2008 Lead NAAQS

Evaluation of Ambient Monitoring Needs to Meet EPA Requirements

State of Connecticut
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
www.ct.gov/dep

Table of Contents

Figures:

Tables:

This document was prepared by Kathleen Knight. Please submit all comments to Kathleen at Kathleen.knight@ct.gov . The information was provided by the EPA's NEI & TRI, The State of Connecticut's Emissions Inventory group (Bill Simpson, Chris Mulcahy & Steve Potter), Source Emissions Monitoring (Robert Girard, Steve Anderson & Mark Spiro) and Field Enforcement Major Sources (Robert Girard and William Wihbey).

1. Overview

In 1991 the U. S. Human Health Services characterized lead (Pb) poisoning as the #1 environmental threat to children. Although subsequent changes were made to the allowable drinking water levels, the U.S. Environmental Protection Agency (EPA) determined that there was not sufficient evidence available at that time to justify a change to the ambient air quality standard (NAAQS) for Pb, which was initially established in 1978.

In 2008, the U.S. EPA determined that there was sufficient new evidence to warrant a significant lowering of the Pb NAAQS from 1.5µg/m^3 (quarterly calendar average) to 0.15µg/m^3 (rolling three-month average). EPA's justification for this change stemmed from a variety of studies which a) directly link air concentrations of Pb to blood level concentrations; b) link blood level concentrations with health effects in humans (especially children); and c) link lower concentrations than the previous standard with environmental effects and human health effects. The new standard is aimed to protect not only human health but the environment as well.

EPA identifies two types of ambient lead monitoring[1]: population orientated monitors and source oriented monitors. At least one population-oriented monitor is required in each urban area (i.e, CBSA or Core-Based Statistical Area) with 500,000 people or more. A source-oriented monitor is required for all sources with lead emissions of 1 ton/year (TPY) or more. In this document, the Connecticut Department of Environmental Protection (CTDEP) reviews lead sources located in the State, evaluates the need for source oriented monitors and identifies appropriate locations for population-oriented monitors.

2. Evaluation of Need for Source-Oriented Lead Monitoring

EPA requires source-oriented monitoring for each source emitting one ton per year (TPY) or more of lead[2]. In order to better establish the existence and geographic distribution of Connecticut's lead sources, this review attempts to identify all sources that could potentially emit greater than 200 lbs/year (0.1 TPY). To accomplish this goal, CTDEP reviewed a variety of materials to identify lead emission levels, including site inspection reports, emissions statements, stack test results, permitted emissions, 2005 National Emissions Inventory (NEI) estimates and 2007 Toxic Release Inventory (TRI) estimates.

CTDEP conducted a two-stage review to identify sources with emissions exceeding 200 lb/yr (0.1 TPY). The first stage of the review included an examination of EPA's 2005 NEI and 2007 TRI, a supplemental search based on facility type to identify other potential lead emitters, a search of CTDEP's permit

[1,2] Federal Register, Vol. 73, No. 219, November 12th 2008, Page 67,029.

inventories to identify permitted and actual emissions and a review of CTDEP's airport emissions inventory. In the second stage review, data from the first-stage were compared and supplemented with available stack test data (where available) to determine a "best estimate" for each facility. The discussion below describes the data gathered and resulting best estimates of lead emissions for sources of potential concern in Connecticut.

2.1 Federal Lead Emissions Inventories

The EPA's 2005 NEI identifies the following Connecticut facilities as having lead emissions of 0.1 TPY or greater (see Table 2.1): MDC Hartford Water Pollution Control Facility (WPCF), C&M Corporation (Wauregan), Peter Paul Electronics (New Britain) and Wheelabrator (Bridgeport). EPA's 2007 TRI indicates that the following Connecticut facilities had lead air emissions of at least 0.1 TPY: PSEG Bridgeport Harbor Station, C&M Corporation and Peter Paul Electronics.

Table 2. 1. Highest Reported Lead Emissions of the 2007 TRI and 2005 NEI.

