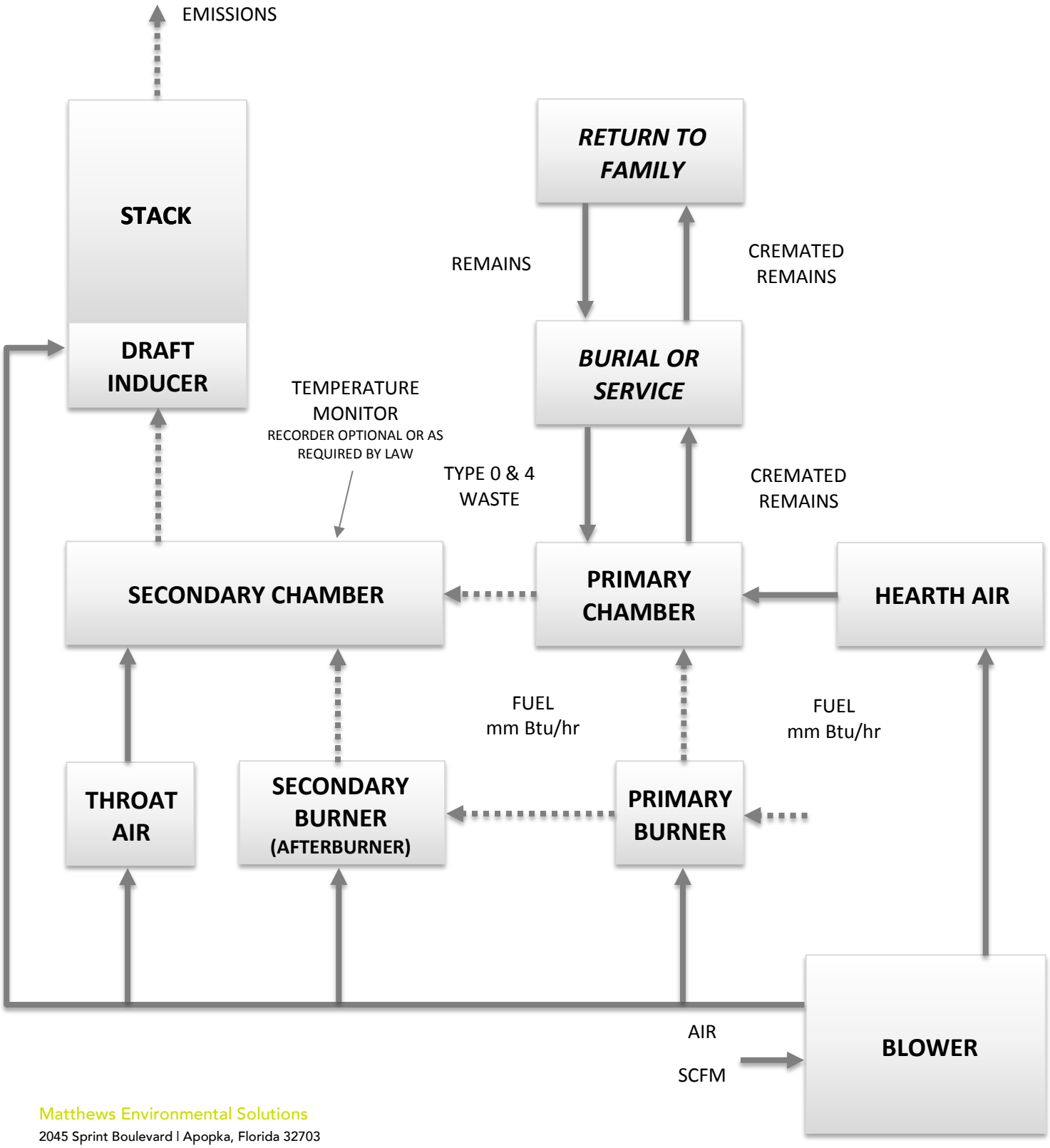
Matthews ENVIRONMENTAL SOLUTIONS

Cremator Process Flow Diagram



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Calculation Of Emissions

Estimated Emission Calculation

Matthews Environmental Solutions
Crematory Incinerator Model IE43-PPII

Total Incenerator Burn Capacity: 100 lb/hr of remains (type 4) and associated containers (type 0)
Flue gas flow rate = 1100 dscfm 12 Hours/Day X 6 Days/Week X 52 Weeks/Year
(100 % Excess Air) = 3744 Hours/Year

