WM

MEDLEY LANDFILL & RECYCLING CENTER
A WASTE MANAGEMENT COMPANY

9350 NW 89 Avenue
Medley, FL 33178
(305) 883-7670
(305) 883-9758 Fax



November 4, 2002

Mr. Patrick Wong, P.E.
Metro-Dade ERM
33 S.W. 2nd Ave.
Miami, FL 33130

RE: **Landfill Gas Enclosed Flare Air Construction Permit Application**
**Medley Landfill & Recycling Facility**
**Title V Facility ID 0250615**

Dear Mr. Wong:

Enclosed please find an application for authority to construct a landfill gas enclosed flare for Medley Recycling & Disposal Facility. The landfill gas utility flare proposed in the permit application will be added to the existing landfill gas collection system to replace one of the utility flares currently permitted. The existing landfill gas collection system consists of a perimeter header line, two 3000 scfm utility flares, associated piping, and eighty-one (81) vertical gas extraction wells located around the Class I and C&D landfills. The landfill is currently permitted as emission unit 001 under Title V Air Permit 0250615 and the existing utility flares serve as the emission control devices. The proposed landfill gas enclosed flare will be added to the perimeter header to increase the system's potential to collect and destroy landfill gas. This action will reduce the potential emissions of pollutants and will assist with the reduction of potentially odorous vapors. A Title V permit modification along with PSD evaluation has been performed to address long term landfill gas control system and air permit requirements. The results of the PSD evaluation are provided with this permit application as *Document 6*.

Waste Management, Inc. of Florida appreciates the responsiveness of Metro-Dade ERM in this matter. If you have any questions please call me at (561) 702-9126.

Sincerely,

Bryan Tindell

Bryan Tindell
Compliance and Construction Engineer

Enclosures

# BEST AVAILABLE COPY

**SCREEN3 Modeling**
**Monitored PM Concentrations**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

| | # Obs | 24-Hour Values | | | | # Exceed | | Annual | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1st Max | 2nd Max | 3rd Max | 4th Max | Actual | Est | Mean | Year | City | County |
| 1 | | 60 | 57 | 53 | 51 | 0 | 0 | 25.1 | 1996 | Miami | Dade Co |
| 2 | | 61 | 63 | 47 | 38 | 0 | 0 | 22.6 | 1997 | Miami | Dade Co |
| 3 | | 58 | 95 | 55 | 55 | 0 | 0 | 26.6 | 1998 | Miami | Dade Co |
| 4 | | 56 | 57 | 44 | 39 | 0 | 0 | 24.1 | 1999 | Miami | Dade Co |
| 5 | | 57 | 48 | 39 | 38 | 0 | 0 | 24.5 | 2000 | Miami | Dade Co |
| 6 | | 40 | 56 | 47 | 45 | 0 | 0 | 26.7 | 2001 | Miami | Dade Co |
| 7 | | 61 | 67 | 62 | 58 | 0 | 0 | 28.4 | 1996 | Miami | Dade Co |
| 8 | | 60 | 71 | 42 | 39 | 0 | 0 | 26.2 | 1997 | Miami | Dade Co |
| 9 | | 56 | 94 | 62 | 40 | 0 | 0 | 27.6 | 1998 | Miami | Dade Co |
| 10 | | 58 | 45 | 39 | 37 | 0 | 0 | 24.2 | 1999 | Miami | Dade Co |
| 11 | | 59 | 54 | 51 | 39 | 0 | 0 | 25.9 | 2000 | Miami | Dade Co |
| 12 | | 45 | 55 | 54 | 54 | 0 | 0 | 26.4 | 2001 | Miami | Dade Co |
| 13 | | 55 | 66 | 56 | 54 | 0 | 0 | 22.5 | 1996 | Miami | Dade Co |
| 14 | | 61 | 64 | 35 | 30 | 0 | 0 | 21.6 | 1997 | Miami | Dade Co |
| 15 | | 55 | 91 | 53 | 37 | 0 | 0 | 25 | 1998 | Miami | Dade Co |
| 16 | | 33 | 50 | 34 | 29 | 0 | 0 | 23.2 | 1999 | Miami | Dade Co |
| 17 | | 58 | 50 | 37 | 35 | 0 | 0 | 22.6 | 2000 | Miami | Dade Co |
| 18 | | 41 | 53 | 47 | 45 | 0 | 0 | 23.3 | 2001 | Miami | Dade Co |
| 19 | | 58 | 88 | 60 | 53 | 0 | 0 | 26.8 | 1996 | Miami | Dade Co |
| 20 | | 61 | 56 | 52 | 43 | 0 | 0 | 21.6 | 1997 | Miami | Dade Co |
| 21 | | 55 | 85 | 56 | 38 | 0 | 0 | 23.8 | 1999 | Miami | Dade Co |
| 22 | | 57 | 41 | 37 | 37 | 0 | 0 | 20.9 | 1999 | Miami | Dade Co |
| 23 | | 53 | 46 | 43 | 35 | 0 | 0 | 21.4 | 2000 | Miami | Dade Co |
| 24 | | 41 | 55 | 54 | 49 | 0 | 0 | 23.2 | 2001 | Miami | Dade Co |
| max (µg/m³) | | | 95 | | | | | 28.4 | | | |

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**SCREEN3 Modeling**
**Monitored CO Concentrations**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

| | # Obs | 1-Hour Values: 1st Max | 1-Hour Values: 2nd Max | 1-Hour Values: # Exceed | 8-Hour Values: 1st Max | 8-Hour Values: 2nd Max | 8-Hour Values: # Exceed | Year | City | County |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6,457 | 3.8 | 3.7 | 0 | 2.8 | 2.4 | 0 | 2001 | Miami | Dade Co |
| 2 | 7,970 | 3.7 | 3.3 | 0 | 2.7 | 2 | 0 | 1996 | Miami | Dade Co |
| 3 | 6,534 | 3.3 | 3.1 | 0 | 2.6 | 2.2 | 0 | 1997 | Miami | Dade Co |
| 4 | 8,627 | 6.2 | 3.5 | 0 | 2.2 | 2 | 0 | 1998 | Miami | Dade Co |
| 5 | 8,456 | 4.2 | 4.2 | 0 | 2.6 | 2.3 | 0 | 1999 | Miami | Dade Co |
| 6 | 8,553 | 3.6 | 3.5 | 0 | 2.9 | 2.4 | 0 | 2000 | Miami | Dade Co |
| 7 | 6,443 | 8.5 | 7.3 | 0 | 4.7 | 4.2 | 0 | 2001 | Miami | Dade Co |
| 8 | 8,605 | 8.7 | 7.7 | 0 | 5.1 | 4.6 | 0 | 1996 | Miami | Dade Co |
| 9 | 8,574 | 9.8 | 8.8 | 0 | 4.4 | 4.1 | 0 | 1997 | Miami | Dade Co |
| 10 | 8,525 | 8.2 | 7.2 | 0 | 5.7 | 3.4 | 0 | 1998 | Miami | Dade Co |
| 11 | 8,561 | 9.2 | 7.1 | 0 | 5.2 | 3.9 | 0 | 1999 | Miami | Dade Co |
| 12 | 8,622 | 6.7 | 6.2 | 0 | 4.8 | 3.4 | 0 | 2000 | Miami | Dade Co |
| 13 | 6,508 | 5.8 | 5.7 | 0 | 4 | 3.3 | 0 | 2001 | Miami | Dade Co |
| 14 | 8,526 | 6.4 | 6.2 | 0 | 3.9 | 3.2 | 0 | 2000 | Miami | Dade Co |
| 15 | 8,616 | 5.3 | 5.2 | 0 | 4.4 | 4 | 0 | 1999 | Miami | Dade Co |
| 16 | 8,422 | 5.1 | 4.9 | 0 | 2.8 | 2.8 | 0 | 1998 | Miami | Dade Co |
| 17 | 8,414 | 7.1 | 6.3 | 0 | 3.6 | 2.5 | 0 | 1997 | Miami | Dade Co |
| 18 | 8,671 | 7.3 | 6.8 | 0 | 4.8 | 4.3 | 0 | 1996 | Miami | Dade Co |
| max (ppm) | | | 8.8 | | | 4.6 | | | | |
| max ($\mu g/m^3$) | | | 10,995 | | | 5,747 | | | | |

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**SCREEN3 Modeling**
**Monitored NO2 Concentrations**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

| | # Obs | 1-Hour Values | | Annual | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1st Max | 2nd Max | Mean | # Exceed | Year | City | County |
| 1 | 5,944 | 0.055 | 0.052 | 0.008 | 0 | 2001 | | Dade Co |
| 2 | 7,019 | 0.054 | 0.054 | 0.006 | 0 | 1998 | | Dade Co |
| 3 | 7,890 | 0.074 | 0.071 | 0.007 | 0 | 1996 | | Dade Co |
| 4 | 7,854 | 0.052 | 0.057 | 0.007 | 0 | 1997 | | Dade Co |
| 5 | 7,916 | 0.072 | 0.065 | 0.005 | 0 | 1999 | | Dade Co |
| 6 | 5,086 | 0.068 | 0.065 | 0.007 | 0 | 2000 | | Dade Co |
| 7 | 6,403 | 0.076 | 0.074 | 0.016 | 0 | 2001 | Miami | Dade Co |
| 8 | 8,203 | 0.203 | 0.169 | 0.016 | 0 | 2000 | Miami | Dade Co |
| 9 | 8,340 | 0.108 | 0.088 | 0.017 | 0 | 1999 | Miami | Dade Co |
| 10 | 8,427 | 0.066 | 0.064 | 0.015 | 0 | 1998 | Miami | Dade Co |
| 11 | 8,477 | 0.094 | 0.081 | 0.017 | 0 | 1997 | Miami | Dade Co |
| 12 | 8,203 | 0.083 | 0.082 | 0.016 | 0 | 1996 | Miami | Dade Co |
| max (ppm) | | | | 0.017 | | | | |
| max (µg/m³) | | | | 34.9 | | | | |

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**SCREEN3 Modeling**
**Monitored SO2 Concentrations**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

| | | 1-Hour Values | | 3-Hour Values | | | 24-Hour Values | | | Annual | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # Obs | 1st Max | 2nd Max | 1st Max | 2nd Max | # Exceed | 1st Max | 2nd Max | # Exceed | Mean | Year | City | County |
| 1 | 6,317 | 0.006 | 0.005 | 0.005 | 0.005 | 0 | 0.003 | 0.003 | 0 | 0.001 | 2001 | Miami | Dade Co |
| 2 | 5,580 | 0.011 | 0.011 | 0.01 | 0.006 | 0 | 0.004 | 0.003 | 0 | 0.001 | 2000 | Miami | Dade Co |
| 3 | 8,310 | 0.016 | 0.013 | 0.009 | 0.008 | 0 | 0.003 | 0.003 | 0 | 0.001 | 1999 | Miami | Dade Co |
| 4 | 8,237 | 0.025 | 0.017 | 0.013 | 0.013 | 0 | 0.005 | 0.004 | 0 | 0.001 | 1998 | Miami | Dade Co |
| 5 | 8,035 | 0.015 | 0.013 | 0.009 | 0.008 | 0 | 0.004 | 0.004 | 0 | 0.001 | 1997 | Miami | Dade Co |
| max (ppm) | | | | | 0.013 | | | 0.004 | | 0.001 | | | |
| max (µg/m³) | | | | | 37.1 | | | 11.4 | | 2.86 | | | |
| | | | | | | | | | | | | | |

## APPENDIX C

## MODELING RUNS
## (INCLUDING VISCREEN)

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**SCREEN3 Modeling**
**Concentrations at Receptor Elevations (Model)**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

| Dist (m) | ME[a] (ft-msl) | HAB[b] (ft) | Dist (m) | ME[a] (ft-msl) | HAB[b] (ft) | Dist (m) | ME[a] (ft-msl) | HAB[b] (ft) |
|---|---|---|---|---|---|---|---|---|
| 30 | 5 | 0 | 1140 | 6 | 1 | 4100 | 10 | 5 |
| 40 | 5 | 0 | 1150 | 6 | 1 | 4200 | 11 | 6 |
| 50 | 5 | 0 | 1160 | 6 | 1 | 4300 | 10 | 5 |
| 60 | 5 | 0 | 1170 | 6 | 1 | 4400 | 12 | 7 |
| 70 | 5 | 0 | 1180 | 6 | 1 | 4500 | 14 | 9 |
| 80 | 5 | 0 | 1190 | 6 | 1 | 4600 | 18 | 13 |
| 90 | 5 | 0 | 1200 | 7 | 2 | 4700 | 19 | 14 |
| 100 | 5 | 0 | 1250 | 9 | 4 | 4800 | 9 | 4 |
| 125 | 5 | 0 | 1300 | 10 | 5 | 4900 | 13 | 8 |
| 150 | 5 | 0 | 1350 | 10 | 5 | 5000 | 9 | 4 |
| 175 | 5 | 0 | 1400 | 10 | 5 | 5500 | 23 | 18 |
| 200 | 5 | 0 | 1450 | 10 | 5 | 6000 | 20 | 15 |
| 225 | 5 | 0 | 1500 | 5 | 0 | 6500 | 7 | 2 |
| 250 | 5 | 0 | 1550 | 5 | 0 | 7000 | 12 | 7 |
| 275 | 5 | 0 | 1600 | 6 | 1 | 7500 | 20 | 15 |
| 300 | 5 | 0 | 1650 | 6 | 1 | 8000 | 10 | 5 |
| 325 | 5 | 0 | 1700 | 6 | 1 | 8500 | 9 | 4 |
| 350 | 5 | 0 | 1750 | 7 | 2 | 9000 | 9 | 4 |
| 375 | 5 | 0 | 1800 | 6 | 1 | 9500 | 30 | 25 |
| 400 | 5 | 0 | 1850 | 7 | 2 | 10000 | 10 | 5 |
| 425 | 5 | 0 | 1900 | 7 | 2 | 15000 | 31 | 26 |
| 450 | 5 | 0 | 1950 | 9 | 4 | 20000 | 15 | 10 |
| 475 | 5 | 0 | 2000 | 9 | 4 | 25000 | 14 | 9 |
| 500 | 5 | 0 | 2100 | 10 | 5 | 30000 | 12 | 7 |
| 550 | 5 | 0 | 2200 | 9 | 4 | 35000 | 12 | 7 |
| 600 | 5 | 0 | 2300 | 10 | 5 | 40000 | 20 | 15 |
| 650 | 5 | 0 | 2400 | 21 | 16 | 45000 | 12 | 7 |
| 700 | 5 | 0 | 2500 | 29 | 24 | 50000 | 15 | 10 |
| 750 | 5 | 0 | 2600 | 11 | 6 | | | |
| 800 | 5 | 0 | 2700 | 9 | 4 | | | |
| 850 | 5 | 0 | 2800 | 29 | 24 | | | |
| 900 | 5 | 0 | 2900 | 10 | 5 | | | |
| 950 | 5 | 0 | 3000 | 10 | 5 | | | |
| 1000 | 6 | 1 | 3100 | 9 | 4 | | | |
| 1050 | 6 | 1 | 3200 | 29 | 24 | | | |
| 1060 | 6 | 1 | 3300 | 9 | 4 | | | |
| 1070 | 6 | 1 | 3400 | 9 | 4 | | | |
| 1080 | 6 | 1 | 3500 | 28 | 23 | | | |
| 1090 | 6 | 1 | 3600 | 9 | 4 | | | |
| 1100 | 6 | 1 | 3700 | 7 | 2 | | | |
| 1110 | 6 | 1 | 3800 | 9 | 4 | | | |
| 1120 | 6 | 1 | 3900 | 8 | 3 | | | |
| 1130 | 6 | 1 | 4000 | 8 | 3 | | | |

Notes:
ME - maximum elevation over all radials
HAB - height above flare base elevation

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3400. | 0.5838 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 207.53 | 72.61 | NO |

**********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 7. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3500. | 0.6135 | 4 | 20.0 | 21.6 | 6400.0 | 67.93 | 212.98 | 73.81 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3600. | 0.5547 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 218.42 | 75.00 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3700. | 0.5366 | 4 | 20.0 | 21.6 | 6400.0 | 74.33 | 223.84 | 76.18 | NO |

**********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3800. | 0.5274 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 229.25 | 77.34 | |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2900. | 0.6685 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 180.01 | 66.31 | NO |
| 3000. | 0.6512 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 185.55 | 67.66 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3100. | 0.6312 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 191.07 | 68.92 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 7. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3200. | 0.6711 | 4 | 20.0 | 21.6 | 6400.0 | 67.62 | 196.58 | 70.16 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3300. | 0.5991 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 202.06 | 71.39 | NO |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4300. | 0.4713 | 4 | 15.0 | 16.2 | 4800.0 | 96.62 | 256.57 | 84.59 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4400. | 0.4672 | 4 | 15.0 | 16.2 | 4800.0 | 96.01 | 261.88 | 85.68 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 3. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4500. | 0.4628 | 4 | 15.0 | 16.2 | 4800.0 | 95.40 | 267.18 | 86.75 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 4. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4600. | 0.4618 | 4 | 15.0 | 16.2 | 4800.0 | 94.18 | 272.47 | 87.82 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 4. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4700. | 0.4660 | 5 | 5.0 | 6.0 | 10000.0 | 132.24 | 209.83 | 63.92 | |

NO

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*********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 3900. | 0.5126 | 4 | 20.0 | 21.6 | 6400.0 | 74.02 | 234.64 | 78.50 | NO |
| 4000. | 0.5003 | 4 | 20.0 | 21.6 | 6400.0 | 74.02 | 240.01 | 79.65 | NO |

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*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4100. | 0.4917 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 245.38 | 80.78 | NO |

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*********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4200. | 0.4815 | 4 | 20.0 | 21.6 | 6400.0 | 73.11 | 250.72 | 81.91 | NO |

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*********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|

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*********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 7. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2500. | 0.8276 | 4 | 20.0 | 21.6 | 6400.0 | 67.62 | 157.67 | 60.75 | NO |

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*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
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*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2600. | 0.7267 | 4 | 20.0 | 21.6 | 6400.0 | 73.11 | 163.28 | 62.17 | NO |

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*********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2700. | 0.7003 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 168.88 | 63.56 | NO |

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*********************************
*** SCREEN DISCRETE DISTANCES ***
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*** TERRAIN HEIGHT OF 7. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2800. | 0.7560 | 4 | 20.0 | 21.6 | 6400.0 | 67.62 | 174.46 | 64.95 | NO |

NO

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**********************************
*** SCREEN DISCRETE DISTANCES ***
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```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2100. | 0.8131 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 134.99 | 54.92 | NO |

```
**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************
```

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2200. | 0.7901 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 140.69 | 56.41 | NO |

```
**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************
```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2300. | 0.7777 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 146.37 | 57.88 | NO |

```
**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************
```

*** TERRAIN HEIGHT OF 5. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 2400. | 0.8131 | 4 | 20.0 | 21.6 | 6400.0 | 70.06 | 152.03 | 59.32 | NO |

*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1750. | 0.8405 | 4 | 20.0 | 21.6 | 6400.0 | 74.33 | 114.83 | 49.56 | NO |