Facility Name	2007 TRI Air Releases (TPY)	2005 NEI *v2* Emissions (TPY)	Revised Emissions
M DC Hartford WPCF	N/A	1.5000	0.0014
C&M Corp	0.1795	0.2925	0.1759
PSEG Bridgeport Harbor Station	0.2749	0.2749	0.0167
Peter Paul Electronics Co Inc	0.6135	0.1305	0.0000
Wheelabrator Bridgeport, L.P.	N/A	0.0988	0.0401

Based on EPA's 2005 NEI and 2007 TRI, only the MDC Hartford WPCF's lead emissions (of 1.5 TPY) exceeded EPA's 1 TPY monitoring threshold. However a review of the stack test data for the facility indicated a calculation error which had resulted in an overestimation by a factor of 100. In June of 2008 revisions were made to the NEI 2005; a 2007 stack test yielded a revised estimate of 0.00494 TPY[3], this value was submitted for the NEI revision. In addition, recent stack tests indicate lead emissions from

[3] Hartford MDC Stack Test 2007 For methodology of Stack Test See Appendix A.

this facility are 0.0014 TPY[4]. Thus, lead emissions from the MDC Hartford WPCF are well below the 1 TPY threshold that triggers EPA's source-oriented lead monitoring requirements.

Recent stack test results for the Wheelabrator Bridgeport facility also indicate that lead emissions from that source are lower than the value contained in the 2005NEI. Stack tests conducted at Wheelabrator Bridgeport in June 2008 yield estimated annual lead emissions of 0.0401 TPY, less than half of EPA's NEI value, which was based on the 2005 SPPD data. The revised emission estimate listed in Table 2.1 is based on these stack tests.

The 2007 TRI provides the most recent data for both C&M Corp and Peter Paul Electronics. An inquiry into the Peter Paul Facility TRI records revealed that the reported value of 0.6135 tons was not an actual air emission release; rather it was the weight of the lead portion of unused solid steel bars which were transported off site. Site inspections verified that C&M Corps is an insignificant source of lead air emissions; thus that facility's revised emission estimates are assigned a value of zero.

2.2 Industry Type Review

In addition to the review of EPA's NEI and TRI data sets, CTDEP also examined other potential sources of lead emissions by industry type[5]. The types of facilities flagged were: Municipal Solid Waste Combustors, Coal Fired Electric Plants, Smelting and Refining of Metals, Metal Production/Fabrication and Inorganic Chemical Production that includes lead oxides. Table 2. 2 lists the facilities which were reviewed on this basis.

Table 2. 2 Estimated Connecticut Emissions from Industries Identified by EPA as Potential Significant Sources of Lead

Industry Type	Facility Name	2007 TRI
Chemical Manufacturing	H Krevit & Company	N/A
Coal Fired Power Plant	PSEG PWR CT LLC / BPT Harbor Station	0.2749
Metal Production/Fabrication	H.B Ives	N/A
	Torrey S Crane	0.0032
	MINTEQ/Specialty Minerals	0.0272
	Ameteck	N/A
	Radcliff Wire	N/A
	Sargent Manufacturing	0.0014
Metal Smelting and Refining	MCP Metal Specialties	0.0025

Site inspection records revealed that Sargent Manufacturing, Ameteck Inc and H.B. Ives are negligible sources of lead. After researching H Krevit & Company, it was determined that they do not use lead materials in their production and are thus not a lead source.

[4] Hartford MDC Stack Test October 28 2008; For methodology of Stack Test See Appendix A.

[5] The list of sources was provided by EPA Region 1 in a 1/23/2009 e-mail from David Conroy to Anne Gobin.

PSEG Power Bridgeport Harbor Station reported estimated emissions of 0.275 TPY to the 2007 TRI, however a recent stack test revealed that actual emissions are 0.0167 TPY[6]; listed in Table 2-1.

The 2007 TRI indicated that Pb emissions for several of the other facilities were also well below EPA's 1 TPY monitoring threshold. Torrey S Crane reported 0.0032 TPY from an emissions factor calculation. MINTEQ Specialty Minerals reported a value of 0.0272 TPY, also from an emissions factor calculation. MCP Metal Specialties reported a value of 0.0025 TPY, calculated using a mass balance approach.