Total Emission Rate = Incinerator Burn Rate X Emission Factor

Sulfur Dioxide (SO_2)

$$\frac{100 \text{ lb/hr} \times 2.17 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.109 \text{ lb/hr} = 0.2031 \text{ TPY}$$

$$\frac{0.1085 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{1100 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 2.61 \text{ mg/m}^3} = 10.10 \text{ ppmv}$$

Nitrogen Oxide (NOx - as Nitrogen Dioxide)

$$\frac{100 \text{ lb/hr} \times 3.56 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.178 \text{ lb/hr} = 0.3332 \text{ TPY}$$

$$\frac{0.178 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{1100 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 1.88 \text{ mg/m}^3} = 23.01 \text{ ppmv}$$

Hydrocarbons (TOC/VOC - methane)

$$\frac{100 \text{ lb/hr} \times 2.99E-01 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.015 \text{ lb/hr} = 0.028 \text{ TPY}$$

$$\frac{0.01495 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{1100 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 0.65 \text{ mg/m}^3} = 5.59 \text{ ppmv}$$

Particulates (PM & PM_{10})

$$\frac{100 \text{ lb/hr} \times 4.67 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.2335 \text{ lb/hr} = 0.4371 \text{ TPY}$$

$$\frac{0.2335 \text{ lb/hr} \times 7.00E+03 \text{ gr/lb}}{1100 \text{ dscfm} \times 60 \text{ min/hr}} = 0.02 \text{ gr/dscf}$$

Carbon Monoxide (CO)

$$\frac{100 \text{ lb/hr} \times 2.95 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.1475 \text{ lb/hr} = 0.2761 \text{ TPY}$$

$$\frac{0.1475 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{1100 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 1.14 \text{ mg/m}^3} = 31.45 \text{ ppmv}$$

Notes:
1. Incinerator Emissions based on EPA emissions from Table 2.3-1 and 2.3-2 of AP-42 (5th Edition)
2. All conversion factors from AP-42 Appendix A.

Calculation Of Emissions

Estimated Emission Calculations

B&L Cremation Systems, Inc.
Crematory Incinerator B&L N-20AA

Total Incenerator Burn Capacity 150 lb/hr of remains (type 4) and associated containers (type 0)
Flue gas flow rate = 934 dscfm 12 Hours/Day X 6 Days/Week X 52 Weeks/Year
(100 % Excess Air) = 3744 Hours/Year

Total Emission Rate = Incinerator Burn Rate X Emission Factor

Sulfur Dioxide (SO_2)

$$\frac{150 \text{ lb/hr} \times 2.17 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.163 \text{ lb/hr} = 0.3047 \text{ TPY}$$

$$\frac{0.16275 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{934 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 2.61 \text{ mg/m}^3} = 17.85 \text{ ppmv}$$

Nitrogen Oxide (NOx - as Nitrogen Dioxide)

$$\frac{150 \text{ lb/hr} \times 3.56 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.267 \text{ lb/hr} = 0.4998 \text{ TPY}$$

$$\frac{0.267 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{934 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 1.88 \text{ mg/m}^3} = 40.66 \text{ ppmv}$$

Hydrocarbons (TOC/VOC - methane)

$$\frac{150 \text{ lb/hr} \times 2.99E-01 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.0224 \text{ lb/hr} = 0.042 \text{ TPY}$$

$$\frac{0.022425 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{934 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 0.65 \text{ mg/m}^3} = 9.88 \text{ ppmv}$$

Particulates (PM & PM_{10})

$$\frac{150 \text{ lb/hr} \times 4.67 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.3503 \text{ lb/hr} = 0.6557 \text{ TPY}$$

$$\frac{0.35025 \text{ lb/hr} \times 7.00E+03 \text{ gr/lb}}{934 \text{ dscfm} \times 60 \text{ min/hr}} = 0.04 \text{ gr/dscf}$$

Carbon Monoxide (CO)

$$\frac{150 \text{ lb/hr} \times 2.95 \text{ lb/ton} \times 1 \text{ ton}}{2000 \text{ lbs}} = 0.2213 \text{ lb/hr} = 0.4142 \text{ TPY}$$

$$\frac{0.22125 \text{ lb/hr} \times 4.54E+05 \text{ mg/lb} \times 1 \text{ ppmv}}{934 \text{ dscfm} \times 60 \text{ min/hr} \times 0.0283 \text{ m}^3/\text{f}^3 \times 1.14 \text{ mg/m}^3} = 55.56 \text{ ppmv}$$

Notes:
1. Incinerator Emissions based on EPA emissions from Table 2.3-1 and 2.3-2 of AP-42 (5th Edition)
2. All conversion factors from AP-42 Appendix A.