

# Health Consultation

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PUBLIC HEALTH EVALUATION  
OF GAS VENT  
SAMPLING DATA REPORTS

OLD SOUTHLINGTON LANDFILL  
SOUTHLINGTON, HARTFORD COUNTY, CONNECTICUT

EPA FACILITY ID: CTD980670806

OCTOBER 4, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Prepared by:

The Connecticut Department of Public Health  
Under Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry

# **HEALTH CONSULTATION**

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OF GAS VENT  
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**CERCLIS No. CTD980670806**

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*The conclusions and recommendations in this health consultation are based on the data and information made available to the Connecticut Department of Public Health (CTDPH) and the Agency for Toxic Substances and Disease Registry (ATSDR). CTDPH and ATSDR will review additional information when received. The review of additional data could change the conclusions and recommendations listed in this document.*

## **A. BACKGROUND AND STATEMENT OF ISSUE**

The United States Environmental Protection Agency (EPA) requested that the Connecticut Department of Public Health (CT DPH) review and comment on the Gas Vent Sampling Data Reports dated December, April, and July of 2002 from the Old Southington Landfill Superfund Site in Southington, Connecticut. The Gas Vent Sampling Data Reports were prepared for the US EPA by MACTEC Engineering and Consulting. The specific question posed to CT DPH by EPA was whether on-site landfill workers were exposed to unacceptable levels of contaminants from the landfill gas.

The Old Southington Landfill (OSL) is located in Southington, Connecticut. The landfill operated from approximately 1920 until 1967. The 13 acre site is located adjacent to Old Turnpike Road in the Plantsville section of town. The site is bordered by Old Turnpike Road to the west, Rejean Road to the north, and Black Pond to the east. The surrounding neighboring properties include town production well number five, the land occupied by the Lori Corporation, WNT4 Radio Station, and Chuck and Eddie's Used Auto Parts Yard. Open dumping of liquid, solid, and hazardous wastes began in 1950. Open burning of wastes and spontaneous chemical fires occurred for an unknown period of time. Various contaminants of concern, including volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), metals, and pesticides have been found in groundwater and soil (ATSDR 1995).

A Public Health Assessment prepared in 1995 concluded that the site is a public health hazard based on the physical hazards associated with the methane contamination of indoor air in commercial facilities (ATSDR 1995). Since that time, structures at risk from methane have been relocated and the landfill has been capped. Following completion of the landfill cap in 2001, a gas vent sampling program was initiated. The purpose of this program was to provide data to support whether or not active gas treatment would be necessary at the landfill. The reports forwarded by EPA to CT DPH for review, present the three rounds of sampling for VOCs, flow rate, temperature, relative humidity, methane, carbon dioxide levels, oxygen and hydrogen sulfide from each of the 13 vents across the Old Southington Landfill Superfund Site in Southington, Connecticut

## **B. DISCUSSION**

### Summary of Data:

Sampling was performed at each of the 13 gas vents on the landfill. A total of three sampling events were conducted (October 2001, April 2002 and September 2002). During each event, samples for VOCs, landfill gas flow rate, temperature, relative humidity, methane, carbon dioxide, oxygen, carbon monoxide, sulfur compounds and

formaldehyde were collected from each of the 13 vents. Sampling results are summarized in Table 1 below. Sampling results are included only for contaminants that are specifically discussed in the comments that follow.

**Table 1.** Summary of Select Landfill Gas Sampling Data, 2001-2002, Old Southington Landfill, Southington, Connecticut.

Chemical	Maximum Concentration ( $\mu\text{g}/\text{m}^3$ ) unless noted	Draft Acute HLV <sup>#</sup>	Number of samples above acute HLV	draft Chronic HLV <sup>§</sup>	Number of samples above chronic HLV	Odor Threshold <sup>ϕ</sup> (ppb)
Trichloroethylene	140,000	5,000	5 of 39	5.85	34 of 39	not applicable
Vinyl Chloride	1,500	650	1 of 39	1.33	31 of 39	not applicable
Tetrachloroethylene	2,900	10,000	0 of 39	2	23 of 39	not applicable
Dimethyl sulfide	26 ppb	not available	-----	not available	-----	1
Dimethyl disulfide	9.7 ppb	not available	-----	not available	-----	7.5

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; **Acute HLV<sup>#</sup>** = Acute Hazard Limit Values are concentrations (developed by Connecticut Department of Public Health) in air that are derived to protect the general public from hazardous air pollutants from permitted stack emissions. Acute HLVs are values not to be exceeded in a 1-hour time period; **Draft Chronic HLV<sup>§</sup>** = chronic hazard limit values are annual averages not to be exceeded; and **Odor Threshold<sup>ϕ</sup> (ppb)** = level of a chemical at which people can smell it, in parts-per-billion (ppb).