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1800. | 0.8281 | 4 | 20.0 | 21.6 | 6400.0 | 74.63 | 117.73 | 50.34 | NO |

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1850. | 0.8300 | 4 | 20.0 | 21.6 | 6400.0 | 74.33 | 120.62 | 51.12 | NO |
| 1900. | 0.8239 | 4 | 20.0 | 21.6 | 6400.0 | 74.33 | 123.51 | 51.89 | NO |

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1950. | 0.8306 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 126.39 | 52.66 | NO |
| 2000. | 0.8231 | 4 | 20.0 | 21.6 | 6400.0 | 73.72 | 129.26 | 53.42 | |

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1250. | 0.8819 | 1 | 2.0 | 2.1 | 687.6 | 686.60 | 315.52 | 751.51 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1300. | 0.8697 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 88.45 | 42.22 | NO |
| 1350. | 0.8749 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 91.41 | 43.06 | NO |
| 1400. | 0.8782 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 94.36 | 43.90 | NO |
| 1450. | 0.8799 | 4 | 20.0 | 21.6 | 6400.0 | 73.41 | 97.31 | 44.73 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1500. | 0.8334 | 4 | 20.0 | 21.6 | 6400.0 | 74.94 | 100.25 | 45.55 | NO |
| 1550. | 0.8339 | 4 | 20.0 | 21.6 | 6400.0 | 74.94 | 103.18 | 46.36 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1600. | 0.8418 | 4 | 20.0 | 21.6 | 6400.0 | 74.63 | 106.10 | 47.17 | NO |
| 1650. | 0.8397 | 4 | 20.0 | 21.6 | 6400.0 | 74.63 | 109.02 | 47.97 | NO |
| 1700. | 0.8366 | 4 | 20.0 | 21.6 | 6400.0 | 74.63 | 111.93 | 48.77 | NO |

```
*********************************
```

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1000. | 0.8702 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 263.76 | 481.65 | NO |
| 1050. | 0.9094 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 274.28 | 530.09 | NO |
| 1060. | 0.9140 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 276.37 | 540.11 | NO |
| 1070. | 0.9176 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 278.46 | 550.23 | NO |
| 1080. | 0.9203 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 280.55 | 560.47 | NO |
| 1090. | 0.9221 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 282.63 | 570.82 | NO |
| 1100. | 0.9232 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 284.71 | 581.28 | NO |
| 1110. | 0.9235 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 286.79 | 591.85 | NO |
| 1120. | 0.9231 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 288.86 | 602.53 | NO |
| 1130. | 0.9222 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 290.93 | 613.33 | NO |
| 1140. | 0.9206 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 293.00 | 624.23 | NO |
| 1150. | 0.9186 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 295.06 | 635.24 | NO |
| 1160. | 0.9161 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 297.12 | 646.37 | NO |
| 1170. | 0.9133 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 299.17 | 657.61 | NO |
| 1180. | 0.9100 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 301.23 | 668.95 | NO |
| 1190. | 0.9065 | 1 | 2.0 | 2.1 | 688.5 | 687.52 | 303.28 | 680.41 | NO |

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 1200. | 0.9031 | 1 | 2.0 | 2.1 | 688.2 | 687.21 | 305.33 | 691.98 | NO |

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|

NO

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 150. | 0.6559E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.28 | 47.02 | NO |
| 175. | 0.6603E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.40 | 47.05 | NO |
| 200. | 0.6651E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.54 | 47.08 | NO |
| 225. | 0.6700E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.69 | 47.12 | NO |
| 250. | 0.6752E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.85 | 47.16 | NO |
| 275. | 0.6807E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 48.04 | 47.20 | NO |
| 300. | 0.6864E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 48.23 | 47.24 | NO |
| 325. | 0.6923E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 48.44 | 47.28 | NO |
| 350. | 0.6985E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 48.66 | 47.33 | NO |
| 375. | 0.7050E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 48.89 | 47.38 | NO |
| 400. | 0.7117E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 49.13 | 47.43 | NO |
| 425. | 0.7186E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 49.39 | 47.48 | NO |
| 450. | 0.7258E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 49.66 | 47.54 | NO |
| 475. | 0.7331E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 49.94 | 47.59 | NO |
| 500. | 0.7408E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 50.23 | 47.65 | NO |
| 550. | 0.7567E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 50.84 | 47.77 | NO |
| 600. | 0.1023 | 4 | 20.0 | 21.6 | 6400.0 | 74.94 | 44.11 | 23.90 | NO |
| 650. | 0.2086 | 1 | 3.0 | 3.1 | 960.0 | 464.14 | 163.87 | 199.41 | NO |
| 700. | 0.3312 | 1 | 3.0 | 3.1 | 960.0 | 464.14 | 174.31 | 229.55 | NO |
| 750. | 0.4417 | 1 | 3.0 | 3.1 | 960.0 | 464.14 | 184.62 | 262.34 | NO |
| 800. | 0.5235 | 1 | 3.0 | 3.1 | 960.0 | 464.14 | 194.84 | 297.79 | NO |
| 850. | 0.5724 | 1 | 3.0 | 3.1 | 960.0 | 464.14 | 204.95 | 335.90 | NO |
| 900. | 0.6936 | 1 | 2.0 | 2.1 | 688.8 | 687.82 | 242.43 | 393.02 | NO |
| 950. | 0.7985 | 1 | 2.0 | 2.1 | 688.8 | 687.82 | 253.14 | 435.97 | NO |

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 8500. | 0.5174 | 5 | 2.0 | 2.4 | 10000.0 | 178.06 | 355.07 | 86.38 | NO |
| 9000. | 0.5256 | 5 | 1.5 | 1.8 | 10000.0 | 194.42 | 373.95 | 90.73 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 8. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 9500. | 0.6179 | 5 | 1.5 | 1.8 | 10000.0 | 188.02 | 392.09 | 92.46 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 10000. | 0.5476 | 5 | 1.5 | 1.8 | 10000.0 | 194.11 | 410.12 | 94.15 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 8. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 15000. | 0.6571 | 5 | 1.0 | 1.2 | 10000.0 | 213.60 | 586.31 | 112.04 | |

NO

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 3. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 20000. | 0.6010 | 5 | 1.0 | 1.2 | 10000.0 | 218.48 | 754.59 | 123.97 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 3. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 25000. | 0.5590 | 5 | 1.0 | 1.2 | 10000.0 | 218.78 | 917.53 | 132.49 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 30000. | 0.5171 | 5 | 1.0 | 1.2 | 10000.0 | 219.39 | 1076.13 | 140.11 | NO |
| 35000. | 0.4822 | 5 | 1.0 | 1.2 | 10000.0 | 219.39 | 1231.11 | 147.05 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 5. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 40000. | 0.4608 | 5 | 1.0 | 1.2 | 10000.0 | 216.95 | 1382.96 | 153.45 |

NO

********************************
*** SCREEN DISCRETE DISTANCES ***
********************************

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 45000. | 0.4188 | 5 | 1.0 | 1.2 | 10000.0 | 219.39 | 1532.07 | 158.11 | NO |

********************************
*** SCREEN DISCRETE DISTANCES ***
********************************

*** TERRAIN HEIGHT OF 3. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 50000. | 0.3943 | 5 | 1.0 | 1.2 | 10000.0 | 218.48 | 1678.74 | 162.44 | NO |

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*********************************************
* SUMMARY OF TERRAIN HEIGHTS ENTERED FOR *
* SIMPLE ELEVATED TERRAIN PROCEDURE *
*********************************************

| TERRAIN HT (M) | DISTANCE RANGE (M) MINIMUM | MAXIMUM |
|---|---|---|
| 5. | 7500. | -- |
| 2. | 8000. | -- |
| 1. | 8500. | -- |
| 1. | 9000. | -- |
| 8. | 9500. | -- |
| 2. | 10000. | -- |
| 0. | 15000. | -- |
| 3. | 20000. | -- |
| 3. | 25000. | -- |
| 2. | 30000. | -- |
| 2. | 35000. | -- |
| 5. | 40000. | -- |
| 2. | 45000. | -- |
| 3. | 50000. | -- |

```
***************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
***************************************
```

| CALCULATION PROCEDURE | MAX CONC (UG/M**3) | DIST TO MAX (M) | TERRAIN HT (M) |
|---|---|---|---|
| SIMPLE TERRAIN | 0.6571 | 15000. | 8. |

# DOCUMENT 4

## SUPPLEMENTAL EMISSION UNIT INFORMATION

## MANUFACTURER SPECIFICATIONS

# TECHNICAL DATA
## EF1355I16

A. Required LFG pressure -- 10 in. W.C.

B. Retention times at operating temperatures, 6000 SCFM design flow and 50% methane content --

1400°F – 1.012 sec.
1600°F – 1.069 sec.
1800°F – 1.120 sec.
2000°F – 1.173 sec.

C. Percent excess air (approximate) at operating temperatures --

1400°F - 230%
1600°F - 178%
1800°F - 140%
2000°F - 108%

D. Stack effluent (calculated) at design flow and 30% CH4

| | | Operating Temperatures | | | |
|---|---|---|---|---|---|
| | | 1400°F | 1600°F | 1800°F | 2000°F |
| Flow | MMSCFD | 144.67 | 123.38 | 107.35 | 94.18 |
| $N_2$ | % vol. | 73.5 | 72.7 | 71.9 | 71.0 |
| $O_2$ | % vol. | 13.6 | 12.3 | 11.1 | 9.7 |
| $CO_2$ | % vol. | 6.0 | 7.0 | 8.0 | 9.2 |
| $H_2O$ | % vol. | 6.9 | 8.0 | 9.0 | 10.1 |
| | TOTAL | 100.0 | 100.0 | 100.0 | 100.0 |

E. Emissions (expected) design operating temperature

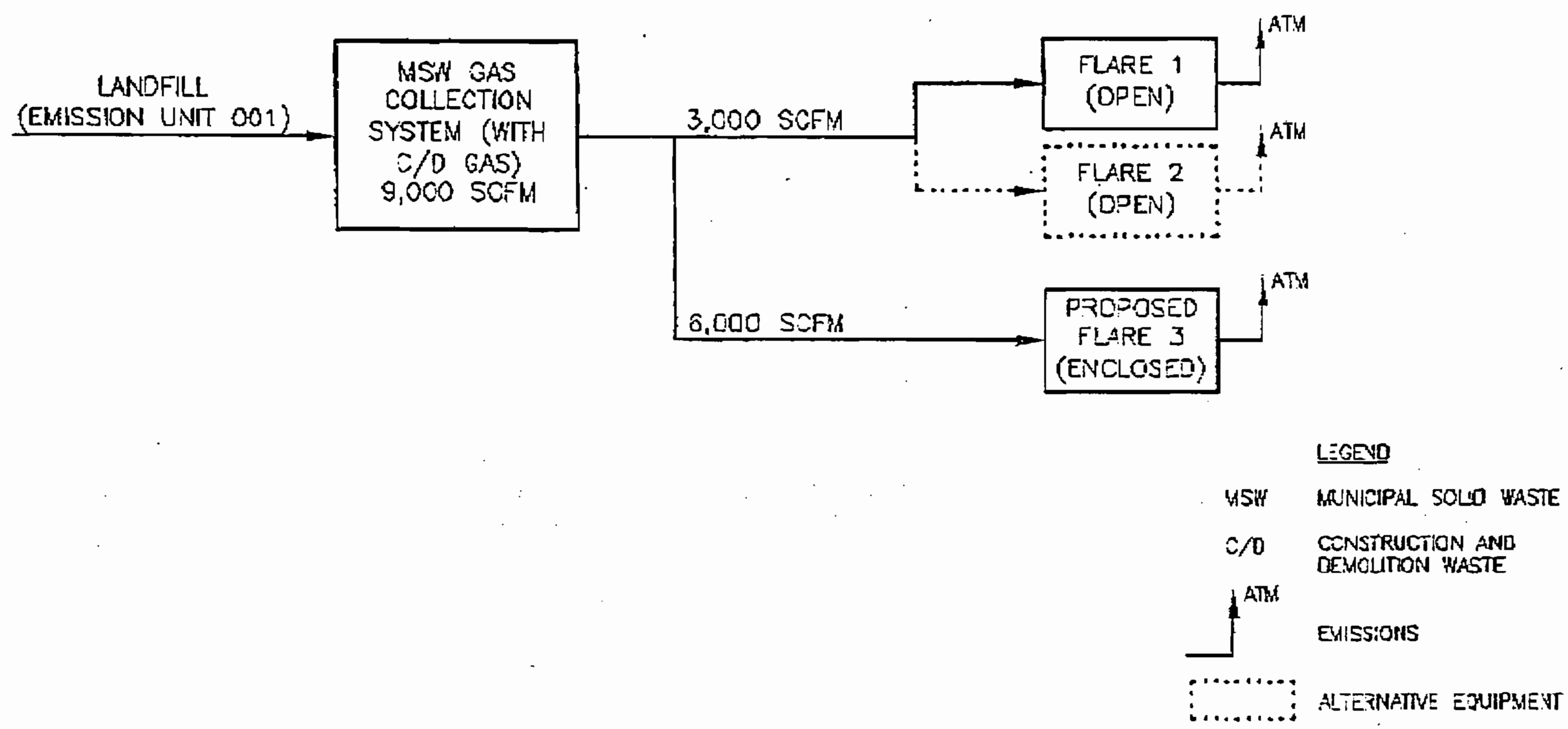
| | 1600°F |
|---|---|
| $NO_2$ | 0.06 lbs/MMBtu |
| CO | 0.20 lbs/MMBtu |
| HCl | Trace |
| $SO_2$ | # of moles S in = # of moles $SO_2$ out |

# DOCUMENT 3

# SUPPLEMENTAL FACILITY INFORMATION

# PROCESS DIAGRAM

XREF Files: cnmsbd02 IMAGE Files:
File: N:\dwg\medley\cnmer-01.dwg Layout: Doc 3 User: jodonnell Oct 08, 2002 - 3:06pm




Shaw™ EMCON/OWT, Inc.

DATE 10/8/02
DWN JOD
APP
REV
PROJECT NO. 840138

**DOCUMENT 3**
WASTE MANAGEMENT, INC.
MEDLEY LANDFILL
MEDLEY, FLORIDA
**APPLICATION FOR FLARE 3 AIR PERMIT**
**PROCESS FLOW DIAGRAM**

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

11. Alternative Methods of Operation
    [ ] Attached, Document ID:________ [X] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
    [ ] Attached, Document ID:________ [X] Not Applicable

13. Identification of Additional Applicable Requirements
    [ ] Attached, Document ID:___6_____ [X] Not Applicable

14. Compliance Assurance Monitoring Plan
    [ ] Attached, Document ID:________ [X] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

    [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
    Attached, Document ID:________

    [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
    Attached, Document ID:________

    [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
    Attached, Document ID:________

    [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
    Attached, Document ID:________

    [ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
    Attached, Document ID:________

    [ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
    Attached, Document ID:________

    [X] Not Applicable

# DOCUMENT 1

## SUPPLEMENTAL FACILITY INFORMATION

## AREA MAP

## H. VISIBLE EMISSIONS INFORMATION
**(Only Regulated Emissions Units Subject to a VE Limitation)**

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 1

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE20** | 2. Basis for Allowable Opacity: [X] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: **20%** Exceptional Conditions: **20%**<br>Maximum Period of Excess Opacity Allowed: **5 min/hour** | |
| 4. Method of Compliance: EPA Method 9, 22 or equivalent | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
**(Only Regulated Emissions Units Subject to Continuous Monitoring)**

**Continuous Monitoring System:** Continuous Monitor ____ of ____

| | |
|---|---|
| 1. Parameter Code: **N/A** | 2. Pollutant(s): **N/A** |
| 3. CMS Requirement: [ ] Rule [ ] Other | |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

# J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements**

| | |
|---|---|
| 1. | Process Flow Diagram<br>[X] Attached, Document ID: 3 [ ] Not Applicable [ ] Waiver Requested |
| 2. | Fuel Analysis or Specification<br>[ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested |
| 3. | Detailed Description of Control Equipment<br>[X] Attached, Document ID: 4 [ ] Not Applicable [ ] Waiver Requested |
| 4. | Description of Stack Sampling Facilities<br>[X] Attached, Document ID: 4 [ ] Not Applicable [ ] Waiver Requested |
| 5. | Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ ] Previously submitted, Date:________<br>[X] Not Applicable |
| 6. | Procedures for Startup and Shutdown<br>[ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested |
| 7. | Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ ] Not Applicable [X] Waiver Requested |
| 8. | Supplemental Information for Construction Permit Application<br>[X] Attached, Document ID: 5 [ ] Not Applicable |
| 9. | Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 10. | Supplemental Requirements Comment:<br>**4.** Specifications and Drawings for LFG Specialties Inc. Enclosed Flare Model EF5513I16; includes sampling port information. Actual flare may be equivalent, by different manufacturer<br>**5.** Emission calculations<br>**6.** PSD evaluation (see #13 below, additional NA requirements) |

**Emissions Unit Information Section __G__ of ____**

**Pollutant Detail Information Page ____ of ____**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **HAPS** | 3. Total Percent Efficiency of Control: Approx. 98% |
| 3. Potential Emissions: **1.46 lb/hour** 6.40 **tons/year** | 4. Synthetically Limited? [ **No** ] |
| 5. Range of Estimated Fugitive Emissions: NA<br>[ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year | |
| 6. Emission Factor: **HAP concentrations and reduction**<br>**Reference: AP-42** | 7. Emissions Method Code: **4** |
| 8. Calculation of Emissions (limit to 600 characters):<br>See attached calculation page in Document 5 | |
| 10. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions ____ of ____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code:<br>N/A | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions:<br>lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

**Emissions Unit Information Section ___G___ of ______**

**Pollutant Detail Information Page ______ of ______**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **NMOC** | 2. Total Percent Efficiency of Control: **98%** |
| 3. Potential Emissions: **0.95 lb/hour** **1.63 tons/year** | 4. Synthetically Limited? [ No ] |
| 5. Range of Estimated Fugitive Emissions: NA [ ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year | |
| 6. Emission Factor: **MSW Landfill** **Reference: AP-42** | 7. Emissions Method Code: **4** |
| 8. Calculation of Emissions (limit to 600 characters): See attached calculation pages in Document 5 | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions ______ of ______

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **40 CFR 60 WWW** | 2. Future Effective Date of Allowable Emissions: NA |
| 3. Requested Allowable Emissions and Units: **20 PPM NMOC** | 4. Equivalent Allowable Emissions: **0.95 lb/hour 4.17 tons/year** |
| 5. Method of Compliance (limit to 60 characters): **initial performance test** | |

**Emissions Unit Information Section __G__ of ______**

**Pollutant Detail Information Page ______ of ______**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **VOC** | 2. Total Percent Efficiency of Control: 98% |
| 3. Potential Emissions: **0.37 lb/hour** **1.63 tons/year** | 4. Synthetically Limited? [ No ] |
| 5. Range of Estimated Fugitive Emissions: NA [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year | |
| 6. Emission Factor: **Flare Data** **Reference: AP-42** | 7. Emissions Method Code: 4 |
| 8. Calculation of Emissions (limit to 600 characters): See attached calculation page in Document 5 | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions ______ of ______

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: N/A | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

