

# **FIELD OLFACTOMETER MONITORING TO DETERMINE INTENSITY**

**Odor Control at Solid Waste Management Facilities  
Albany, New York  
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# Sullivan County Landfill & Leachate Experiences

- ◆ Background
- ◆ Odor Issues
- ◆ Landfill Odor Monitoring Study
- ◆ Intensity Results
- ◆ Point Sources – Leachate Tanks

# Background

- ◆ 45-Acre County owned Landfill
- ◆ Average 200,000 tons/yr MSW-variable
- ◆ Average 45,000 tons/yr WTE Ash
- ◆ Average 30,000 tons/yr C&D Fines
  - 1997 through 2003
- ◆ Suburban/Rural Environment
- ◆ Phase II Expansion Planned

# Odor Issues

- ◆ **Odor Sources**
  - LFG
  - Working Face
  - Leachate Seeps
- ◆ **C&D Fines as ADC**
  - Gypsum wallboard to H<sub>2</sub>S
  - LFG H<sub>2</sub>S Levels Increase
- ◆ **Regulatory Discussion**
- ◆ **Ambient Air Monitoring, H<sub>2</sub>S-2004**
  - No Health Impacts
  - Odor from H<sub>2</sub>S
- ◆ **Odor Control Plan-2004**
- ◆ **Odor Hotline-2004**

# Initial Odor Control Efforts

- ◆ Install Odor Masking System
- ◆ Cease receipt of C&D fines – June 2004
- ◆ Expand/Monitor LFG collection system
  - Aggressive collection
- ◆ Minimize working face area
- ◆ Increase frequency of daily cover application
- ◆ Install new flare

# Additional Issues/Steps/Needs

- ◆ Initial Actions reduce some odors
- ◆ Define Perimeter Odor Threshold/violation
- ◆ H<sub>2</sub>S Reduction Slow, over time
- ◆ Develop Specific Monitoring Procedures
  - Quantify Odors vs. Complaints

# Odor Monitoring Program

- ◆ **Odor Hotline Complaints**
  - Refine Verification
- ◆ **2-Month Intensive Monitoring Program**
  - Field Olfactometer Equipment (Nasal Ranger)
  - Respond to Odor Hotline Inquiries/Complaints
  - Compare/Correlate results

# Intensive Monitoring Program Objectives

- ◆ Odor - Relative Intensity
- ◆ Location, frequency, duration
- ◆ Odor source (Landfill or Other)
- ◆ Odor source relationship to LF/LFG
- ◆ Results Comparison with Hotline Complaints
- ◆ Recommend additional measures



# Olfactometer Monitoring

## ◆ Locations

- 5 on Landfill Site
- 23 Offsite

## ◆ Frequency

- One, two or three rounds
- Weekdays
- Early morning or early evening
- Over 40 days, 77 rounds = 1,765 Readings

# Nasal Ranger ®

- ◆ **Field Olfactometer-eliminates “Human Factor”**
- ◆ **Hand Held, portable device**
- ◆ **Trained Technician**
  - **Passed Odor Sensitivity Test**
- ◆ **Measures Relative Intensity**
- ◆ **“Dilution-to-Threshold” (D/T) value 0-60**
  - **Discrete Dilutions of odorous gas to filtered air**

# Relative Intensity

**$D/T = \frac{\text{Volume of Carbon Filtered Air}}{\text{Volume of Odorous Air}}$**

<b>D/T Ratio</b>	<b>Description</b>
<b>0</b>	<b>No Odor Detected</b>
<b>2</b>	<b>Barely discernable Odor</b>
<b>4</b>	<b>Very slight Odor</b>
<b>7</b>	<b>Slight Odor</b>
<b>15</b>	<b>Mild Odor</b>
<b>30</b>	<b>Moderate Odor</b>
<b>60</b>	<b>Strong Odor</b>



# Odor Types

## On-site

- ◆ Hydrogen Sulfide
- ◆ Working Face
- ◆ Odor Neutralizing Agent
- ◆ Refuse Trucks/Bins
- ◆ Leachate/Condensate
- ◆ Pretreatment Plant
- ◆ Landfill Gas
- ◆ Other

## Off-Site

- ◆ Septic/Sewage
- ◆ Animal Carcass
- ◆ WW Treatment Plant
- ◆ Tanker Trucks
- ◆ Local Refuse Trucks
- ◆ Wood Smoke
- ◆ Vehicle Exhaust/Diesel
- ◆ Burning Tires
- ◆ Propane
- ◆ Other

# Field Olfactometer Readings Summary

## ◆ On-Site Locations

- Most in 2-15 Range
- Readings up to 30 (highest recorded on-site)
- Some correlation with hotline complaints
- Some working face, most LFG

# Field Olfactometer Readings Summary (Continued)

## ◆ Off-site Locations

- 1,765 Readings
- 105 Detections with  $D/T \geq 2$
- 59 Detections from Landfill
- 97 percent of readings no odor detected