***Comments on the Gas Vent Sampling Data Reports for Old Southington Landfill***

In reviewing the Gas Vent Sampling Data Reports, CT DPH focused on the particular question posed by EPA: are on-site landfill workers exposed to unacceptable levels of contaminants from the landfill gas? CT DPH provided the following comments to EPA for its consideration:

1. The data reports compare the gas vent sampling results with Occupational Health and Safety Administration (OSHA) Permissible Exposure Limits (PELs). PELs are time-weighted average concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. CT DPH disagrees with use of occupational standards in this instance. OSHA standards were designed primarily for industries which use chemicals in industrial production and thus involve workers who are unavoidably exposed. To protect those workers, OSHA requires that employers provide appropriate training and information regarding exposure, exposure control and potential health effects from the hazardous chemicals they are exposed to in their workplace. It would not be reasonable to expect employers to provide such information and protections to non-industrial workers such as groundskeepers. Given this, the OSHA standards are not appropriate for the non-industrial workplace.

Furthermore, OSHA standards are not strictly health-based. For most chemicals, OSHA standards are a compromise between health-based values and levels that are technically feasible for industry to achieve.

2. CT DPH believes that more appropriate comparison values are the Connecticut draft Hazard Limit Values (HLVs). CT DPH compared the levels of VOCs from the landfill vents with the draft chronic and acute HLVs. HLVs are developed to protect the general public from hazardous air pollutants from permitted stack emissions. The HLVs were revised recently, but the revised values have not been formally adopted yet by the Connecticut Department of Environmental Protection (CTDEP). For this reason, they are referred to as draft HLVs. The draft chronic HLVs are expressed as annual averages, and the draft acute HLVs are 1 hour values.
3. According to the vent sampling data reports, on-site workers with the potential to be exposed to landfill vent gases are: 1) landfill inspectors who would spend very brief periods of time on the landfill cap to perform monthly inspections; and 2) maintenance workers who would mow the grass and perform other needed landscaping work during the growing season. Given that these are short duration exposures, CT DPH believes that the acute HLVs are more relevant comparison values than the chronic HLVs. It should be noted that the mouth of each of the landfill vents is only about 4 feet above the ground surface.

VOC levels at the landfill exceed acute HLVs for two contaminants, trichloroethylene (TCE) and vinyl chloride. The acute HLV for TCE is exceeded at three different locations (GV-03, GV-07 and GV-09). The acute HLV for vinyl chloride is exceeded at one location (GV-07). Exceedances range from 25 times above the acute HLV for TCE to two times above the acute HLV for vinyl chloride.

For TCE, an exceedance of 25 times above the acute HLV is within the range where health effects from acute inhalation exposure to TCE have been seen in humans and animals (central nervous system toxicity and adverse effects on the endocrine system and liver) (ATSDR 1997a). For vinyl chloride, an exceedance of two times above the acute HLV is below (about 100 times below) the lowest exposure level where adverse effects were observed (developmental effects in mice and rabbits) (ATSDR 1997b).

4. CT DPH also compared average VOC levels from landfill gas with the chronic HLVs. Even though exposures at the landfill (inspectors and maintenance workers) are short-term exposures and not continuous, long-term exposures, CT DPH thought it would be worthwhile to see how average VOC levels compare with chronic HLVs. CT DPH calculated the 95% upper concentration limit (95% UCL) for each VOC across all sampling locations and sampling rounds. The 95% UCL is a conservative estimate of the average concentration (central tendency). It accounts for variability in the data and ensures that the average concentration is not underestimated. CT DPH then multiplied the 95% UCL by a time factor of 0.01 to account for the fact that exposure time for on-site workers is not continuous. The time factor assumes on-site workers are exposed 3 to 4 hours per day, 1 day per week for 6 months per year. Based upon

these exposure assumptions, for two VOCs (TCE and vinyl chloride), the 95% UCL slightly exceeds the chronic HLV. These are the same two contaminants for which acute HLVs were exceeded. It should also be noted that these same two contaminants also exceeded their Acute Minimal Risk Levels (MRL) derived by the Agency for Toxic Substances and Disease Registry (ATSDR). The acute MRL is a screening value that is set at an exposure level that is not likely to cause adverse health effects. One additional contaminant (tetrachloroethylene) detected from the vents also exceeded its ATSDR acute MRL. Exposures above an MRL do not mean that health effects will occur, but suggest that additional evaluation is warranted.