**Emissions Unit Information Section** ___G___ **of** ______

**Pollutant Detail Information Page** ______ **of** ______

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | 2. Total Percent Efficiency of Control: **None** |
| 3. Potential Emissions: **39.6 lb/hour** 173.45 **tons/year** | 4. Synthetically Limited? [ **No** ] |
| 5. Range of Estimated Fugitive Emissions: NA [ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year | |
| 6. Emission Factor: **0.2 lb/MMbtu** **Reference: Manufacturer guarantee** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): See attached calculation page in Document 5 | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions ______ of ______

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **N/A** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

**Emissions Unit Information Section** G **of** ____

**Pollutant Detail Information Page** ______ **of** ______

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$SO_2$** | 2. Total Percent Efficiency of Control: **None** |
| 3. Potential Emissions: 86 lb/hour **380** tons/year | 4. Synthetically Limited? [ No ] |
| 5. Range of Estimated Fugitive Emissions: [N/A ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year | |
| 6. Emission Factor: 100 % conversion of H2S to SO2<br>Reference: gas analysis | 7. Emissions Method Code: **2** |
| 8. Calculation of Emissions (limit to 600 characters):<br>SO2 (lb/hr) = H2S conc (ppmv) * MW H2S * scfm * 60 / (R * Temp) * (MW SO2/ MW H2s)<br>See attached calculation page in Document 5 | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):<br>$SO_2$ emissions are dependent on $H_2S$ concentration in LFG; no SO2 in LFG | |

**Allowable Emissions** Allowable Emissions ______ of ______

| | |
|---|---|
| 1. Basis for Allowable Emissions Code:<br>N/A | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions:<br>lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

**Emissions Unit Information Section __G__ of ____**

**Pollutant Detail Information Page ____ of ____**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **NOx** | 2. Total Percent Efficiency of Control: N/A |
| 3. Potential Emissions: **13.5** lb/hour **59** tons/year | 4. Synthetically Limited? [ No] |
| 5. Range of Estimated Fugitive Emissions: NA [ N/A ] 1 [ ] 2 [ ] 3 ____ to ____ tons/year | |
| 6. Emission Factor: **0.06** lb/MMBtu<br>Reference: Manufacturer guarantee | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters):<br>See attached calculation page in Document 5 | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions ____ of ____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: N/A | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

**Emissions Unit Information Section __E__ of ____**

## E. SEGMENT (PROCESS/FUEL) INFORMATION
**(All Emissions Units)**

**Segment Description and Rate:** Segment _1__ of _1___

1. Segment Description (Process/Fuel Type) (limit to 500 characters):

Municipal Solid Waste Disposal - Landfill waste gas collection system and destruction - flares

| | | |
|---|---|---|
| 2. Source Classification Code (SCC): **5-01-004-10** | 3. SCC Units: **million cubic feet burned** | |
| 3. Maximum Hourly Rate: **0.360** | 1. Maximum Annual Rate: **3154** | 6. Estimated Annual Activity Factor: **100 %** |
| 4. Maximum % Sulfur: **0.014 %** | 7. Maximum % Ash: **< 0.1** | 7. Btu per SCC Unit: **530 / cf (typical)** |

10. Segment Comment (limit to 200 characters):

LFG: approximately 50-55% methane; 45-50 % CO2; trace other constituents

**Segment Description and Rate:** Segment _____ of _____

1. Segment Description (Process/Fuel Type ) (limit to 500 characters):

**N/A**

| | | |
|---|---|---|
| 2. Source Classification Code (SCC): | 3. SCC Units: | |
| 4. Maximum Hourly Rate: | 5. Maximum Annual Rate: | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: |

10. Segment Comment (limit to 200 characters):

**Emissions Unit Information Section F of ____**

## F. EMISSIONS UNIT POLLUTANTS
## (All Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| $SO_2$ | None | None | NS |
| NMOC | 021 | None | EL |
| NOx | None | None | NS |
| CO | None | None | NS |
| HAPS | 021 | None | NS |
| PM10 | None | None | NS |
| PM | None | None | NS |
| VOC | 021 | None | NS |
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Emissions Unit Information Section ___C___ of ______

## C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

**List of Applicable Regulations**

| | |
|---|---|
| 40 CFR 60 -- Subpart WWW | Federal Requirements of NSPS for Subtitle D landfills |
| FAC 62-210.300 | State Permit Requirements |
| F.A.C. Rule 62-297.310(8) | State Test Report Requirements (from Title V Permit) |
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## D. EMISSION POINT (STACK/VENT) INFORMATION
### (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | |
|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram? **Proposed Enclosed Flare - "Flare 3"** | 2. Emission Point Type Code: 3 |

2. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):

**Enclosed Flare 3 (used in conjunction with Flares 1 and 2)**

3. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:
**EU 001 only**

| | | |
|---|---|---|
| 5. Discharge Type Code: **V** (vertical) | 6. Stack Height: **55** feet | 7. Exit Diameter: **13** feet outer diameter |
| 8. Exit Temperature: **1,600** °F | 9. Actual Volumetric Flow Rate: **350,000** acfm | 10. Water Vapor: **approx 8%** |

| | |
|---|---|
| 11. Maximum Dry Standard Flow Rate: **90,000** dscfm | 12. Nonstack Emission Point Height: N/A feet |

13. Emission Point UTM Coordinates:

Zone: 17 East (km): **565.04** North (km): **2860.02**

14. Emission Point Comment (limit to 200 characters):

**Emissions Unit Control Equipment**

| |
|---|
| 1. Control Equipment/Method Description (Limit to 200 characters per device or method):<br><br>The proposed enclosed flare (Flare 3) is a control device for the LFG generated by the Class I and C&D landfill. Specifications are provided in the Document 4 attachment. |
| 2. Control Device or Method Code(s): **023 (Flaring)** |

**Emissions Unit Details**

| |
|---|
| 1. Package Unit: **Utility Flare**<br>Manufacturer: **Landfill Gas Specialties or eq.** **Model Number: EF1355116 or equiv.** |
| 2. Generator Nameplate Rating: **None** MW N/A |
| 3. Incinerator Information: **N/A**<br>Dwell Temperature: °F<br>Dwell Time: seconds<br>Incinerator Afterburner Temperature: °F |

## B. EMISSIONS UNIT CAPACITY INFORMATION
### (Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | | |
|---|---|---|---|---|
| 1. Maximum Heat Input Rate: | | | 180,000,000 | mmBtu/hr |
| 2. Maximum Incineration Rate: N/A | lb/hr | | N/A | tons/day |
| 3. Maximum Process or Throughput Rate: 6000 scfm | | | | |
| 4. Maximum Production Rate: 6000 scfm | | | | |
| 5. Requested Maximum Operating Schedule: 24 hours/day; 7 days/week; 52 (or as required) weeks/year; 8,760 hours/year | | | | |
| 6. Operating Capacity/Schedule Comment (limit to 200 characters): The proposed enclosed flare will be the primary control device. The other control flares will also be operated (as needed) to provide continuous LFG control of all collected gas. | | | | |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

| |
|---|
| 8. List of Proposed Insignificant Activities:<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 9. List of Equipment/Activities Regulated under Title VI:<br>[ ] Attached, Document ID:________<br>[ ] Equipment/Activities On site but Not Required to be Individually Listed<br>[X] Not Applicable |
| 10. Alternative Methods of Operation:<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading):<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 12. Identification of Additional Applicable Requirements:<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 13. Risk Management Plan Verification:<br>[ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:________) or previously submitted to DEP (Date and DEP Office:________________)<br>[ ] Plan to be submitted to CEPPO (Date required:________________)<br>[X] Not Applicable |
| 14. Compliance Report and Plan:<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 15. Compliance Certification (Hard-copy Required):<br>[ ] Attached, Document ID:________ [X] Not Applicable |

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**Emissions Unit Description and Status**

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Enclosed flare to combust LFG from Emission Unit 1.

4. Emissions Unit Identification Number: [ 001 ] No ID [ ] ID Unknown

| | | | |
|---|---|---|---|
| 5. Emissions Unit Status Code: **A** | 6. Initial Startup Date: **1/1/03** | 7. Emissions Unit Major Group SIC Code: **49** | 8. Acid Rain Unit? [No] |

8. Emissions Unit Comment: (Limit to 500 Characters)

Additional control flare for Emission Unit 1 – the landfill and its collection and control system (GCCS), which has been in operation for more than 10 years.

## B. FACILITY POLLUTANTS

**List of Pollutants Emitted**

| 1. Pollutant Emitted | 2. Pollutant Classif. | 3. Requested Emissions Cap lb/hour | tons/year | 4. Basis for Emissions Cap | 5. Pollutant Comment |
|---|---|---|---|---|---|
| SO2 | A | Not Requested. * | | | * Note: LFG from Medley Landfill (Emission Unit is required to collect and control gas generated.) |
| NMOC | B | | | | |
| NO2 | B | | | | |
| CO | A | | | | |
| PM10 | B | | | | |
| HAP | B | | | | |
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## C. FACILITY SUPPLEMENTAL INFORMATION

**Supplemental Requirements**

| | |
|---|---|
| 1. | Area Map Showing Facility Location:<br>[X] Attached, Document ID: _1___ [ ] Not Applicable [ ] Waiver Requested |
| 2. | Facility Plot Plan:<br>[X] Attached, Document ID: _2__ [ ] Not Applicable [ ] Waiver Requested |
| 3. | Process Flow Diagram(s):<br>[X] Attached, Document ID: _3__ [ ] Not Applicable [ ] Waiver Requested |
| 4. | Precautions to Prevent Emissions of Unconfined Particulate Matter:<br>[ ] Attached, Document ID: ____ [X] Not Applicable [ ] Waiver Requested |
| 5. | Fugitive Emissions Identification:<br>[ ] Attached, Document ID:____ [X] Not Applicable [ ] Waiver Requested |
| 6. | Supplemental Information for Construction Permit Application:<br>[ ] Attached, Document ID: _____ [X] Not Applicable |
| 7. | Supplemental Requirements Comment:<br><br>Supplemental requirements are also on file with the existing Title V permit for the facility.<br><br>Equipment information and emission calculations are included as documents 4 and 5 in Section J: Emission Unit Supplemental Information. |

# II. FACILITY INFORMATION

## A. GENERAL FACILITY INFORMATION

**Facility Location and Type**

| | | | |
|---|---|---|---|
| 1. Facility UTM Coordinates:<br>Zone: **17** | East (km): **565.04** | North (km): **2860.02** | |
| 2. Facility Latitude/Longitude:<br>Latitude (DD/MM/SS): **25/51/55 N** | | Longitude (DD/MM/SS): **80/20/80W** | |
| 3. Governmental Facility Code:<br>**0** | 4. Facility Status Code:<br>**A** | 5. Facility Major Group SIC Code:<br>**49** | 6. Facility SIC(s):<br>**4953** |
| 7. Facility Comment (limit to 500 characters):<br><br>This facility consists of a Class 1 and C&D landfill with an active gas collection and control system (GCCS) | | | |

**Facility Contact**

| |
|---|
| 1. Name and Title of Facility Contact: **Bryan Tindell** |
| 2. Facility Contact Mailing Address: Medley Landfill and Recycling Facility<br>Organization/Firm: **Waste Management, Inc. of Florida**<br>Street Address: **9350 N.W. 89th Ave.**<br>City: **Medley** State: **FL** Zip Code: **33178** |
| 3. Facility Contact Telephone Numbers:<br>Telephone: **(305) 883-7670** Fax: **(305) 883-9758** |

**Facility Regulatory Classifications**

**Check all that apply:**

| | |
|---|---|
| 1. [ ] Small Business Stationary Source? | [ ] Unknown |
| 2. [ X ] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)? | |
| 3. [ ] Synthetic Minor Source of Pollutants Other than HAPs? | |
| 4. [ ] Major Source of Hazardous Air Pollutants (HAPs)? | |
| 5. [ ] Synthetic Minor Source of HAPs? | |
| 6. [ X ] One or More Emissions Units Subject to NSPS? | |
| 7. [ X ] One or More Emission Units Subject to NESHAP? | |
| 8. [ X ] Title V Source by EPA Designation? | |
| 9. Facility Regulatory Classifications Comment (limit to 200 characters):<br><br>The facility consists of a Class I and C&D landfill.<br><br>This existing major facility (Title V) is subject to the 40CFR60 Subpart WWW NSPS and the asbestos NESHAPS. | |

**List of Applicable Regulations**

| | |
|---|---|
| FAC 62-210.300 | State Permits Required |
| FAC 62-4 | Permitting |
| FAC 62-213 | Title V Operating Permits |
| FAC 62-210.400-2(c) | Prevention of Significant Deterioration exemptions |
| 40 CFR 61 Subpart M | National Emission Standards for Hazardous Air Pollutants (Asbestos Disposal) |
| 40 CFR 60 - Subpart WWW | Federal Requirements of NSPS for Subtitle D landfills |
| | |
| | |
| | |

**Scope of Application**

| Emissions Unit ID | Description of Emissions Unit | Permit Type | Processing Fee |
|---|---|---|---|
| 001 | **Landfill with Gas Collection and Control (GCCS) System** | AC1B | 0 |
| | The 160 acre landfill and gas collection system of the Medley Landfill and Recycling Center (MLRC) which accepts MSW and C&D.<br>This construction application is for an additional enclosed flare (odor and pollution control device). | | |
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**Application Processing Fee**

Check one: [ ] Attached - Amount: $____________ [X] Not Applicable

## Construction/Modification Information

| |
|---|
| 1. Description of Proposed Project or Alterations:<br><br>A new enclosed flare will be added to the landfill gas (LFG) collection and control system to improve the system's potential for collecting and destroying landfill gas generated.<br><br>The flare will be an enclosed flare capable of combusting landfill gas at a flow of 6000 standard cubic feet per minute (SCFM) as manufactured by Landfill Gas Specialties, Inc. Enclosed Flare Model EF1355I16 unit or equivalent. Typical specifications for the unit are provided as an attachment (Document 3) to this application. |
| 2. Projected or Actual Date of Commencement of Construction: **January 1, 2003** |
| 3. Projected Date of Completion of Construction: **February 28, 2003** |

## Application Comment

This project will expand the control capability of the existing landfill gas collection and control system (GCCS). The GCCS was originally designed with a 3,000 cfm utility (open) flare, which was expected to abate the gas flow from a perimeter gas collection system.

This additional 6,000 cfm enclosed flare (Flare 3) will provide enough capacity to accommodate the future gas generation rate. It will have a meet the NSPS requirement for 98 percent destruction efficiency (or emissions of 20 ppmv) for organic compounds, will control potentially odorous vapors, and is designed to emit lower levels of combustion pollutants than a utility flare.

The maximum gas collection rate in the peak year is expected to be less than 9,000 cfm. The facility will have back-up equipment capacity after Enclosed Flare 3 is installed.

**Owner/Authorized Representative or Responsible Official**

| | |
|---|---|
| 1. | Name and Title of Owner/Authorized Representative or Responsible Official: |
| 2. | Owner/Authorized Representative or Responsible Official Mailing Address:<br>Organization/Firm: **Waste Management, Inc. of Florida**<br>Street Address: **9350 N.W. 89th Ave.**<br>City: **Medley** State: **FL** Zip Code: **33178** |
| 3. | Owner/Authorized Representative or Responsible Official Telephone Numbers:<br>Telephone: **(305) 883-7670** Fax: **(305) 883-9758** |
| 4. | Owner/Authorized Representative or Responsible Official Statement:<br>*I, the undersigned, am the owner or authorized representative*(check here [ ], if so) or the responsible official (check here [ ], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*<br>[signature] 10/28/02<br>Signature Date |

* Attach letter of authorization if not currently on file.

**Professional Engineer Certification**

| | |
|---|---|
| 1. | Professional Engineer Name: (SEE NEXT PAGE FOR PE CERTIFICATION)<br>Registration Number: |
| 2. | Professional Engineer Mailing Address:<br>Organization/Firm:<br>Street Address:<br>City: State: Zip Code: |
| 3. | Professional Engineer Telephone Numbers:<br>Telephone: ( ) - Fax: ( ) - |

**Professional Engineer Certification**

1. Professional Engineer Name: **Juene Franklin**
   Registration Number: **58943**

2. Professional Engineer Mailing Address:
   Organization/Firm: **EMCON/ OWT, Inc**
   Street Address: **13111 Northwest Freeway**
   City: **Houston** State: **Texas** Zip Code: **77040-6392**

3. Professional Engineer Telephone Numbers:
   Telephone: (713)996-4400 Fax: (713) 329-9163

4. Professional Engineer Statement:

*I, the undersigned, hereby certify, except as particularly noted herein*, that:*

*(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*

*(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*

*If the purpose of this application is to obtain a Title V source air operation permit (check here [ ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.*

*If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X ], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

*If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*

Juene Franklin 10/24/02

Signature Date

(seal)

## Purpose of Application

**Air Operation Permit Application**

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number: ______________________

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: ______________________

Operation permit number to be revised: ______________________

[ ] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected: ______________________

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised: ______________________

Reason for revision: ______________________

**Air Construction Permit Application**

This Application for Air Permit is submitted to obtain: (Check one)

[X] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

**Owner/Authorized Representative or Responsible Official**

| | |
|---|---|
| 1. | Name and Title of Owner/Authorized Representative or Responsible Official:<br>John Casagrande, Area Vice President |
| 2. | Owner/Authorized Representative or Responsible Official Mailing Address:<br>Organization/Firm: **Waste Management, Inc. of Florida**<br>Street Address: **9350 N.W. 89th Ave.**<br>City: **Medley** State: **FL** Zip Code: **33178** |
| 3. | Owner/Authorized Representative or Responsible Official Telephone Numbers:<br>Telephone: **(305) 883-7670** Fax: **(305) 883-9758** |
| 4. | Owner/Authorized Representative or Responsible Official Statement:<br>*I, the undersigned, am the owner or authorized representative*(check here [ ], if so) or the responsible official (check here [ ], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*<br><br>Signature Date |

* Attach letter of authorization if not currently on file.

# 1 APPLICATION FORMS

# Department of Environmental Protection

## Division of Air Resources Management

RECEIVED
NOV 07 2002
Air Quality Management Division

## APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

## I. APPLICATION INFORMATION

**Identification of Facility**

| | |
|---|---|
| 1. Facility Owner/Company Name: **Waste Management, Inc. of Florida** | |
| 2. Site Name: **Medley Landfill and Recycling Center** | |
| 3. Facility Identification Number: **0250615** [ ] Unknown | |
| 4. Facility Location: **Medley Landfill**<br>Street Address or Other Locator: **9350 N.W. 89th Ave.**<br>City: **Medley, FL** County: **Miami-Dade** Zip Code: **33178** | |
| 5. Relocatable Facility?<br>[ ] Yes [X] No | 6. Existing Permitted Facility?<br>[X] Yes [ ] No |

**Application Contact**

| |
|---|
| 1. Name and Title of Application Contact: **Bryan Tindell, Engineer** |
| 2. Application Contact Mailing Address:<br>Organization/Firm: **Waste Management, Inc. of Florida**<br>Street Address: **9350 N.W. 89th Ave.**<br>City: **Medley** State: **FL** Zip Code: **33178** |
| 3. Application Contact Telephone Numbers:<br>Telephone: (305)883-7670 Fax: (305) 883-9758 |

**Application Processing Information (DEP Use)**

| | |
|---|---|
| 1. Date of Receipt of Application: | |
| 2. Permit Number: | |
| 3. PSD Number (if applicable): | |
| 4. Siting Number (if applicable): | |

# APPLICATION FOR AUTHORITY TO CONSTRUCT ENCLOSED FLARE 3

## MEDLEY LANDFILL AND RECYCLING CENTER

## MEDLEY, FLORIDA

There is a flare option in screen Why did you bypass that Short-term peak? Did they do an annual avg hourly or a real short term

Prepared for

Waste Management, Inc.