# Off-Site Odor Readings

- ◆ No D/T > 7 (slight) for off-site locations
- ◆ Six locations – no odor detected
- ◆ Eleven locations – odors detected 4 times or less (total of 77 readings)
- ◆ Seven locations – odors detected 6 to 21 times (total of 77 readings)

# Odor Hot Line Complaints

- ◆ **61% Complaints Investigated**
  - **28% No Odor**
  - **21% Odors from other sources**
  - **14% Landfill Odors**
  - **39% unconfirmed**

## SUMMARY OF ODOR HOTLINE COMPLAINTS AND INVESTIGATIONS SULLIVAN COUNTY LANDFILL

Month	No. of Odor Comp.	No. of Cty Invest.	LF Odors (2)	Total Other Odors (4)	Other Odor Types <sup>(3)</sup>						No Odor Detect <sup>(3)</sup>	% of No LF Odors	% of LF Odors	% of Other Odors	% Not confirm.
					1	2	3	4	5	6					
Mar - 04	54	32	6	11	0	4	7	0	0	0	15	28%	11%	20%	41%
Apr - 04	40	14	5	1	0	1	0	0	0	0	8	20%	13%	3%	65%
May -04	21	13	2	5	0	0	0	2	3	0	6	29%	10%	24%	38%
Jun-04	21	13	2	5	0	2	0	1	2	0	6	29%	10%	24%	38%
Jul-04	19	11	1	3	0	1	0	0	0	3	6	32%	5%	16%	42%
Aug-04	25	9	0	6	0	2	0	1	0	3	3	12%	0%	24%	64%
Sep-04	19	8	3	2	0	0	1	0	0	1	0	0%	16%	11%	58%
Oct-04	4	1	0	0	0	0	0	0	0	0	1	25%	0%	0%	75%
Nov-04	13	9	4	0	0	0	0	0	0	1	6	46%	31%	0%	31%
Dec-04	8	7	6	1	0	0	0	0	1	0	1	13%	75%	13%	13%
Jan-05	5	5	1	2	0	0	0	0	1	1	2	40%	20%	40%	0%
Feb-05	18	10	5	3	0	0	1	0	0	2	2	11%	28%	17%	44%
Mar-05	6	7	2	3	0	2	0	0	0	1	2	33%	33%	50%	0%
<b>Apr-05</b>	<b>36</b>	<b>19</b>	<b>4</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>14%</b>	<b>11%</b>	<b>28%</b>	<b>47%</b>
<b>May-05</b>	<b>15</b>	<b>14</b>	<b>2</b>	<b>7</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>33%</b>	<b>13%</b>	<b>47%</b>	<b>7%</b>
<b>Jun-05</b>	<b>29</b>	<b>20</b>	<b>10</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>7</b>	<b>24%</b>	<b>34%</b>	<b>7%</b>	<b>31%</b>
Jul-05	27	16	0	8	0	0	0	0	6	2	8	30%	0%	30%	41%
Aug-05	67	40	3	20	1	0	1		13	5	17	25%	4%	30%	40%
Sep-05	27	22	3	9	4	0	0	0	4	1	15	56%	11%	33%	19%
Oct-05	19	17	7	0	0	0	0	0	0	0	12	63%	37%	0%	11%
Nov-05	8	7	3	1	0	0	0	0	0	1	4	50%	38%	13%	13%
<b>Average /Month</b>	<b>23</b>	<b>14</b>	<b>3</b>	<b>5</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>28%</b>	<b>14%</b>	<b>21%</b>	<b>39%</b>

# Study Conclusions

- ◆ Some correlation between on-site  $D/T > 15$  and off-site odor
- ◆ Significant “other” odor sources
- ◆ Ability to quantify maximum impact areas
- ◆ 1 percent total readings  $D/T > 4$
- ◆ Reasonable Hotline correlation to  $D/T > 4$

# Applicability/Utility

- ◆ Analytical Odor Tests are not sensitive to be useful
- ◆ Field Olfactometer Testing can quantify odor intensity
- ◆ Statistical data is useful in evaluating actual conditions vs. complaints
- ◆ “Threshold” and “Violation” conditions remain subjective

# Point Source

- ◆ **Leachate Tank/Plant**
  - Jerome Meter
  - Olfactometer (previous study)
- ◆ **Tank Vents- up to 1.37 ppm H<sub>2</sub>S**
- ◆ **Plant - 0.015 to 0.32 ppm**
- ◆ **Landfill Perimeter – 0.004 to 0.010 ppm**

# Additional Odor Control Techniques

- ◆ Close Plant doors
- ◆ Leachate Storage Tank Vents



# Leachate Tank Vents

- ◆ Vents and Equalization Line
- ◆ PVC Piping
- ◆ Activated Carbon Canisters
- ◆ High Pressure/Vacuum Breaker Valve
- ◆ Canisters in Series

# Recommendations

- ◆ Continue Odor Hot Line
- ◆ Discontinue Intensive Olfactometer Monitoring
- ◆ Daily On-site Olfactometer Monitoring
- ◆ Implement Mitigating Measures