5. Based on CT DPH's review of the gas vent data, it appears that the landfill continues to be a significant source of VOCs to outdoor air. Levels of some VOCs being emitted from the landfill vents exceed both acute and chronic HLVs. However, the vent gas data represents VOC concentrations at the mouth of the gas vent and not necessarily the concentration that on-site workers are breathing, after some amount of dilution occurs with ambient air. Without VOC air sampling data from the breathing zone of on-site workers, it is not possible to determine whether VOCs from the landfill present a health threat to on-site workers. However, the VOC concentrations were measured at the mouth of the gas vent and do not necessarily represent the concentrations that on-site workers are breathing after dilution. In order to evaluate exposures that on-site workers are actually receiving, it is necessary to have a good estimate of the VOC concentrations in the breathing zone of the workers.
6. With regard to potential odors, the vent gas data reports indicate that no hydrogen sulfide or methyl mercaptan (substances with the lowest odor thresholds) were measured in any of the samples during any of the sampling rounds. However, dimethyl sulfide and dimethyl disulfide were detected in some of the vents. The sampling reports do not discuss potential odors from these chemicals. According to various Material Safety Data Sheets available for these chemicals (MSDS 2005), the odor threshold for dimethyl sulfide is reported to be as low as 1 part-per-billion (ppb) and the odor threshold for dimethyl disulfide is reported to be as low as 7.5 ppb. Concentrations of both of these compounds were detected at levels above these odor thresholds at multiple vents (see Table 1). CT DPH questions whether odors have been reported by any of the on-site workers and if so, how those odors are being addressed.

7. The December 2002 report contains a regulatory analysis concerning whether VOC levels from the landfill vents exceed the CT Department of Environmental Protection (CT DEP) maximum allowable stack concentrations (MASCs). The analysis concludes that emissions are far below the MASC for every contaminant at every gas vent. However, it should be recognized that MASCs are developed to apply to stack emissions, where the point of emission is fairly high above the ground and the receptor is located at a hypothetical fence line at some distance from the stack. The landfill gas vents are only 4 feet above the ground and receptors (on-site workers) may come within very close proximity to the vents. Comparing landfill vent gas concentrations with MASCs is a regulatory step that is required by CT DEP. However, the comparison with MASCs may not be health protective in this case for on-site workers. Comparison with HLVs is a more public health protective comparison for on-site workers.
8. With regard to potential exposures to individuals living nearby the landfill, the fact that VOC emissions are below MASCs means that it is very unlikely that HLVs will be exceeded at any offsite locations. As stated previously, HLVs are developed to protect the general public from hazardous air pollutants emitted from permitted stacks. MASCs are derived from HLVs to ensure that air emissions do not exceed HLVs.

### ***Child Health Issues***

In reviewing the Gas Vent Sampling Data Reports, CT DPH gave special consideration to whether exposures and risks to children were evaluated appropriately.

### **C. CONCLUSIONS**

In conclusion, the landfill appears to be a significant source of VOCs to outdoor air. However, the VOC concentrations were measured at the mouth of the gas vent and do not necessarily represent the concentrations that on-site workers are breathing after dilution. In order to evaluate exposures that on-site workers are actually receiving, it is necessary to have a good estimate of the VOC concentrations in the breathing zone of the workers. It is possible to estimate these exposure concentrations using modeling to apply a dilution factor to the gas vent emissions. However, there would be some degree of uncertainty involved in estimating this exposure concentration. It is preferable to have actual sampling data. Air data from the breathing zone of the workers will provide more realistic estimates of exposures to on-site workers and would allow a more accurate evaluation of worker health risks to be done. In addition, CT DPH is interested in reviewing any sampling proposals or protocols that are prepared for such a sampling effort.

## **D. RECOMMENDATIONS**

- CT DPH recommends that additional sampling of VOCs in air be done in the breathing zone of the on-site workers. This could be done by having workers wear personal monitoring equipment, using air sampling equipment placed in proximity to the vents, or by some other method.
- CT DPH recommends that EPA address each of the specific issues raised in the comments included in this health consultation.

## **E. PUBLIC HEALTH PLAN**

### Actions Taken

- CT DPH has provided these comments to EPA for their consideration.

### Actions Planned

- CT DPH is interested in reviewing any sampling proposals or protocols that are prepared by EPA for the air sampling that was recommended.
- CT DPH will discuss the comments made in this health consultation with EPA, as needed.
- CT DPH will continue to review data and other materials for the Old Southington Landfill site, as requested.

## **REFERENCES**

ATSDR (1995). Public Health Assessment for Old Southington Landfill, March 9, 1995.

ATSDR (1997a). U.S. Department of Health and Human Services. Public Health Service. Toxicological Profile for Trichloroethylene. September 1997.

ATSDR (1997b). U.S. Department of Health and Human Services. Public Health Service. Toxicological Profile for Vinyl Chloride. September 1997.

MACTEC (2001). October 2001. Vent Sampling Program Monitoring Report for Old Southington Landfill Site. Prepared for the United States Environmental Protection Agency, April 2002.

MACTEC (2002a). April 2002 Vent Sampling Program Monitoring Report for Old Southington Landfill Site. Prepared for the United States Environmental Protection Agency, July 2002.

MACTEC (2002b). September 2002 Vent Sampling Program Monitoring Report and Regulatory Analysis for Old Southington Landfill Site. Prepared for the United States Environmental Protection Agency, December 2002.

## CERTIFICATION

The Health Consultation for the Public Health Evaluation of Gas Vent Sampling Data Reports for Old Southington Landfill in Southington, Connecticut, was prepared by the Connecticut Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the ATSDR Cooperative Agreement Partner.

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The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

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