October 2002

Puffat 24
Soc 2241
Puffat 3
Puffso2.21P
Pufcar 24

Prepared by

EMCON/OWT, INC.
3 Riverside Drive
Andover, MA 01810-1121

Shaw EMCON/OWT, Inc.

# CONTENTS

## MEDLEY LANDFILL AND RECYCLING CENTER

## PROPOSED FLARE 3

# APPENDIX B

# BACKUP INFORMATION

must use FLARE option
50km or beyond
CALPUFF

Sources

**SCREEN3 Modeling**
**Modeling Results - PSD**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

Dilution Factor[a,b] 0.9235 µg/m³/g/s — Dilution Factor[a,c] 0.6571

Is the factor 1 hour or 24 hour? 1 hr[c] — Simple Terrain

Annual operation[e] 8,760 hr/yr

**Criteria Pollutants**

| Pollutant | Emission Rates[b] | | | Averaging Period (hr) | Maximum Modeled Concentrations (µg/m³)[b,c] | | SIL (µg/m³) | PSD Increments (µg/m³) | |
|---|---|---|---|---|---|---|---|---|---|
| | TPY | lb/hr | g/s | | Over All Receptors | Within Class I Area | | Class I | Class II |
| $NO_2$ | 59.0 | 13.5 | 1.70 | Annual | 0.13 | 0.09 | 1 | 2.5 | 25 |
| $SO_2$ | 370 | 84.4 | 10.6 | 3 | 8.84 | 6.29 | 25 | 25 | 512 |
| | | | | 24 | 3.95 | 2.79 | 5 | 5 | 91 |
| | | | | Annual | 0.79 | 0.56 | 1 | 2 | 20 |
| CO | 173 | 39.6 | 4.99 | 1 | 4.61 | 3.28 | 2,000 | – | – |
| | | | | 8 | 3.23 | 2.30 | 500 | – | – |
| $PM_{10}$ | 7.67 | 1.75 | 0.22 | 24 | 0.06 | 0.06 | 5 | 8 | 30 |
| | | | | Annual | 0.02 | 0.01 | 1 | 4 | 17 |

SIL
cumulative increment analysis
CALPUFF

Notes:

PSD - Prevention of Significant Deterioration

SIL - Significant Impact Level

[a] Source: SCREEN3 maximum modeled concentration

[b] Maximum modeled concentration over all receptors occurs at 1,100 m

[c] Maximum modeled concentration over receptors assumed to be within the nearest PSD Class I area occurs at 15,000 m

[d] Conversions

| from 1 hour to: | from 24 hr to: |
|---|---|
| 1 hour 1.00 | 1 hour 2.50 |
| 3 hour 0.90 | 3 hour 2.25 |
| 8 hour 0.70 | 8 hour 1.75 |
| 24 hour 0.40 | 24 hour 1.00 |
| Annual 0.08 | Annual 0.20 |

NOV.14.2002 12:44PM DERM AQMD 9TH FLOOR NO.582 P.4

**SCREEN3 Modeling**
**Modeling Results - NAAQS**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

Dilution Factor[a] 0.9235 μg/m³/g/s
Is the factor 1 hour or 24 hour? 1 hr[c] Simple Terrain
Annual operation[a] 8,760 hr/yr

**Criteria Pollutants**

| Pollutant | Emission Rate ton/yr | Emission Rate lb/hr | Emission Rate g/s | Averaging Period (hr) | Maximum Modeled Concentration (μg/m³) | Monitored Concentration[b] (μg/m³) | Total (μg/m³) | NAAQS (μg/m³) |
|---|---|---|---|---|---|---|---|---|
| $NO_2$ | 59.0 | 13.5 | 1.70 | Annual | 0.13 | 34.9 | 35.0 | 100 |
| $SO_2$ | 370 | 84.4 | 10.63 | 3 | 8.84 | 37.1 | 46.0 | 1,300 |
| | | | | 24 | 3.93 | 11.4 | 15.4 | 365 |
| | | | | Annual | 0.79 | 2.85 | 3.64 | 80 |
| CO | 173 | 39.6 | 4.99 | 1 | 4.61 | 10,995 | 11,000 | 40,000 |
| | | | | 8 | 3.23 | 5,747 | 5,751 | 10,000 |
| $PM_{10}$ | 7.67 | 1.75 | 0.22 | 24 | 0.08 | 95.0 | 95.1 | 150 |
| | | | | Annual | 0.02 | 28.4 | 28.4 | 50 |

,4 mult.

Notes:
NAAQS - National Ambient Air Quality Standards
[a] Source: SCREEN3 maximum modeled concentration
[b] Source: AIRS database; maximum high-second high over the latest 4+ years listed (except for annual)
[c] Conversions

| from 1 hour to: | | from 24 hr to: | |
|---|---|---|---|
| 1 hour | 1.00 | 1 hour | 2.50 |
| 3 hour | 0.90 | 3 hour | 2.25 |
| 8 hour | 0.70 | 8 hour | 1.75 |
| 24 hour | 0.40 | 24 hour | 1.00 |
| Annual | 0.08 | Annual | 0.20 |

NOV.14.2002 12:44PM DERM AQMD 9TH FLOOR NO.582 P.3

**SCREEN3 Modeling**
**Source Information**
**Waste Management, Inc. of Florida**
**Medley Landfill**
**Medley, Florida**

| Source Information | | Exhaust Parameters[a] | | | | | | Emission Rates[a] | | | | Structure Used in Modeling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flare | Type | Base Elev (ft) | Height (ft) | Diameter (ft) | Flow ($ft^3$/min) | Velocity (ft/s) | Temp (°F) | $NO_x$ (ton/yr) | $SO_2$ (ton/yr) | CO (ton/yr) | $PM_{10}$ (ton/yr) | Height (ft) | Length (ft) | Width (ft) |
| 3[b] | Enclosed | 0 | 55 | 12.5 | 357,343 | 48.5 | 1,600 | 59.0 | 370 | 173 | 7.67 | NA | NA | NA |
| Total Annual Emission Rate (TPY) | | | | | | | | 59.0 | 370 | 173 | 7.67 | – | – | – |

Notes:
NA- Not Applicable
[a] Source: Flare 3 Application for Authority to Construct
[b] Modeled as "point source"

## New Enclosed Flare
## Fuel and Equipment Information
## Medley Landfill

| Standard Conditions | | |
|---|---|---|
| standard temperature | 70 °F | 530 °R |
| gas constant (R) | 0.7302 atm-ft$^3$/lb-mol°R | |
| pressure | 1 atm | |

| LFG Assumptions | | |
|---|---|---|
| operation period | 365 days | |
| % Methane | 55% | |
| LFG heating value[a] | | 550 btu/scf |
| expected LFG temp | 100 °F | 560 °R |
| methane combustion constant | 9.53 ft$^3$ air/ft$^3$ $CH_4$ | |

| Inlet LFG Calculations | | LFG inlet flow | Operating | | Heat Input | |
|---|---|---|---|---|---|---|
| | | scfm | hrs/yr | MMscf/yr | MMbtu/hr | Mmbtu/yr |
| Flare 3 | New Enclosed Flare | 6,000 | 8760 | 3,154 | 198.0 | 1,734,480 |

**Flare Design Parameters**

| | Flare 3 Enclosed | |
|---|---|---|
| design flame temperature[b] | 1,600 °F | 2,060 °R |
| inlet/flare tip flow (at 100°F ) | 6,340 acfm | |
| moisture[c] | 8% | |
| inlet flow (dry) | 5,832 dscfm | 165,158 dslm |
| excess air [b] | 180% | |
| maximum exhaust flow rate [d] | 91,938 scfm | |
| actual flow rate | 357,343 acfm | 10,118,893 *al/min* |
| flare tip diameter[b] | 12.50 ft | 3.810 m |
| flare tip velocity[e] | 2,912 ft/min | 14.8 m/s |
| flare tip height agl[b] | 55 ft | 16.76 m |

[a]Based on the heating value of the methane content (source: AP-42, 0/07)

Heating value of landfill gas (btu/cf) = percent methane * heat value of methane (1000 btu/cf)

[b]Source: flare manufacturer °R = °F + 460

[c]Source: "Landfill Gas Emislsons," Louis Kalani and Ray Nardelli, LFG Specialties, 20th Annual Landfill Gas Symposium (SWANA), 3/25/96

DSCFM = acfm * (1- moisture%) DSLM = dscfm * 28.316

[d] Max Exhaust flow (scfm) = combustion air + (excess air% * combustion air) + inlet fuel) scfm *EXCEPT*

*Except Utility flare exhaust flow ( scfm ) assumed = inlet fuel (acfm)*

Combustion air = fuel scfm * methane % * methane combustion constant

*Actual exhaust flow (acfm) =* exhaust flow (scfm) * exhaust temp °R / standard temp °R

[e] Stack Tip velocity = acfm / (diameter/2)^2 * 3.1416 = flow / cross-section

**Project Summary for**
**New Enclosed Flare at**
**Medley Landfill**

| Emission Unit | Equipment | Type | Size / Capacity |
|---|---|---|---|
| Flare 3 | New Enclosed Flare | Enclosed | 0,000 scfm |
| | | | 3,154 mmscf/yr |

| Flare 3 | (lb/hr) | (tons/yr) |
|---|---|---|
| **Pollutant** | | |
| PM-10 | 1.75 | 7.65 |
| CO | 39.6 | 173.45 |
| NOx | 11.88 | 52.03 |
| SO2 | 84.38 | 369.59 |
| VOC | 0.37 | 1.63 |
| NMOC | 0.95 | 4.17 |
| HAPs | 1.46 | 6.40 |
| *HCl* | *1.43* | *6.25* |

Notes:

*HCl is the highest HAP emission; < 10 tons/yr;*
*also included in total HAP emissions*

# TECHNICAL DATA
## EF1355I16

F. Destruction efficiency – 99% overall destruction of total hydrocarbons. 98% destruction efficiency for NNOCs. Guaranteed to meet E.P.A. emission standards for landfill gas disposal in enclosed type flares

G. Turndown Ratio – 6:1 at design operating temperature

H. Unit Dimensions – 13.0 ft. diameter x 55.0 ft. OAH

I. Minimum flow rate to maintain stable flame and 99% destruction efficiency – 1000 SCFM

J. Minimum methane content required to maintain stable flame and 99% destruction efficiency – 30%

## NOTE

Wind loads - Designed for 125 mph wind loading (per ASCE 7-88, Exp.C)

# DOCUMENT 5

## SUPPLEMENTAL EMISSION UNIT INFORMATION

## EMISSION CALCULATIONS

10/14/02

23:52:34

*** SCREEN3 MODEL RUN ***

*** VERSION DATED 96043 ***

Waste Management of Florida, Inc.: Medley LF, Proposed Enclosed Flare (6K scfm)

SIMPLE TERRAIN INPUTS:

| | | |
|---|---|---|
| SOURCE TYPE | = | POINT |
| EMISSION RATE (G/S) | = | 1.00000 |
| STACK HEIGHT (M) | = | 16.7640 |
| STK INSIDE DIAM (M) | = | 3.8100 |
| STK EXIT VELOCITY (M/S) | = | 14.7924 |
| STK GAS EXIT TEMP (K) | = | 1144.2611 |
| AMBIENT AIR TEMP (K) | = | 293.1500 |
| RECEPTOR HEIGHT (M) | = | 0.0000 |
| URBAN/RURAL OPTION | = | RURAL |
| BUILDING HEIGHT (M) | = | 0.0000 |
| MIN HORIZ BLDG DIM (M) | = | 0.0000 |
| MAX HORIZ BLDG DIM (M) | = | 0.0000 |

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 391.551 M**4/S**3; MOM. FLUX = 203.438 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************

*** SCREEN DISCRETE DISTANCES ***

**********************************

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 30. | 0.3868E-09 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 24.34 | 24.32 | NO |
| 40. | 0.1782E-05 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 29.49 | 29.46 | NO |
| 50. | 0.1697E-03 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 34.23 | 34.19 | NO |
| 60. | 0.2734E-02 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 38.66 | 38.61 | NO |
| 70. | 0.1713E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 42.85 | 42.79 | NO |
| 80. | 0.6162E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 46.85 | 46.77 | NO |
| 90. | 0.6469E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.05 | 46.95 | NO |
| 100. | 0.6482E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.08 | 46.96 | NO |
| 125. | 0.6518E-01 | 6 | 1.0 | 1.3 | 10000.0 | 180.93 | 47.17 | 46.99 | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 1 | 150.0 | 18.8 | 15.7 | 7.3 | 35.2 | 2.00 | .050 | 2.00 | .25 | 2.00 | .07 | 2.00 | .00 | 2.00 | .00 |
| 31 | 1 | 155.0 | 13.8 | 21.3 | 9.8 | 105.3 | 1.55 | .050 | 2.00 | .17 | 2.00 | .05 | 2.00 | .00 | 2.00 | .00 |
| 32 | 0 | 1.0 | 167.7 | 1.0 | 11.0 | 11.5 | .31 | .050 | 2.00 | .49 | 2.00 | .13 | 2.00 | .40 | 2.00 | .11 |
| 33 | 1 | 84.4 | 84.4 | 12.0 | 2.4 | 4.8 | 5.25 | .050 | 2.09 | .34 | 2.00 | .11 | 2.00 | .13 | 2.00 | .03 |
| 34 | 1 | 167.2 | 1.5 | 100.0 | 88.3 | 88.3 | .26 | .050 | 2.00 | .00 | 2.00 | .00 | 2.00 | .00 | 2.00 | .00 |
| 34 | | | | | | | | | | | | | | | | |
| 1 | 0 | 5.000 | .050 | -.000 | .003 | -.003 | .003 | -.005 | .004 | -.006 | .004 | .002 | .003 | -.001 | .002 | |
| 2 | 0 | 10.000 | .050 | -.000 | .002 | -.002 | .002 | -.005 | .004 | -.006 | .003 | .001 | .002 | -.001 | .002 | |
| 3 | 0 | 15.000 | .050 | -.000 | .002 | -.002 | .002 | -.005 | .003 | -.006 | .003 | .001 | .002 | -.001 | .001 | |
| 4 | 0 | 20.000 | .050 | -.000 | .002 | -.002 | .002 | -.005 | .003 | -.006 | .003 | .001 | .002 | -.001 | .001 | |
| 5 | 0 | 25.000 | .050 | -.000 | .002 | -.002 | .001 | -.005 | .003 | -.006 | .003 | .001 | .002 | -.001 | .001 | |
| 6 | 0 | 30.000 | .050 | -.000 | .002 | -.002 | .001 | -.004 | .003 | -.006 | .002 | .001 | .002 | -.001 | .001 | |
| 7 | 0 | 35.000 | .050 | -.000 | .002 | -.002 | .001 | -.004 | .003 | -.006 | .002 | .001 | .002 | -.000 | .001 | |
| 8 | 0 | 40.000 | .050 | -.000 | .002 | -.002 | .001 | -.004 | .003 | -.006 | .002 | .001 | .002 | -.000 | .001 | |
| 9 | 0 | 45.000 | .050 | -.000 | .002 | -.002 | .001 | -.004 | .002 | -.006 | .002 | .001 | .002 | -.000 | .001 | |
| 10 | 0 | 50.000 | .050 | -.000 | .002 | -.002 | .001 | -.004 | .002 | -.005 | .002 | .001 | .002 | -.000 | .001 | |
| 11 | 0 | 55.000 | .050 | -.000 | .002 | -.002 | .001 | -.004 | .002 | -.005 | .002 | .001 | .001 | -.000 | .001 | |
| 12 | 0 | 60.000 | .050 | -.000 | .001 | -.002 | .001 | -.004 | .002 | -.005 | .002 | .001 | .001 | -.000 | .001 | |
| 13 | 0 | 65.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .002 | .001 | .001 | -.000 | .001 | |
| 14 | 0 | 70.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .002 | .001 | .001 | -.000 | .001 | |
| 15 | 0 | 75.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .002 | .001 | .001 | -.000 | .001 | |
| 16 | 0 | 80.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .002 | .001 | .001 | -.000 | .001 | |
| 17 | 1 | 85.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 18 | 1 | 90.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 19 | 1 | 95.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 20 | 1 | 100.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 21 | 1 | 105.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 22 | 1 | 110.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .002 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 23 | 1 | 115.000 | .050 | -.000 | .001 | -.001 | .001 | -.004 | .001 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 24 | 1 | 120.000 | .050 | -.000 | .001 | -.002 | .001 | -.004 | .001 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 25 | 1 | 125.000 | .050 | -.000 | .001 | -.002 | .001 | -.004 | .001 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 26 | 1 | 130.000 | .050 | -.000 | .001 | -.002 | .001 | -.004 | .001 | -.005 | .001 | .001 | .001 | -.000 | .001 | |
| 27 | 1 | 135.000 | .050 | -.000 | .001 | -.002 | .000 | -.004 | .001 | -.005 | .001 | .001 | .001 | -.000 | .000 | |
| 28 | 1 | 140.000 | .050 | -.000 | .000 | -.002 | .000 | -.004 | .000 | -.005 | .000 | .001 | .000 | -.000 | .000 | |
| 29 | 1 | 145.000 | .050 | -.000 | .000 | -.002 | .000 | -.003 | .000 | -.004 | .000 | .001 | .000 | -.0 | | |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 5. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 6000. | 0.5076 | 5 | 3.0 | 3.6 | 10000.0 | 154.16 | 260.94 | 73.33 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 6500. | 0.4662 | 5 | 3.0 | 3.6 | 10000.0 | 158.13 | 279.89 | 75.44 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 7000. | 0.4981 | 5 | 2.5 | 3.0 | 10000.0 | 165.50 | 299.06 | 78.86 | NO |

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

```
********************************************
*   SUMMARY OF TERRAIN HEIGHTS ENTERED FOR  *
*     SIMPLE ELEVATED TERRAIN PROCEDURE     *
********************************************
```

| TERRAIN HT (M) | DISTANCE RANGE (M) MINIMUM | MAXIMUM |
|---|---|---|
| 0. | 1. | 1250. |

NO

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4800. | 0.4317 | 4 | 15.0 | 16.2 | 4000.0 | 96.92 | 283.01 | 89.94 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 4900. | 0.4457 | 5 | 4.5 | 5.4 | 10000.0 | 138.35 | 217.83 | 65.55 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 5000. | 0.4318 | 5 | 4.5 | 5.4 | 10000.0 | 139.57 | 221.71 | 66.02 | NO |

```
*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************
```

*** TERRAIN HEIGHT OF 5. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 5500. | 0.5082 | 5 | 3.5 | 4.2 | 10000.0 | 146.14 | 241.51 | 70.01 | NO |

"Flare "
"Everglades "
4 3
1.750 11.880 .000 .000 .000
12.000 12.000 100.000 20.000
1 1.500 3
1 2.500 8
1 2.500 6
1 2.000 1
1 1.500 4
1 .040 1.000 6
1 11.250
34

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 5.0 | 163.8 | 3.7 | 8.4 | 9.9 | .88 | .050 | 2.00 | .42 | 2.00 | .12 | 2.00 | .24 | 2.00 | .07 |
| 2 | 0 | 10.0 | 158.8 | 5.7 | 6.5 | 8.5 | 1.40 | .050 | 2.00 | .44 | 2.00 | .13 | 2.00 | .21 | 2.00 | .06 |
| 3 | 0 | 15.0 | 153.8 | 7.0 | 5.3 | 7.5 | 1.87 | .050 | 2.00 | .44 | 2.00 | .14 | 2.00 | .20 | 2.00 | .06 |
| 4 | 0 | 20.0 | 148.8 | 7.9 | 4.5 | 6.8 | 2.31 | .050 | 2.00 | .44 | 2.00 | .14 | 2.00 | .19 | 2.00 | .06 |
| 5 | 0 | 25.0 | 143.8 | 8.6 | 4.0 | 6.2 | 2.73 | .050 | 2.00 | .43 | 2.00 | .14 | 2.00 | .19 | 2.00 | .05 |
| 6 | 0 | 30.0 | 138.8 | 9.1 | 3.6 | 5.8 | 3.12 | .050 | 2.00 | .42 | 2.00 | .13 | 2.00 | .18 | 2.00 | .05 |
| 7 | 0 | 35.0 | 133.8 | 9.5 | 3.2 | 5.4 | 3.46 | .050 | 2.00 | .41 | 2.00 | .13 | 2.00 | .17 | 2.00 | .05 |
| 8 | 0 | 40.0 | 128.8 | 9.9 | 3.0 | 5.2 | 3.82 | .050 | 2.00 | .40 | 2.00 | .13 | 2.00 | .17 | 2.00 | .05 |
| 9 | 0 | 45.0 | 123.8 | 10.2 | 2.8 | 5.0 | 4.12 | .050 | 2.00 | .38 | 2.00 | .12 | 2.00 | .16 | 2.00 | .04 |
| 10 | 0 | 50.0 | 118.8 | 10.5 | 2.7 | 4.8 | 4.39 | .050 | 2.00 | .37 | 2.00 | .12 | 2.00 | .16 | 2.00 | .04 |
| 11 | 0 | 55.0 | 113.8 | 10.7 | 2.6 | 4.7 | 4.63 | .050 | 2.00 | .37 | 2.00 | .12 | 2.00 | .15 | 2.00 | .04 |
| 12 | 0 | 60.0 | 108.8 | 11.0 | 2.5 | 4.6 | 4.83 | .050 | 2.00 | .36 | 2.00 | .12 | 2.00 | .15 | 2.00 | .04 |
| 13 | 0 | 65.0 | 103.8 | 11.2 | 2.4 | 4.6 | 4.99 | .050 | 2.00 | .35 | 2.00 | .12 | 2.00 | .15 | 2.00 | .04 |
| 14 | 0 | 70.0 | 98.8 | 11.4 | 2.4 | 4.6 | 5.12 | .050 | 2.04 | .35 | 2.00 | .11 | 2.00 | .14 | 2.00 | .04 |
| 15 | 0 | 75.0 | 93.8 | 11.6 | 2.3 | 4.6 | 5.20 | .050 | 2.07 | .34 | 2.00 | .11 | 2.00 | .14 | 2.00 | .03 |
| 16 | 0 | 80.0 | 88.8 | 11.8 | 2.3 | 4.7 | 5.25 | .050 | 2.09 | .34 | 2.00 | .11 | 2.00 | .13 | 2.00 | .03 |
| 17 | 1 | 85.0 | 83.8 | 12.0 | 2.4 | 4.8 | 5.25 | .050 | 2.09 | .34 | 2.00 | .11 | 2.00 | .13 | 2.00 | .03 |
| 18 | 1 | 90.0 | 78.8 | 12.2 | 2.4 | 5.0 | 5.22 | .050 | 2.08 | .34 | 2.00 | .11 | 2.00 | .12 | 2.00 | .03 |
| 19 | 1 | 95.0 | 73.8 | 12.5 | 2.4 | 5.2 | 5.14 | .050 | 2.05 | .34 | 2.00 | .11 | 2.00 | .12 | 2.00 | .03 |
| 20 | 1 | 100.0 | 68.8 | 12.7 | 2.5 | 5.4 | 5.03 | .050 | 2.01 | .34 | 2.00 | .11 | 2.00 | .11 | 2.00 | .03 |
| 21 | 1 | 105.0 | 63.8 | 12.9 | 2.6 | 5.8 | 4.88 | .050 | 2.00 | .34 | 2.00 | .11 | 2.00 | .11 | 2.00 | .03 |
| 22 | 1 | 110.0 | 58.8 | 13.2 | 2.7 | 6.2 | 4.68 | .050 | 2.00 | .34 | 2.00 | .11 | 2.00 | .10 | 2.00 | .03 |
| 23 | 1 | 115.0 | 53.8 | 13.5 | 2.9 | 6.8 | 4.46 | .050 | 2.00 | .35 | 2.00 | .11 | 2.00 | .09 | 2.00 | .02 |
| 24 | 1 | 120.0 | 48.8 | 13.8 | 3.1 | 7.5 | 4.20 | .050 | 2.00 | .35 | 2.00 | .11 | 2.00 | .08 | 2.00 | .02 |
| 25 | 1 | 125.0 | 43.8 | 14.2 | 3.4 | 8.5 | 3.90 | .050 | 2.00 | .35 | 2.00 | .11 | 2.00 | .07 | 2.00 | .02 |
| 26 | 1 | 130.0 | 38.8 | 14.7 | 3.7 | 9.9 | 3.57 | .050 | 2.00 | .35 | 2.00 | .11 | 2.00 | .05 | 2.00 | .01 |
| 27 | 1 | 135.0 | 33.8 | 15.3 | 4.2 | 12.0 | 3.22 | .050 | 2.00 | .34 | 2.00 | .11 | 2.00 | .04 | 2.00 | .01 |
| 28 | 1 | 140.0 | 28.8 | 16.0 | 4.9 | 15.3 | 2.84 | .050 | 2.00 | .33 | 2.00 | .10 | 2.00 | .02 | 2.00 | .00 |
| 29 | 1 | 145.0 | 23.8 | 17.1 | 5.8 | 21.2 | 2.43 | .050 | 2.00 | .30 | 2.00 | .09 | 2.00 | .01 | 2.00 | .00 |

Visual Effects Screening Analysis for
Source: Flare
Class I Area: Everglades

*** Level-1 Screening ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 1.75 | LB /HR |
| NOx (as NO2) | 11.00 | LB /HR |
| Primary NO2 | .00 | LB /HR |
| Soot | .00 | LB /HR |
| Primary SO4 | .00 | LB /HR |

OK — Why Not 13.5 lbs/hr

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

| | |
|---|---|
| Background Ozone: | .04 ppm |
| Background Visual Range: | 20.00 km |
| Source-Observer Distance: | 12.00 km |
| Min. Source-Class I Distance: | 12.00 km |
| Max. Source-Class I Distance: | 100.00 km |
| Plume-Source-Observer Angle: | 11.25 degrees |
| Stability: 6 | |
| Wind Speed: 1.00 m/s | |

RESULTS

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 125. | 14.2 | 44. | 2.00 | .350 | .05 | -.000 |
| SKY | 140. | 125. | 14.2 | 44. | 2.00 | .113 | .05 | -.002 |
| TERRAIN | 10. | 84. | 12.0 | 84. | 2.00 | .129 | .05 | .001 |
| TERRAIN | 140. | 84. | 12.0 | 84. | 2.00 | .032 | .05 | .001 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 1. | 1.0 | 168. | 2.00 | .491 | .05 | .000 |
| SKY | 140. | 1. | 1.0 | | | | | |

# APPENDIX A

# MODELING RESULTS

# LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

| | | |
|---|---|---|
| 0. | 2. | 1300. |
| 0. | 2. | 1350. |
| 0. | 2. | 1400. |
| 0. | 2. | 1450. |
| 0. | 0. | 1600. |
| 0. | 0. | 1650. |
| 0. | 0. | 1700. |
| 0. | 1. | 1750. |
| 0. | 0. | 1800. |
| 0. | 1. | 1850. |
| 0. | 1. | 1900. |
| 0. | 1. | 1950. |
| 0. | 1. | 2000. |
| 0. | 2. | 2100. |
| 0. | 1. | 2200. |
| 0. | 2. | 2300. |
| 0. | 5. | 2400. |
| 0. | 7. | 2500. |
| 0. | 2. | 2600. |
| 0. | 1. | 2700. |
| 0. | 7. | 2800. |
| 0. | 2. | 2900. |
| 0. | 2. | 3000. |
| 0. | 1. | 3100. |
| 0. | 7. | 3200. |
| 0. | 1. | 3300. |
| 0. | 1. | 3400. |
| 0. | 7. | 3500. |
| 0. | 1. | 3600. |
| 0. | 1. | 3700. |
| 0. | 1. | 3800. |
| 0. | 1. | 3900. |
| 0. | 1. | 4000. |
| 0. | 2. | 4100. |
| 0. | 2. | 4200. |
| 0. | 2. | 4300. |
| 0. | 2. | 4400. |
| 0. | 3. | 4500. |
| 0. | 4. | 4600. |
| 0. | 4. | 4700. |
| 0. | 1. | 4800. |
| 0. | 2. | 4900. |
| 0. | 1. | 5000. |
| 0. | 5. | 5500. |
| 0. | 5. | 6000. |
| 0. | 1. | 6500. |
| 1. | 2. | 7000. |

***************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
***************************************

| CALCULATION PROCEDURE | MAX CONC (UG/M**3) | DIST TO MAX (M) | TERRAIN HT (M) |
|---|---|---|---|
| SIMPLE TERRAIN | 0.9235 | 1110. | 0. |

10/14/02

23:50:57

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Waste Management of Florida, Inc.: Medley LF, Proposed Enclosed Flare (6K scfm)

SIMPLE TERRAIN INPUTS:

| | | |
|---|---|---|
| SOURCE TYPE | = | POINT |
| EMISSION RATE (G/S) | = | 1.00000 |
| STACK HEIGHT (M) | = | 16.7640 |
| STK INSIDE DIAM (M) | = | 3.8100 |
| STK EXIT VELOCITY (M/S) | = | 14.7924 |
| STK GAS EXIT TEMP (K) | = | 1144.2611 |
| AMBIENT AIR TEMP (K) | = | 293.1500 |
| RECEPTOR HEIGHT (M) | = | 0.0000 |
| URBAN/RURAL OPTION | = | RURAL |
| BUILDING HEIGHT (M) | = | 0.0000 |
| MIN HORIZ BLDG DIM (M) | = | 0.0000 |
| MAX HORIZ BLDG DIM (M) | = | 0.0000 |

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 391.551 M**4/S**3; MOM. FLUX = 203.438 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF 5. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 7500. | 0.5409 | 5 | 2.0 | 2.4 | 10000.0 | 174.71 | 318.18 | 82.65 | NO |

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF 2. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

| DIST (M) | CONC (UG/M**3) | STAB | U10M (M/S) | USTK (M/S) | MIX HT (M) | PLUME HT (M) | SIGMA Y (M) | SIGMA Z (M) | DWASH |
|---|---|---|---|---|---|---|---|---|---|
| 8000. | 0.5115 | 5 | 2.0 | 2.4 | 10000.0 | 177.76 | 336.68 | 84.54 | NO |

# 4 RESULTS

Air Quality Impact analysis results tables are provided in Appendix A. The modeling runs are presented as backup information in Appendix C.

## 4.1 NAAQS

The table, "Modeling Results – NAAQS" shows a comparison of the modeling results to the NAAQS. As shown in the table, the proposed flare's modeled impacts are below the standards. Also, total concentrations (i.e., the flare's impact concentrations + background concentrations) are below the standards.

## 4.2 PSD Increments

The table, "Modeling Results – PSD" show the comparison of the maximum–modeled concentrations to the Class I and Class II PSD increments. As shown in the table, all maximum-modeled concentrations are below PSD increments.

The same results table shows SILs. SILs generally apply to areas that do not comply with the NAAQS (i.e., nonattainment areas). A comparison with the SILs here is included for completeness. As shown in the table, all maximum-modeled concentrations are below SILs.

## 4.3 Visibility

The maximum visual impacts of the plume do not exceed the screening criteria for Class I or the areas outside the Class I areas. The VISCREEN Screening Analysis for the proposed flare is included in Appendix C.

## 3.4 Model Inputs

The source information, exhaust parameter, and emission rate inputs for the SCREEN modeling analysis are presented in the table, "Source Information" in Appendix A.

## 3.5 SCREEN Model Strategy

The modeling was performed using an emission rate of 1 g/s (gram per second). The maximum-modeled "dilution factor" (i.e., concentration based on 1 g/s or $\mu g/m^3/g/s$ [microgram per cubic meter per gram per second]) was then scaled in spreadsheet calculations to derive maximum-modeled concentrations. These calculations, as well as the scaled results, are shown on the two Modeling Results charts in Appendix A.

## 3.6 Visibility Analysis

The visual impacts of the proposed source plume were evaluated using the EPA screening model for visibility "Plume Visual Impact Screening Model" (VISCREEN) from the screening tools in the EPA Support Center for Regulatory Air Models." The emission inputs were the NOx and particulate rates from the permit application. The assumed observer distance (12 kilometers), background visual range (20 kilometers), and other parameters are listed on the summary report contained in Appendix C.

## 3.2 Air Quality Model and Options

EPA's SCREEN3 (Version 96043) was used for this analysis. The model is included in EPA's "Guideline on Air Quality Models" (Revised—Supplement C). It can include aerodynamic influences of "nearby" structures in its dispersion calculations A brief summary of what impacts the model calculates is as follows:

- ground-level impacts from "point," "area," "volume," or "flare" sources at downwind distances (receptors)
- ground-level impacts on elevated terrain, including terrain above stack top
- ground-level impacts using "rural" or "urban" dispersion coefficients
- ground-level impacts within the "re-circulation" zone of a structure (cavity)

The model is conservative because it assumes that dispersion occurs directly downwind of a source (i.e., exhaust gases blown directly at receptors). Also, if building parameters are input, the model assumes the building to be next to the stack. This is very conservative because the model uses special equations in its dispersion calculations to incorporate downwash. If a stack is relatively "low" compared to building height (i.e., a few feet above the building), very high modeled concentrations are likely.

SCREEN3 allows a user to tailor it to a specific scenario through a variety of available options. For this analysis, the *regulatory-default* option was used.

## 3.3 Receptors and Terrain

SCREEN3 uses source data, meteorological data, and other input parameters to calculate concentrations at downwind locales (receptors). Table 5.3 lists the receptor spacing:

**Table 5.3: Receptor Spacing**

| Distance (m) | Spacing (m) |
|---|---|
| 30-100 | 10 |
| 100-500 | 25 |
| 500-2,000 | 50 |
| 2,000-5,000 | 100 |
| 5,000-10,000 | 500 |
| 10,000-50,000 | 5,000 |

Note: Additional receptors are placed around the area of predicted maximum impact

Terrain for each receptor was derived using digitized elevation data. Receptor elevations over all quadrants are presented as backup information in Appendix B.

# 3 AIR QUALITY ANALYSIS

## 3.1 Impact Analysis

An impact analysis (dispersion modeling) usually involves two phases:

(1) a preliminary screening analysis, and
(2) a refined, sequential modeling analysis.

An analysis to demonstrate that a source is not violating NAAQS or contributing to a violation will use the maximum-modeled impacts (concentrations) from the proposed source and regional background concentration levels derived from ambient monitoring data. The monitored data plus the modeled contribution from the proposed source is combined to see whether the total air quality concentration exceeds the NAAQS.

The preliminary screening technique predicts how the emission plume would disperse under all atmospheric conditions, a wide range of wind speeds and in every direction. It is a conservative prediction of source impacts, and if a source's screening impacts are acceptable, no further analysis is required. Screening was performed for Medley Landfill.

A sequential modeling analysis is required for any pollutant for which the maximum-modeled pollutant concentrations exceed Significant Impact Levels (SILs). This analysis considers emissions from the applicant's source and other nearby existing sources.

**Table 2.3: Significant Impact Levels**

| Pollutant | Averaging Time (hr) | SIL |
|---|---|---|
| CO | 1 | 2,000 |
| | 8 | 500 |
| $NO_2$ | Annual | 1 |
| $PM_{10}$ | 24 | 5 |
| | Annual | 1 |
| $SO_2$ | 3 | 25 |
| | 24 | 5 |
| | Annual | 1 |

Source: 40 CFR §52.21(23)(i)
Units are ($\mu g/m^3$).

## 2.6 Good Engineering Practice Stack Height Analysis

In some cases, an exhaust plume from a stack is influenced by aerodynamic turbulence induced by nearby structures, and the plume is mixed rapidly toward the ground in a condition called "downwash." This results in higher ground-level concentrations immediately to the lee of the building than would otherwise occur.

A standard rule-of-thumb, known as Good Engineering Practice (GEP) is applied to determine the stack height ($h_s$) necessary to avoid downwash problems. If the stack is within a distance of five times the height of any nearby structure (or the building width, if they are smaller), the building is assumed to cause downwash, and modeling analyses are required to determine impacts under the downwash conditions.

Landfill records and maps show that the flare station is located 205 feet from the nearest structure, the administration building, which is approximately 35 feet high. This means that all structures are sufficiently far enough away from the proposed source so as to not influence the flare exhaust plume (for modeling purposes). Therefore, building dimensions and downwash have not been considered in this analysis.

## 2.7 Meteorological Data

The dispersion model uses meteorological data (i.e., wind speed and direction, stability class, mixing height, and temperature) to calculate impacts downwind of a source. A brief discussion of each of these parameters follows:

- Wind Speed - The wind speed is used to determine plume dilution and plume rise downwind of the stack. These factors, in turn, affect the magnitude of and distance to the maximum ground-level concentration.
- Stability - *Stability* categories (i.e., 1 through 6) are indicators of atmospheric turbulence. The stability category at any given time will depend upon *static stability* (related to the change in temperature with height), *thermal turbulence* (caused by heating of the air at ground level), and *mechanical turbulence* (a function of wind speed and surface roughness). Stability 1 indicates high instability whereas stability 6 indicates high stability.
- Mixing Height - The *mixing height* is the distance above the ground to which relatively unrestricted vertical mixing occurs in the atmosphere. When the mixing height is low (but still above plume height) ambient ground-level concentrations will be relatively high because the pollutants are prevented from dispersing upward.
- Temperature - Plume rise (i.e., *buoyancy*) is proportional to a fractional power of the temperature difference between the stack gases and the ambient air.

chosen were located in urban areas of Dade County. A summary of the monitoring data used is included in Appendix B.

**Table 4.1: Air Quality Monitors**

| Pollutant | Averaging Time (hr) | City | County |
|---|---|---|---|
| $NO_2$ | Annual | Miami | Dade |
| $SO_2$ | 3 | Miami | Dade |
| | 24 | Miami | Dade |
| | Annual | Miami | Dade |
| CO | 1 | Miami | Dade |
| | 8 | Miami | Dade |
| $PM_{10}$ | 24 | Miami | Dade |
| | Annual | Miami | Dade |

Source: AIRS Database (summary provided in Appendix B)

## 2.4 Land Use Analysis

Land use in the vicinity of the landfill is a combination of rural-agricultural, light industrial, and residential. The dispersion model uses different coefficients depending on whether an area is classified as *rural* or *urban*. To designate a site as either rural or urban, land use within a 3-kilometer radius of a site is classified according to criteria developed by *Auer*. If at least 50 percent of land use within the radius is classified as rural, rural dispersion coefficients are used in the modeling analysis— otherwise, urban coefficients are used.

A land-use analysis using USGS maps indicates rural land use: therefore, rural dispersion coefficients are used for the analysis.

## 2.5 Topography

Topography can play an important role in air impacts. The model has the capability to incorporate terrain in its dispersion calculations. The landfill is located southern Florida where the local grade is approximately 5-10 ft-msl. Terrain well beyond the landfill is gently rolling, and rises only minimally.

# 2 PROJECT DESCRIPTION AND SITE CHARACTERISTICS

This section describes and discusses the air dispersion model used in this analysis and its capability to incorporate various specific site characteristics, which can affect dispersion.

## 2.1 Emissions and Exhaust Parameters

Emission rates of criteria pollutants have been calculated for the permit application using manufacturer's guarantees, results of stack tests, mass balance, and EPA approved AP-42 emission factors. The impact analysis is based on potential emission rates. Exhaust parameters (i.e., stack height, stack diameter, stack flow, stack velocity, stack temperature) were obtained or derived from information used in the application (see "Source Information," Appendix A).

## 2.2 Medley Landfill Site Description

Medley Landfill is located in Medley, approximately 10 miles northwest of Miami. The latitude and longitude coordinates of the proposed flare are N 25° 51' 55" and W 80° 20' 80". The converted UTM (Universal Transverse Mercator) coordinates for the proposed flare station (located on landfill property) are 565.480 km East and 2,860.240 km North

The landfill's grade rises from approximately 5-10 ft-msl (feet above mean sea level) to a peak future elevation of over 260 ft-msl. The flare location is approximately 110 feet north of the nearest property line.

The nearest boundary of the Everglades National Park is approximately 12 kilometers west of the facility.

## 2.3 Regional Background Levels (Monitored Data)

Monitored data used for the NAAQS compliance analysis was taken from the AIRS database. The maximum HSH (high-second high) concentrations from 1998 to present are used. Monitors chosen are based on their relative geographic location to the landfill and recorded concentrations. Monitors in urban areas tend to record higher concentrations of pollutants relative to their counterparts in rural areas. The monitors

The Medley landfill is located in a Class II area and is approximately 12 km (kilometers) from the closest boundary of Everglades National Park, which is a Class I area. No PSD baseline has been triggered in Miami-Dade County because the first PSD application has not yet been submitted. — Not true

### Table 2-2 PSD Increments

| Pollutant | Averaging Time | Class I | Class II |
|---|---|---|---|
| NO2 | Annual | 2.5 | 25 |
| PM10 | 24 hr | 8 | 30 |
| | Annual | 4 | 17 |
| SO2 | 3 hr | 25 | 512 |
| | 24 hr | 5 | 91 |
| | Annual | 2 | 20 |

Source: 40 CFR §52.21(38)(c)
Units are ($\mu g/m^3$)

The Florida PSD permitting regulations (cited above) also require that a PCP project is not allowed to violate visibility standards. Exhaust plumes with high NOx and particulate emission levels can be visible and impair the "blue sky" view for many miles downwind of the stack, especially in clear visual conditions in states like Arizona and New Mexico. EPA has developed screening techniques and criteria that demonstrate whether the plume color will contrast with its background and be perceptible over distances of 10 – 100 kilometers. If the plume characteristics are higher than these thresholds, more detailed visibility modeling should be performed.

### Table 2-1 NAAQS

| Pollutant | Averaging Time (hr) | NAAQS |
|---|---|---|
| Carbon Monoxide (CO) | 1 | 10,000 |
| | 8 | 40,000 |
| Nitrogen Dioxide ($NO_2$) | Annual | 100 |
| Particulate Matter less than 10 microns ($PM_{10}$) | 24 | 150 |
| | Annual | 50 |
| Sulfur Dioxide $SO_2$ | 3[a] | 1,300 |
| | 24 | 365 |
| | Annual | 80 |
| Ozone $O_3$ | 1 | 235 |
| Lead Pb | Calendar Qtr. | 1.5 |

Source: 40 CFR 50
Units are ($\mu g/m^3$)
[a] secondary standard, all other secondary standards are the same as the primary standard
b NOx includes NO2 and is thus used interchangeably in this report

## 1.2 Prevention of Significant Deterioration

PSD applies in attainment areas, but in this instance, the facility is exempt from PSD requirements. The facility does not require a PSD permit, even though the pollutant discharge is higher than the PSD thresholds, since the project is a pollution control project at a landfill.

A major component of the PSD permitting process, and a requirement for a pollution control project, is to evaluate whether the incremental air quality impact from a new source degrades the area's air quality. Proposed major sources or source modification projects are only allowed to contribute concentrations below specified PSD increments, and must control emissions to a stricter degree if their impact exceeds the increment. The PSD Increment analysis uses the modeled impact of the proposed source by itself, i.e. the concentration increase caused by the new source's emissions.

The maximum allowable PSD increment is the maximum increase in concentration that is allowed to occur in an area. The baseline ambient concentration for a pollutant in an area is triggered when the first PSD application is submitted. The smallest incremental impact concentrations apply in Class I areas, wilderness areas and national parks. All other areas of the country are designated Class II (i.e., for normal, well-managed industrial growth). Table 2-2 presents the PSD increments.

# 1 PROJECT AND IMPACT ANALYSIS OVERVIEW

On behalf of Waste Management of Florida, Inc, EMCON/OWT, Inc. (EMCON) submits this report describing the air modeling analysis performed to determine the potential impacts of the proposed enclosed flare (Flare 3) to be installed at Medley Landfill and Recycling Center ("the landfill") in Medley, Florida. The subject facility is a Municipal Solid Waste Landfill, regulated by NSPS subpart WWW.

The proposed flare is designed to control 6,000 standard cubic feet per minute of landfill gas. The calculated potential emissions of $SO_2$ exceed the Prevention of Significant Deterioration (PSD) major source threshold of 250 tons per year [40 CFR §52.21(b)]. However, the proposed flare project is a pollution control project (PCP) under F.A.C. 62-400 Prevention of Significant Deterioration (PSD) Subsection(2)(a)(2)(c), Pollution Control Project Exemptions.

The screening modeling performed demonstrates that the increase in emissions due to the Flare 3 project will not cause or contribute to a violation of any ambient air quality standard, maximum allowable increase, or visibility standard, as required by the above mentioned rule. Because the project impacts are so low, the project meets the definition of a PCP, and the emission increases due to the project are exempt from the preconstruction review requirements of the F.A.C. 62-212.400(2)(a)2.c rule.

## 1.1 National Ambient Air Quality Standards Requirements

New emission sources may not create air quality conditions that violate the National Ambient Air Quality Standards (NAAQS). NAAQS are allowable concentration levels, based on health and welfare effects, of the most nationally significant pollutants ("criteria pollutants"). Primary NAAQS define air quality levels necessary to protect public health; secondary standards define levels to protect the environment (e.g., vegetation, wildlife).

Air quality in Miami-Dade County, Florida and the surrounding counties attain the NAAQS. This means that the criteria pollutant ambient concentrations are below the NAAQS, and the areas are in attainment.

# CONTENTS

# DOCUMENT 6

# AIR QUALITY ANALYSIS REPORT

# PROPOSED FLARE 3

# MEDLEY LANDFILL

Prepared for

Waste Management of Florida, Inc.

October 23, 2002

Prepared by

EMCON/OWT Inc.,
a Shaw Group Company
3 Riverside Drive
Andover, MA 01810-1121

Shaw EMCON/OWT, Inc.

Project 840138

# DOCUMENT 6

# IMPACT EVALUATION

## Gas Information

| LFG Compound | HAP | MW (lb/lb-mol) | Conc (ppmv)[a] | Sulfur Atoms | Equiv Conc (ppmv) |
|---|---|---|---|---|---|
| Hydrogen Sulfide | | 34.08 | 1400 | 1 | 1400.00 |
| Carbon Disulfide | x | 76.13 | 0.221 | 2 | 0.44 |
| Carbonyl Sulfide | x | 60.07 | 0.183 | 1 | 0.18 |
| Dimethyl Sulfide (methyl sulfide) | | 62.13 | 6.809 | 1 | 6.81 |
| Ethyl Mercaptan (ethanothiol) | | 62.13 | 0.226 | 1 | 0 |
| Methyl Mercaptan | | 48.11 | 1.266 | 1 | 1 |
| | Total Equivalent concentration in gas | | | | 1408.93 |
| Sulfur Dioxide [b] | | 64.07 | | 1 | |

Notes:
(a) Source: Waste Industry Air Coalition (WIAC)
"Comparison of Recent Landfill Gas Analyses with Historic AP-42 Values, January 2001"
except H2S concentration from landfill records, rather than the average 23.59 ppmv found by the WIAC study
(b) Product of combustion

## Calculated Sulfur Constituent Emissions

LFG inlet flow 6,000 scfm
Flare 3 8760 hours

Destruction Efficiency 99%

Conversion Efficiency 100% (b), (c)

| | Inlet LFG lbs/hr | Flare Exhaust Emissions [c] lb/hr | lb/yr | ton/yr | | H2S Converted lbs/hr | $SO_2$ Emissions (lbs/hr) |
|---|---|---|---|---|---|---|---|
| Hydrogen Sulfide | 44.38 | 0.444 | 3.9e+5 | 1.9e+2 | | 44.38 | 83.43 |
| Carbon Disulfide | 0.02 | 0.000 | 1.4e+2 | 6.9e-2 | | 0.02 | 0.06 |
| Carbonyl Sulfide | 0.01 | 0.000 | 9.0e+1 | 4.5e-2 | | 0.01 | 0.02 |
| Dimethyl Sulfide (methyl sulfide) | 0.39 | 0.004 | 3.4e+3 | 1.7e+0 | | 0.39 | 0.74 |
| Ethyl Mercaptan (ethanethiol) | 0.01 | 0.000 | 1.1e+2 | 5.7e-2 | | 0.01 | 0.02 |
| Methyl Mercaptan | 0.06 | 0.001 | 5.0e+2 | 2.5e-1 | | 0.06 | 0.11 |
| | | | | | | | 84.38 |

| | |
|---|---|
| **lb $SO_2$/scfm at 1400 ppmv H2S** | **0.0141** |

(d) Worst case sulfur compound emission rates based on 0.99 destruction efficiency
(d) Worst case SO2 emissions assumes that 100% of sulfur constituents oxidized to SO2
**lb/hr in inlet gas =** (MW compound * concentration compound [ppmv] * scfm * 60 [min/hr]) / (R * °T)
**Emissions (lb/hr)** = lb/hr inlet * (1-destruction efficiency)

**Calculated Air Toxics Emissions**

LFG inlet flow 6,000 scfm

| LFG Compound | HAP | MW (lb/lb-mol) | Conc (ppmv)[a] | Total Compounds (lbs/hr) [b] | Control Efficiency (%)[b], [c] | Flare Exhaust (lbs/hr) |
|---|---|---|---|---|---|---|
| 1,1,1 - Trichloroethane | x | 133.42 | 0.168 | 0.02 | 98 | 0.000 |
| 1,1,2,2 - Tetrachloroethane | x | 167.85 | 0.005 | 0.00 | 98 | 0.000 |
| 1,1 - Dichloroethane | x | 98.95 | 0.741 | 0.07 | 98 | 0.001 |
| 1,1 - Dichloroethene | x | 96.94 | 0.092 | 0.01 | 98 | 0.000 |
| 1,2 - Dichloroethane | x | 98.96 | 0.120 | 0.01 | 98 | 0.000 |
| 1,2 - Dichloropropane | x | 112.98 | 0.023 | 0.00 | 98 | 0.000 |
| Acrylonitrile | x | 53.06 | 0.036 | 0.00 | 99.7 | 0.000 |
| Benzene | x | 78.11 | 0.972 | 0.07 | 99.7 | 0.000 |
| Bromodichloromethane | | 163.83 | 0.284 | 0.04 | 98 | 0.001 |
| Carbon Disulfide | x | 76.13 | 0.221 | 0.02 | 99.7 | 0.000 |
| Carbon Tetrachloride | x | 153.84 | 0.007 | 0.00 | 98 | 0.000 |
| Carbonyl Sulfide | x | 60.07 | 0.183 | 0.01 | 99.7 | 0.000 |
| Chlorobenzene | x | 112.56 | 0.227 | 0.02 | 98 | 0.000 |
| Chlorodifluoromethane | | 86.47 | 0.355 | 0.03 | 98 | 0.001 |
| Chloroethane | x | 64.52 | 0.448 | 0.03 | 98 | 0.001 |
| Chloroform | x | 119.39 | 0.010 | 0.00 | 98 | 0.000 |
| Chloromethane | | 50.49 | 0.136 | 0.01 | 98 | 0.000 |
| Dichlorobenzene | x | 147.00 | 1.448 | 0.20 | 98 | 0.004 |
| Dichlorodifluoromethane | | 120.91 | 0.964 | 0.11 | 98 | 0.002 |
| Dichlorofluoromethane | | 102.92 | 2.620 | 0.25 | 98 | 0.005 |
| Dichloromethane | x | 84.94 | 3.395 | 0.27 | 98 | 0.005 |
| Ethylbenzene | x | 106.16 | 6.789 | 0.67 | 99.7 | 0.002 |
| Fluorotrichloromethane | | 137.38 | 0.327 | 0.04 | 98 | 0.001 |
| Hexane | x | 86.18 | 2.063 | 0.17 | 99.7 | 0.000 |
| Hydrogen Sulfide [b] | | 34.08 | 23.578 | 0.75 | 99.7 | 0.002 |
| Mercury (total) | x | 200.61 | 0.000 | 0.00 | 0 | 0.000 |
| Methyl Ethyl Ketone | x | 72.11 | 12.604 | 0.85 | 99.7 | 0.003 |
| Methyl Isobutyl Ketone | x | 100.16 | 0.750 | 0.07 | 99.7 | 0.000 |
| Perchloroethylene | x | 165.83 | 1.193 | 0.18 | 98 | 0.004 |
| t - 1,2 - Dichloroethene | | 96.94 | 0.051 | 0.00 | 98 | 0.000 |
| Toluene | x | 92.13 | 25.405 | 2.18 | 99.7 | 0.007 |
| Trichloroethylene | x | 131.38 | 0.681 | 0.08 | 98 | 0.002 |
| Vinyl Chloride | x | 62.50 | 1.077 | 0.06 | 98 | 0.001 |
| Xylenes | x | 106.16 | 16.582 | 1.64 | 99.7 | 0.005 |
| | | | **LFG HAPs at Inlet** | **6.63** | **HAP** | **0.04** |
| **Hydrogen Chloride[d]** | **x** | **36.50** | **42.00** | **1.43** | **0.0** | **1.43** |
| | | | **Total HAP Emissions (lb/hr)** | | | **1.46** |

Notes:

(a) Source. Waste Industry Air Coalition (WIAC) Comparison of Recent Landfill Gas Analyses with Historic AP-42 Values, January 2001

(b) source: emissions estimation techniques present in Waste Industry Air Coalition (WIAC) Comparison of Recent Landfill Gas Analyses with Historic AP-42 Values, January 2001.
lb/hr in inlet gas = (MW compound * concentration compound [ppmv] * scfm * 60 [min/hr]) / (R * °T)

(c) AP-42 gives ranges for control efficiencies. Chlorinated compound destruction assumed to be 98%; other compounds are 99.7%
Emissions (lb/hr) = lb/hr inlet * (1-destruction efficiency)

(d) product of combustion
emission concentration for hydrogen chloride equivalents is default concentration from AP-42.

| | | | *New Enclosed Flare* |
|---|---|---|---|
| LFG flow | | (scfm) | *8,000* |
| Heat Input to Flare(s) | | (MMbtu/hr) | *198* |
| <u>$PM_{10}$ Emission Rate</u> | | | |
| PM emission factor (EF)[a] | 80 | μg/dsl inlet | |
| PM emission rate | | (lb/hr) | *1.75* |
| <u>VOC Emission Rate</u> | | | |
| NMOC conc in inlet gas[b] | 595 | ppmv | |
| MW hexane | 86 | lb/lb-mol | |
| NMOC content in gas | | (lb/hr) | *47.60* |
| Destruction efficiency | 98% | | |
| NMOC emission rate | | (lb/hr) | *0.95* |
| VOC fraction of NMOC[b] | 39% | (lb/hr) | *18.56* |
| VOC conc in inlet gas | 232 | ppmv | |
| VOC emission rate | | (lb/hr) | *0.37* |
| <u>$SO_2$ Emission Rate</u> | | | |
| Total sulfur in inlet gas[c] | 1409 | ppmv | |
| Calculated EF | 0.014 | lb $SO_2$ /scfm | |
| $SO_2$ emission rate | | (lb/hr) | *84.38* |
| <u>$NO_2$ Emission Rate</u> | | | |
| $NO_2$ EF Enclosed Flare[d] | 0.06 | lb/MMbtu | |
| $NO_2$ emission rate | | (lb/hr) | *11.88* |
| <u>CO Emission Rate</u> | | | |
| CO EF Enclosed Flare[d] | 0.2 | | |
| CO emission rate | | (lb/hr) | **39.6** |

[a] Source: draft AP-42 (9/95), table 13.5-1, PM emission factor for lightly-smoking flares (x 2 for safety factor)
lb/hr = μg/dsl x dsl/min effluent x 60 min/hr / 1,000,000 ug/gram x 1 lb/454 grams

[b] Source: AP-42 (11/98), table 2.4-2
**VOC lb/hr in inlet gas = (MW constituent * concentration constituent [ppmv] * scfm * 60 [min/hr]) / (R * °T)**

[c] $H_2S$ from landfill records. Inlet carbon disulfide, carbonyl sulfide, dimethyl sulfide, and methyl mercaptan concentrations from AP-42 (11/98), table 2.4-1. See worksheet entitled, "SO2 Emissions" for details.

[d] Source: flare manufacturer
lb/hr = (lb/MMbtu/hr) * (MMbtu/hr)

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BUREAU OF AIR REGULATION

**MIAMI-DADE** COUNTY, FLORIDA

MIAMI-DADE

DERM

ENVIRONMENTAL RESOURCES MANAGEMENT
AIR QUALITY MANAGEMENT DIVISION
33 S.W. 2nd AVENUE
SUITE 900
MIAMI, FLORIDA 33130-1540
TELEPHONE: (305) 372-6925
FAX: (305) 372-6954

December 6, 2002

CERTIFIED MAIL NO. 7000 0600 0025 3506 3720
RETURN RECEIPT REQUESTED

Mr. John Casagrande
Area Vice President
Waste Management, Inc. of Florida
9350 NW 89 Avenue
Medley, Florida 33178

Subject: Air Construction Permit Application for Enclosed Flare #3 (Project No: 0250615-004-AC), for the Medley Landfill and Recycling Center located at, near, in the vicinity of 9350 NW 89 Avenue, Medley, Miami-Dade County, Florida

Dear Mr. Casagrande:

The Department of Environmental Resources Management (DERM) staff has reviewed the above referenced document, received November 7, 2002, and has determined that the application is incomplete. Pursuant to Sections 120 and 403, Florida Statutes (F.S.), and Chapters 62-4 and 62-209 through 62-297 of the State of Florida Administrative Code (F.A.C.), a completed Air Construction Application is required to obtain a permit. DERM would like to offer comments and request additional information as specified below:

1. The DERM can find no documentation to indicate that the Medley Landfill and Recycling Center is not in compliance with the non-methane organic compound emission reduction requirements of 40 CFR part 60, Subpart Cc or WWW. Therefore, DERM does not believe that the exemptions, as contained in Rule 62-212.400(2)2c, Florida Administrative Code, Pollution Control Exemptions, relating to collateral emissions associated with a project to achieve compliance with the aforementioned rules is applicable in this instance. Please provide any additional information to demonstrate the applicability of said exemption.

2. Not withstanding the above, F.A.C. Rule 62-212.400(2)(a)2.c. does not exempt the applicant from demonstrating to the Department that the increase in emissions does not violate an ambient air quality standard, maximum allowable increase (increment), or visibility limitation. This includes an evaluation of both short term and long term impacts. The evaluation of short-term impacts should be based on the highest expected short-term emission rate. This value is usually greater than the long-term emission rate. Please provide calculations and documentation for all stack parameters used in the modeling analyses.

   a) As such the department requires that Medley Landfill demonstrate that the impact of projected increase in emissions will not result in exceedances of significant impact levels for Class 1 as well as Class 2 PSD areas. The applicant should redo the short-term significant impact modeling if the highest expected short-term rates are greater than those proposed in the permit application. If any significant impact levels are exceeded, then further multi-source impact analyses will be required for any pollutant and averaging time that an above significant impact is predicted. This multi-source modeling is required to demonstrate that increased emissions will not result in an exceedance of any federal, state or local ambient air quality standards or PSD increments. The EPA-proposed Significant Impact Levels for PSD Class I areas, which the state of Florida Department of Environmental Protection (DEP) accepts as a guideline are as follows:

(i) $SO_2$ 3-hour--1 ug/m3; 24-hour--0.2 ug/m3; annual--0.1 ug/m3

(ii) PM10 24-hour--0.3 ug/m3; annual--0.2 ug/m3

(iii) $NO_2$ Annual--0.1 ug/m3

b) DERM requires that the Medley Landfill submit a modeling protocol for approval prior to conducting such modeling to assess the air quality impacts.

3. The facility must demonstrate that the increased emissions due to this project will not result in exceedance of the Miami-Dade County's ambient air quality standards for $SO_2$.

4. Contrary to your assertion in the construction permit application package, statewide minor source baselines have been established for PM10, $SO_2$, and $NO_2$.

5. Downwash was not considered as an issue in Medley Landfill's submittal. Based on the location of the existing and proposed flare(s) and the topography of the site, it is DERM's belief that downwash does apply. Provide adequate information such as the elevations of different structures surrounding the proposed flare, including existing and proposed landfill cells, pine trees, etc. and demonstrate why downwash does not apply in this case.

6. Submit a sample analysis and detailed characterization of the off-gases generated at the landfill, specifically to determine the methane and non-methane organic composition.

7. It is not clear if the existing flares will be replaced by this proposed additional flare, or if all flares will be maintained in operation. Clarify this matter and submit a netting analysis of emissions as appropriate for each pollutant.

Please be advised that the processing of the application will continue only upon receipt of the above-mentioned additional information. In addition, DERM staff will contact you to schedule a teleconference to discuss the modeling requirements.

Sincerely,

H. Patrick Wong

H. Patrick Wong, Chief
Air Quality Management Division

Copy: Juene Franklin, P.E., EMCON/OWT, Inc., 13111 Northwest Freeway, Houston, TX 77040
Bryan Tindell, Engineer, 9350 NW 89 Avenue, Medley, FL 33178
Alvaro Linero, P.E. New Source Review Section, DEP, Tallahassee
Cleve Holladay, DEP, Tallahassee ✓
Syed Arif, DEP, Tallahassee

**MEDLEY LANDFILL & RECYCLING CENTER**
A WASTE MANAGEMENT COMPANY

9350 NW 89 Avenue
Medley, FL 33178
(305) 883-7670
(305) 883-9758 Fax

January 7, 2003

Mr. H. Patrick Wong, Chief
Air Quality Management Division
Miami-Dade Department of Environmental Resource Management
33 S.W. 2nd Avenue, Suite 900
Miami, FL 33130-1540

Re: Response to December 6, 2002 Letter
Medley Landfill and Recycling Center Flare Permit Application

Dear Mr. Wong:

Waste Management, Inc. of Florida (WMIF) and EMCON/OWT Inc. (EMCON) offers these responses to your comments in the above referenced letter regarding the permit application for the proposed enclosed flare at the Medley Landfill and Recycling Center. After discussing the issues with you and your staff in a teleconference on December 11, 2002, EMCON is submitting the following information to complete the application for the proposed flare.

1. *Please provide additional information to demonstrate the applicability of the Pollution Control Exemption contained in Rule 62-212.400(2)2.c.*

The new proposed control flare project will result in a significant reduction in the NMOC emissions anticipated from the existing Medley Landfill (Permit No. 0250615-002-AV), as required under the New Source Performance Standards (NSPS) for Municipal Solid Waste Landfills 40 CFR Subpart WWW.

As described in the summary of the preamble to "Standards of Performance for New Stationary Sources and Guideline for Control of Existing Sources: Municipal Solid Waste Guidelines" (61FR9919, March 12, 1996):

> These standards... are based on the Administrator's determination that municipal solid waste [MSW] landfills cause, or contribute significantly to, air pollution that may reasonably be anticipated to endanger public health or welfare. The emissions of concern are non-methane organic compounds (NMOC) and methane. NMOC include volatile organic compounds (VOC), hazardous air pollutants (HAPs), and odorous compounds... Methane emissions contribute to global climate change and can result in fires or explosions when they accumulate in structures on or off the landfill site. The intended effect of the standards and guidelines is to require certain MSW landfills to control emissions to the level achievable by the best demonstrated system of

> continuous emission reduction, considering costs, non-air quality, health, and environmental and energy impacts.

In accordance with NSPS Subpart WWW, Medley must collect and control all gas.

This hydrocarbon flare is a PCP device specifically identified in the New Source Review regulations recently promulgated on November 22, 2002. Its combustion will produce emissions of two collateral combustion pollutants, NOx and CO, and will emit $SO_2$ as the result of combusting the inlet gas stream, which is contaminated with hydrogen sulfide ($H_2S$) produced from the anaerobic decomposition of the MSW.

The emission increase that results from the proposed project is exempt under 62-212.400, FAC, because the project is being undertaken for the purpose of complying with the non-methane organic compound emission requirements of 40 CFR Part 60 Subpart WWW. In fact, "Condition A.16. Pollution Control Project" of the Medley Landfill and Recycling Center Title V Operating Permit states:

> "The installation of controls pursuant to 40 CFR 60 Subpart WWW for the control of landfill gases is considered a pollution control project consistent with the EPA Guidance Memorandum "Pollution Control Projects and New Source Review" dated July 1, 1994."

In early 2002, only one 3,000 scfm flare had been installed at the facility and was operating at capacity. Additional gas, which was not being collected and controlled, was being released, and more gas collection and destruction was necessary to address local effects. While surface monitoring has demonstrated that the existing collection system has met the NSPS requirements (Annual Operating Report), recent values are approaching the level defined as a "leak." A permit application for an interim, skid mounted 3,000 cfm flare was submitted to DERM, and the interim open flare was brought to the facility during August 2002.

The uncontrolled landfill would emit more than 100 tons of NMOC, $H_2S$, and methane, a potent global warming gas, and more than 10 tons of HAPs. Landfill gas does not contain $SO_2$, NOx or CO; as discussed above, it is the NSPS required control system, in this case flares, that will emit these combustion pollutants. As best demonstrated technology (BDT) under the NSPS program, flares have been determined to be beneficial in comparison to the effect of emitting the NMOC in the landfill gas, including HAP and VOC constituents. This technology has the secondary benefit of controlling methane and $H_2S$.

As shown in Table 1 (attached), which will supplement Document 5 of the application, the landfill currently generates gas with approximately 215 tons of NMOC, 84 tons of VOC, 11 tons of HAPs, and 188 tons of $H_2S$ (based on recent monitoring of 1310 ppmv $H_2S$

(0.13%)). The control system reduces the NMOC and $H_2S$ emissions from more than 100 tons to 3 tons or less.

The capacity to control 6,000 cfm of gas appears to be adequate at this time. The facility expects to operate the proposed Flare 3 (6,000 scfm) as the primary control, replacing the open flares. The collateral pollutants of CO and NOx will be emitted at rates lower than the original open flares. The collateral emissions of $SO_2$ will not change due to this PCP, because the $H_2S$ content of the landfill gas, and therefore the combustion emissions of $SO_2$, will not change due to the project.

2. *Please provide calculations and documentation for all stack parameters used in the modeling analyses.*

Calculations were contained in Document 5 of the application (Supplemental Information, Emission Calculations). A more detailed response to this comment is included in correspondence to Mr. Cleve Holladay, DEP, and it will be copied to your office.

*2a. Demonstrate that the impact of the projected increase in emission will not result in exceedences of the Class 1 and Class 2 significant impact levels*

The screening results presented in the application were higher than the Class 1 significant impact levels used by the Federal Land Managers. In the teleconference, DEP indicated it had performed further analyses and the impacts were found to be acceptable. lower than the screening results at the Class 1 Everglades boundary, although still above the significant impact levels. DEP then considered the effects of nearby sources from an impact analysis submitted to them previously, and has concluded, with the Federal Land Manager, that the air quality concentrations resulting from the proposed flare will not exceed standards and the increment of the higher concentration levels under the proposed project is acceptable.

A more detailed response to this comment is included in correspondence to Mr. Cleve Holladay, DEP, and it will be copied to your office.

*a) Redo the short-term significant impact modeling if the highest expected short-term rates are greater than those proposed in the permit application.*

The short-term rates are not higher because landfill gas generation rate is relatively constant over the year time interaval and landfill control equipment operates continuously to burn all gas collected. This comment is addressed in more detail in the correspondence to to Mr. Cleve Holladay, DEP.

*b) submit a modeling protocol for approval*

As discussed in the teleconference, the modeling analysis is adequate and no protocol is required. This comment is also addressed in the correspondence to to Mr. Cleve Holladay, DEP.

3. *Demonstrate that the emissions will not violate the Miami-Dade $SO_2$ ambient air quality standards.*

The modeling results have been compared against the local AAQS and found to be acceptable. This comment is addressed in the correspondence to to Mr. Cleve Holladay, DEP.

4. *Statewide minor source baselines have been established for PM10, $SO_2$, and NOx.*

The teleconference clarified this point and indicated that the minor source baseline issue does not need to be addressed further.

Medley is an existing minor source, which is not above the threshold levels for a major PSD source. With the original and interim flare operating, the facility emissions during 2002 have been less than 250 tons for each pollutant. The need to control all landfill gas being produced at the current $H_2S$ levels, as proposed with this application for the enclosed flare, will change the potential emission profile of the facility, as discussed under Item 7 below.

5. *Provide adequate information such as the elevations of different structure surrounding the proposed flare, including existing and proposed landfill cells, pine trees, etc. and demonstrate why downwash does not apply in this case.*

Nearby structures are not close enough to create downwash. More complete details on the Good Engineering Practice stack height and downwash questions are being provided in the correspondence to Mr. Cleve Holladay, DEP.

6. *Submit a sample analysis and detailed characterization of the off-gases generated at the landfill specifically to determine the methane and non-methane organic composition.*

Recent testing shows that the methane content averages 48%. The NMOC content has not been tested recently. WMIF will sample the landfill gas for NMOC and report the results to DERM.

7. *Clarify if the existing flares will be replaced by this proposed flare... Submit a netting analysis of emissions.*

As discussed above, the proposed Flare 3 (6,000 scfm) will be operated as the primary control, replacing the open flares and emitting the collateral combustion pollutants CO and NOx at lower emission rates. It will control as much of the landfill gas as possible, up to its design capacity. $SO_2$ emissions will remain the same from the enclosed flare as they are from burning the gas in the open flares.

Should gas generation exceed 6,000 scfm, the original open flare would also be used for continuous control. Gas modeling for the NMOC and design reports has indicated that the landfill is predicted to produce a peak gas rate of 9,000 cfm in the peak year, 2013 (see Attachment 2.). Medley does not anticipate burning landfill gas at a rate above 9,000 cfm. The ultimate facility, when operating with the required controls, will emit 6.3 tons NMOC per year, appreciably below the major source threshold for NMOC. However, if the $H_2S$ content remains at 1400 ppmv, the facility-wide NSPS control system, will produce approximately 500 tons of $SO_2$ emissions in the year 2013.

Two factors show that this estimate is likely to be conservatively high. First, the $H_2S$ level is not expected to increase in the future and, in fact, has been decreasing since the mid 1990's. If there is a lower $H_2S$ content in 2013, the $SO_2$ emissions from controlling the peak generation rate would be lower than our assumed design rate.

In addition, the predicted maximum gas production rate in CY 2012 is only 8200 scfm, 9 percent lower than the 9,000 scfm basis for our calculation of the peak emission rate (in 2013). In the year following 2013, the maximum gas rate is predicted to be only 7700 scfm, approximately 14 percent lower than the peak year flow basis. Assuming conservatively that the $H_2S$ concentration remained at the assumed level of 1400 ppmv, these years would produce $SO_2$ emissions approximately 45 and 74 tons lower than the potential emission rate in the peak design year.

A review of the facility wide emissions and changes is presented in Table 1 attached.

Please proceed with processing the application based on this information. Medley would like to have approval to start construction of this flare in the spring of 2003.

We appreciate your assistance in clarifying the additional information necessary to complete the application. Should you have further questions, comments, or information needs, please contact me or Bryan Tindell at 305 883- 7670.

Sincerely,

Bryan Tindell
Engineer
Waste Management Inc. of Florida

Sarah Simon
Senior Air Engineer
EMCON/OWT, Inc.

Attachments: Table 1; Facility Emissions
Table 2; Predicted Landfill Gas Generation Rates

cc: Harold Watson, WMIF
Mallika Muthiah, DERM
Manuel Garcia, DERM
Cleve Holliday, FDEP
Syed Arif, FDEP
Juene Franklin, P.E., EMCON/OWT

# ATTACHMENT 1

# FACILITY EMISSIONS

**Facility Actual Flare Emissions ( 2001-2002)**

| Operation | Flare 1 Utility Flare (lb/hr) | Flare 2 [(2)] Interim Flare (lb/hr) | Inlet (tons) | Annual Emissions - 2002 Flare 1 8760 (tons) | Flare 2 (: 3285 (tons) | Actual 2002 (hours) (tons) | Permit Limit (tons/yr) |
|---|---|---|---|---|---|---|---|
| VOC | 0.14 | 0.25 | 84.02 | 0.73 | 0.41 | **1.14** | |
| NMOC | 0.35 | 0.63 | 215.43 | 1.88 | 1.04 | **2.92** | |
| HAPs | 0.01 | 0.02 | 11.31 | 0.06 | 0.03 | **0.09** | |
| $H_2S$ [(1)] | *0.23* | *0.42* | *188.0* | 1.23 | 0.68 | ***1.91*** | |
| ***Collateral Combustion Pollutants*** | | | | | | | |
| CO [(3)] | 26.9 | 48.8 | - | 144 | 80 | **225** | 244 |
| NOx | 4.9 | 9.0 | - | 27 | 15 | **41** | |
| PM-10 | 0.65 | 1.19 | - | 4 | 2 | **5** | |
| ***Contaminant Collateral Byproducts*** | | | | | | | |
| $SO_2$ [(1)] | 29.3 | 53.3 | - | 157 | 87 | **245** | 249.2 |
| HCl | 0.52 | 0.95 | - | 2.81 | 1.56 | **4.37** | |

| **Future** | **Potential to Emit [(2)]** Flare 3 ton/yr | **Facility** (tons/yr) | **Emission Change (netting)** from permit | from 2002 actual emissions |
|---|---|---|---|---|
| VOC | 1.6 | **2.16** | | 1.0 |
| NMOC | 4.2 | **5.55** | | 2.6 |
| HAPs | 0.1 | **0.18** | | 0.1 |
| $H_2S$ | 2.7 | **3.63** | | 1.7 |
| CO [(3)] | 173.4 | **279.34** | 35.3 | *54.7* |
| NOx | 52.0 | **71.50** | | 30.2 |
| PM-10 | 7.81 | **10.39** | | 4.9 |
| SO2 | 349.9 | **465.33** | 216.1 | *220.4* |
| HCl | 6.2 | **8.31** | | 3.9 |

Notes:

(1) $H_2S$ and SO2 emissions dependent upon H2S concentration in landfill gas 1310 ppmv used for potential at 900 ppmv, 31% lower ~ 240.4 tons/yr for Flare #3

(2) Flare 2 installed in August 2002
Potential emissions based on Flare1 (open flare) and New Flare 3 (enclosed) burning 9,000 cfm gas. Flare 2 will be for backup.
9000 scfm used for calculations to cover Flare #1 and Flare #3 capacity
8477 scfm landfill gas predicted in 2013, peak year.

(3) Enclosed Flare #3 has lower emission rates for CO and NOx than utility flares

# ATTACHMENT 2

# PREDICTED LANDFILL GAS GENERATION RATES

## LFG Recovery Projection

SCS conducted LFG modeling to estimate the potential LFG recovery rate using our in-house model, which employs a first-order exponential decay function similar to the U.S. EPA Landfill Gas Emissions Model. The SCS model was developed based on actual LFG collection data for over 100 sites across the U.S. Because the model is based on "real world" collection data it projects a LFG recovery potential, and not a generation rate. The LFG recovery potential is the maximum potential amount of LFG that can expect to be collected at a landfill with a 100-percent comprehensive collection system.

The parameters input to the SCS model include the historical and expected future annual waste receipts in tons, the expected collection system coverage percentage, and precipitation-based values of the "apparent" ultimate methane recovery potential ($L_o$) and decay rate constant (k). Based on these variables, the model calculates an annual LFG recovery rate estimate.

The model results are summarized in Table 1. Note that LFG generation will continue to increase until the landfill closes, which is currently expected to occur in approximately 2012. Note that the actual LFG collection/recovery rate will depend on the comprehensive installation of LFG wells as the landfill continues to expand.

**TABLE 1. TOTAL LFG RECOVERY PROJECTION**
**MEDLEY LANDFILL - DADE COUNTY, FLORIDA**

| YEAR | REFUSE IN PLACE (tons) | LFG RECOVERY POTENTIAL (scfm) | |
|---|---|---|---|
| | | 100% Coverage | 75% Coverage |
| 2002 | 13,459,283 | 5,363 | 4,022 |
| 2003 | 14,219,613 | 5,657 | 4,243 |
| 2004 | 15,002,753 | 5,946 | 4,460 |
| 2005 | 15,809,387 | 6,231 | 4,673 |
| 2006 | 16,640,220 | 6,512 | 4,884 |
| 2007 | 17,495,978 | 6,791 | 5,093 |
| 2008 | 18,377,409 | 7,070 | 5,302 |
| 2009 | 19,285,283 | 7,348 | 5,511 |
| 2010 | 20,220,393 | 7,627 | 5,720 |
| 2011 | 21,183,556 | 7,908 | 5,931 |
| 2012 | 22,175,615 | 8,191 | 6,143 |
| 2013 | 22,175,615 | 8,477 | 6,358 |
| 2014 | 22,175,615 | 7,677 | 5,758 |
| 2015 | 22,175,615 | 6,953 | 5,215 |
| 2016 | 22,175,615 | 6,298 | 4,724 |
| 2017 | 22,175,615 | 5,706 | 4,279 |
| 2018 | 22,175,615 | 5,170 | 3,877 |
| 2019 | 22,175,615 | 4,685 | 3,514 |
| 2020 | 22,175,615 | 4,246 | 3,184 |

WASTE MANAGEMENT

Miami Dade/Monroe Division
2125 NW 10th Ct.
Miami, FL 33127
(305) 547-6019
(305) 326-0247 Fax

January 9, 2003

Mr. Cleve Holladay
Division of Air Resources Management
Department of Environmental Protection
2600 Blair Stone Road, MS-5505
Tallahassee, FL 32399

Re: Response to Modeling Comments in December 6, 2002, Letter from Miami-Dade Department of Environmental Management, on the Medley Landfill and Recycling Center Flare Permit Application

Dear Mr. Holladay:

On behalf of Waste Management, Inc. of Florida, EMCON/OWT Inc. (EMCON) offers these responses to the Florida Department of Environmental Protection comments regarding the impact analysis for the proposed enclosed flare that were included in the letter referenced above from the Miami-Dade Department of Environmental Resource Management (DERM). After discussing the issues with you and DERM in a teleconference on December 11, 2002, EMCON is submitting more detailed information regarding the impact analysis comments, as follows.

1. *Please provide additional information to demonstrate the applicability of the Pollution Control Exemption contained in Rule 62-212.400(2)2.c.*

As discussed in a letter responding to H. Patrick Wong, Miami-Dade Department of Environmental Resource Management (DERM), the proposed hydrocarbon flare is a pollution control project (PCP) that is required under 40 CFR Subpart WWW. EMCON has sent a copy of that letter to DEP.

2. *The rules do not exempt the applicant from demonstrating to the Department that the increase in emissions does not violate an ambient air quality standard (AAQS), maximum allowable increase (increment), or visibility limitation. This includes an evaluation of both short term and long term impacts. The evaluation of short-term impacts should be based on the highest expected short-term emission rate. This value is usually greater than the long-term emission rate. Please provide calculations and documentation for all stack parameters used in the modeling analyses.*

Calculations were contained in Document 5 of the application. The landfill gas generation rate at a landfill is relatively constant over a year's time. Because landfill gas collection and control systems must operate continuously, the short term (hourly) emission rates for the proposed flare were based on the hourly design capacity using Medley's gas. The annual rate was calculated assuming 8760 hour annual operation. Thus, the highest short term emission rates are the same as, rather than higher than, the long-term emission rates. These rates were the basis for the AAQS, increment, and visibility analyses submitted.

*2 a) ...Medley Landfill [should] demonstrate that the impact of the projected increase in emissions will not result in exceedences of significant impact levels for Class 1 as well as Class 2 PSD areas. The applicant should redo the short-term significant impact modeling if the highest expected short-term rates are greater than those proposed in the permit application. If any significant impact levels are exceeded, then further multi-source impact analyses will be required for any pollutant and averaging time that an above significant impact level is predicted. This multi-source modeling is required to demonstrate that increased emission will not result in an exceedance of any federal, state, or local ambient air quality standards of PSD increments.*

As discussed in our teleconference on December 11, 2002, the screening results presented in the application were higher than the Class 1 significant impact levels used by the Federal Land Managers. DEP performed a refined modeling analysis using ISC and the results of a CAL-PUFF model run, and the flare's impacts were found to be lower than the screening results at the Class 1 Everglades boundary, although still above the significant impact levels.

You indicated that the analysis you performed considered the effects of nearby sources from a modeling study submitted previously. DEP said that it had determined, with the Federal Land Manager, that the air quality concentrations resulting from the proposed flare will not exceed AAQS or the increments in the Class I or Class 2 areas. DEP has concluded that the proposed project impacts are acceptable. EMCON prepared an expanded summary of the analysis as described in our response to Comments 3 and 4.

As discussed under Comment 2), the short-term impact modeling submitted with the application reflected the highest short-term emission rates.

*b) submit a modeling protocol for approval...*

As discussed in the teleconference, the modeling analysis is adequate and no protocol is required to be submitted.

While not included in the comment letter, during the teleconference you asked about whether the "flare option" had been used in the screen modeling run. EMCON did run the inputs using the "flare option" and found that the impacts were lower. As a result, EMCON submitted results in the impact report that were not modeled using the "flare option."

3. *Demonstrate that the emissions will not violate the Miami-Dade $SO_2$ ambient air quality standards.*

The modeling results have been compared against the local AAQS in a revision to Table Ambient Air Quality Standards Modeling Results in the application. The AAQS will not be exceeded.

The revised table is presented in Attachment 1.

3. *Statewide minor source baselines have been established for PM10, $SO_2$, and NOx.*

The teleconference clarified this point and indicated that the minor source baseline issue does not need to be addressed further.

4. *Provide adequate information such as the elevations of different structures surrounding the proposed flare, including existing and proposed landfill cells, pine trees, etc. and demonstrate why downwash does not apply in this case.*

More complete details of nearby structures near the proposed flare have been included in a revision to the facility plan of the facility in order to more thoroughly evaluate the Good Engineering Practice (GEP) stack height and the potential for downwash.

A chart presenting detailed information and a description of the GEP analysis is included with the revised plan (Figure 2) in Attachment 2.

5. *Submit a sample analysis and detailed characterization of the off-gases generated at the landfill specifically to determine the methane and non-methane organic composition.*

Gas characterization information was included in the DERM letter. As indicated above, a copy of this letter has been sent to you.

6. *Clarify if the existing flares will be replaced by this proposed flare... Submit a netting analysis of emissions.*

Emission information for the facility is included in the DERM letter. A copy of this letter was sent to your office.

The modeling comments discussed in detail above were briefly addressed in the letter to DERM referenced above. EMCON is sending a copy of this letter to DERM to complete their file with the detailed responses to the modeling issues. We have requested that DERM proceed with processing the application based on the responses contained in both letters.

Should you have further questions, comments, or information needs, please contact me or Sarah Simon at 978-691-2126

Sincerely,

EMCON/OWT, Inc.

Bryan Tindell,
Engineer

Sarah J. Simon
Senior Air Engineer

Attachments: Attachment 1: Revised Table AAQS Modeling Results
Attachment 2: GEP Analysis and Nearby Building Plan

cc: H. Patrick Wong, DERM
Mallika Muthiah, DERM
Juene K. Franklin – EMCON
Bruce Maillet – EMCON
Scott Miller - EMCON
Syed Arif, DEP

# ATTACHMENT 1

| | | |
|---|---|---|
| Dilution Factor[a] | 0.9235 µg/m³/g/s | |
| Is the factor 1 hour ( | 1 hrb | Simple Terrain |
| Annual operation[e] | 8,760 hr/yr | |

**Criteria Pollutants**

| Pollutant | Emission Rate [(c)] ton/yr | g/s | Averaging Period (hr) | Maximum Modeled Concentration (µg/m³) | Monitored Concentration [d] (µg/m³) | Total (µg/m³) | Miami-Dade AAQS [(e)] (µg/m³) | NAAQS (µg/m³) |
|---|---|---|---|---|---|---|---|---|
| $NO_2$ | 59.0 | 1.70 | Annual | 0.13 | 34.9 | 35.0 | | 100 |
| $SO_2$ | 370 | 10.63 | 3 | 8.84 | 37.1 | 46.0 | 350 | 1,300 |
| | | | 24 | 3.93 | 11.4 | 15.4 | 110 | 365 |
| | | | Annual | 0.79 | 2.86 | 3.64 | 25 | 80 |
| CO | 173 | 4.99 | 1 | 4.61 | 10,995 | 11,000 | | 40,000 |
| | | | 8 | 3.23 | 5,747 | 5,751 | | 10,000 |
| $PM_{10}$ | 7.67 | 0.22 | 24 | 0.08 | 95.0 | 95.1 | | 150 |
| | | | Annual | 0.02 | 28.4 | 28.4 | | 50 |

[a] Source: SCREEN3 maximum modeled concentration

[b] Conversions per EPA guidance from 1 hour to 1 hour 1.00, 3 hour 0.90, 8 hour 0.70, 24 hour 0.40, Annual 0.08

[c] Emission Rates taken from Medley Modeling 6K Flare.xls:Source Information

[d] Source: AIRS database; maximum high-second high over the latest 4+ years listed (except for annual)
Monitored Concentrations taken from
Medley Modeling 6K Flare.xls:Monitored NO2 Concentrations'!

[e] Miami Dade AAQS added; taken from Miami-Dade DERM Website

# ATTACHMENT 2

Shaw

3 Riverside Drive
Andover, MA 01810-1141
Phone: 978-682-1980
Fax: 978-975-2065

# Memorandum

**Date:** January 8, 2003

**To:** Rick Garcia

**CC:** Bryan Tindell

**From:** Scott D. Miller/Sarah Simon

**RE:** GEP and Downwash Potential for New Flare at Medley Landfill

## Good Engineering Practice Stack Height Analysis

In some cases, the aerodynamic turbulence induced by a *nearby* (i.e., structures within a distance of five times the lesser of the height or width of the structure, but not greater than 0.5 miles) building will cause a pollutant emitted from an elevated source to be mixed rapidly toward the ground (*downwash*), resulting in higher ground-level concentrations immediately to the lee of the building than would otherwise occur. SCREEN3 can calculate ground-level pollutant concentrations that occur as a result of the downwash. The building downwash screening procedure is divided into the *cavity* region and *wake* region.

A simple rule-of-thumb, known as "GEP" (Good Engineering Practice) stack height, is typically applied to determine the stack height ($h_s$) necessary to *avoid* downwash problems:

$$h_s \geq h_b + 1.5\ L_b$$

where $h_b$ is building height and $L_b$ is the lesser of either building height or maximum projected building width. In other words, if the stack height is equal to or greater than $h_b + 1.5\ L_b$, downwash is unlikely to be a problem.

A GEP stack height analysis identifies nearby structures on an off a site that have the potential to influence stack exhaust. If more than one structure is considered in the analysis, the structure (or tier on a structure) that results in the highest GEP formula height is considered the *controlling* structure (or tier) and is input to SCREEN3.

### Cavity Region

Generally, downwash has its greatest impact when the effluent is caught in the cavity region. Cavity calculations are based on the determination of a *critical* (i.e., minimum) wind speed required to cause *entrainment* of the plume in the cavity (defined as being when the plume centerline height equals the cavity height). Two cavity calculations are made, the first using the minimum horizontal dimension alongwind, and the second using the maximum horizontal dimension alongwind. SCREEN3 provides the cavity concentration, cavity length (measured from the lee side of the building), cavity height, and critical wind speed for each orientation. The highest concentration value that potentially affects ambient air is used as the maximum 1-hour cavity concentration for the source.

### Wake Region

The cavity may not extend beyond the plant boundary and, in some instances, impacts in the *wake* region may exceed impacts in the cavity region. SCREEN3 accounts for downwash effects within the *near* wake region (out to 10 times the lesser of the building height or projected building width, $10L_b$), and also accounts for the effects of enhanced dispersion of the plume within the *far* wake region (i.e., beyond $10L_b$). The same building dimensions as described above for the cavity calculations are used, and SCREEN3 calculates the maximum projected width from the values input for the minimum and maximum horizontal dimensions.

### Structures Considered for this Analysis

Figure 2 is a footprint showing all structures considered in the GEP analysis. Table 1 (next page) shows that the flare is far enough away from all buildings/structures such that dimensions do not have to be considered in the modeling.

Shaw

**Table 1. Good Engineering Stack Height Analysis**
**Flare3 is located beyond the furthest "aerodynamic" extent of any building/structure**

| Building/Structure | Dimensions[a,b] Height (ft) | Length (ft) | Width (ft) | MPW (ft) | L (ft) | 5L (ft) | Distance to Flare 3[d] (ft) | GEP Formula Height[c] (ft) |
|---|---|---|---|---|---|---|---|---|
| Administation Building | 35 | 95 | 70 | 110 | 35 | 175 | 195 | 87.5 |
| Truck Wash Cover | 35 | 65 | 50 | 80 | 35 | 175 | 345 | 87.5 |
| Treatment Plant | 30 | 60 | 50 | 80 | 30 | 150 | 515 | 75.0 |
| Tank 1(round) | 30 | -- | -- | 32 | 30 | 150 | 520 | 75.0 |
| Tank 2 (round) | 30 | -- | -- | 32 | 30 | 150 | 570 | 75.0 |

MPW - maximum projected width

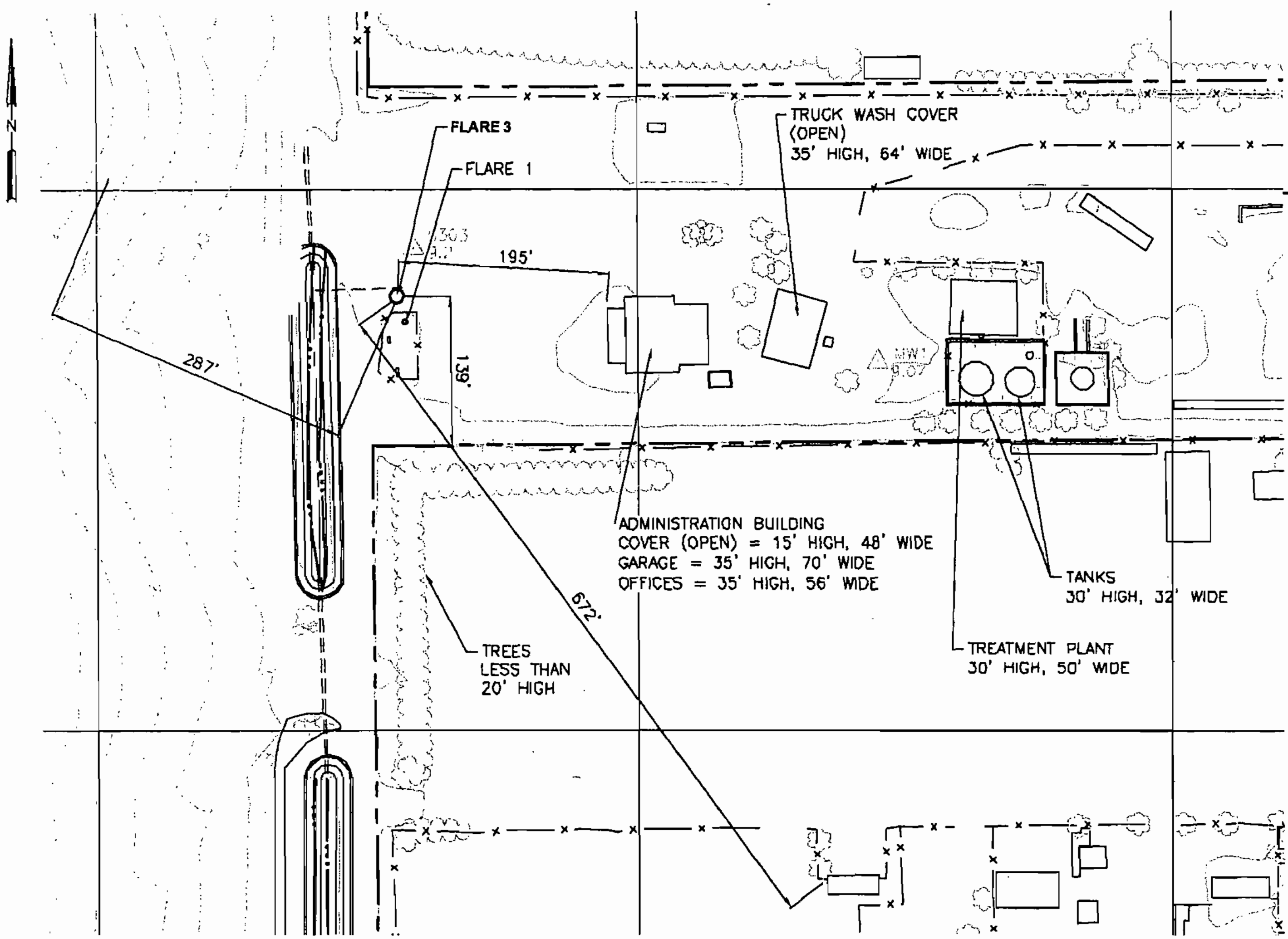
L - lesser of height or maximum projected width

[a]Dimensions measured from: *Figure 2, Nearby Buildings and Dimensions*, EMCON/OWT, Inc. January 2003.

[b]measurements are approximate

[c]A stack would have to be at least this height to escape the aerodynamic influence of this building/structure (for modeling purposes)

[d]Measured from center of flare to nearest edge




## LEGEND

FINAL COVER GRADE CONTOURS

EXISTING PROPERTY LINE

FLARE SYSTEM:

FLARE 1 IS 30' TALL, 14" DIAMETER (EXISTING UTILITY FLARE)

FLARE 3 (PROPOSED) WILL BE 55' TALL, 13' DIAMETER (ENCLOSED FLARE)

NOTES:

1. NEAREST PROPERTY LINES ARE 110' SOUTH OF FLARE 1 AND FLARE 3.
2. ADMINISTRATION BUILDING IS 205' EAST OF FLARES.
3. NEAREST BUILDING SOUTH BEYOND FENCE LINE IS 635' SOUTHWEST.
4. BUILDING HEIGHTS AND WIDTHS MARKED IN FEET.

This map compiled by photogrammetric methods from aerial photography dated 09-05-99 Vertical datum based on NGS Mean Sea Level Contour interval 2 ft Grid based on Florida State Plane Coordinate System South Zone NAD 1927.

Shaw EMCON/OWT, Inc.

0 100 200
SCALE IN FEET

**FOR PERMITTING ONLY**

DATE 1/3/03
DWN J.O'D.
APP
REV
PROJECT NO. 840138

**FIGURE 2**
WASTE MANAGEMENT, INC.
MEDLEY LANDFILL
MEDLEY, FLORIDA
**NEARBY BUILDINGS AND DIMENSIONS**