2.3 Individual Source Review

CTDEP also reviewed permit files, reports of actual emissions and available stack test results to identify stationary sources with the highest lead air emissions (see Table 2.4). Stack test records for Borough of Naugatuck, Wheelabrator Bridgeport & CRRA Mid-Connecticut indicated that actual emissions at those facilities were all much lower than permitted lead levels: Borough of Naugatuck had a total of 0.0002 TPY[7]; Wheelabrator Bridgeport 0.04 TPY[8]; and CRRA Mid-Connecticut 0.055 TPY[9]. In addition, a 2004 site inspection of the Turner & Seymour facility concluded that potential lead emission sources were negligible.

Table 2. 3 CT DEP Permit Database: High Actual Emissions and High Permitted Emissions

COMPANY NAME	Worst Case Permitted Emissions (TPY)	Emissions Statement 2007
BOROUGH OF NAUGATUCK	0.32	0.0002
C R R A / MID-CONNECTICUT	0.10	0.123
TURNER & SEYMOUR MFG CO	0.05	N/A
AMERBELLE TEXTILES LLC	5.47	*N/A
A E S THAMES, LLC	1.22	0.031
WHEELABRATOR BRIDGEPORT LP	1.68	0.036

[6] Bridgeport PSEG Stack Test March 17 2009, for methodology of Stack Test See Appendix A.

[7] Borough of Naugatuck Stack Test July 2008, for methodology of Stack Test See Appendix A.

[8] Wheelabrator Bridgeport Stack Test June 2008, for methodology of Stack Test See Appendix A.

[9] CRRA Mid-Connecticut Stack Test May 2008, for methodology of Stack Test See Appendix A.

2.4 Connecticut Airports Review

CTDEP compared in-house inventory estimates of lead emissions from the use of aviation gasoline to those developed by EPA[10] (see Table 2.3). Although the two agencies used consistent methodologies to calculate emissions, CTDEP's estimates were based on a local 2005 survey of landing/take-off (LTO) activity and taxi, landing and take-off times and are, therefore, considered to be more accurate. Estimates developed by both CTDEP and EPA indicate all Connecticut airports have lead emissions that do not exceed the 1 TPY monitoring threshold. Only Danbury Municipal Airport and Hartford-Brainard Airport have CTDEP-estimated lead emissions that exceed 0.2 TPY

Table 2. 4 Connecticut Airport Pb Emissions Estimates

Airport Name	CT Pb Emissions Estimate (TPY)	EPA Pb Emissions Estimate (TPY)
DANBURY MUNICIPAL	0.270	0.316
HARTFORD-BRAINARD	0.265	0.279
IGOR I SIKORSKY MEMORIAL	0.193	0.271
WATERBURY-OXFORD	0.089	0.256
TWEED-NEW HAVEN	0.178	0.181
GROTON-NEW LONDON	0.171	0.179
BRADLEY INTL	0.082	0.173
ROBERTSON FIELD	0.193	0.164
WINDHAM	0.033	0.084
CHESTER	0.017	0.057
DANIELSON	0.054	0.056

2.5 Summary and Conclusions of Lead Source Review

Table 2.5 compiles and summarizes available lead emissions data for each of the sources that were identified above. The table displays the facility name and location, stack test date and associated emissions, 2005 NEI (unamended), 2007 TRI emissions, and the most recent emissions statement year and corresponding emissions. The table also provides the CTDEP's "best estimate" of emissions for each source, selected from the various available estimates. When determining best estimates, stack tests were given first priority as they are the most accurate and realistic number available. Emissions statements from 2007 were used next as these values had been verified by the facility and DEP staff. If neither of those were available, 2007 TRI values were used as these values are the more recent estimates of the two national databases.

Based on the best available estimates, no Connecticut sources have lead emissions that exceed EPA's 1 TPY threshold requiring source-oriented ambient lead monitoring. In addition, as depicted

[10] Lead Emissions from the Use of Leaded Aviation Gasoline in the United States: Technical Support Document; EPA420-R-08-020; October 2008.

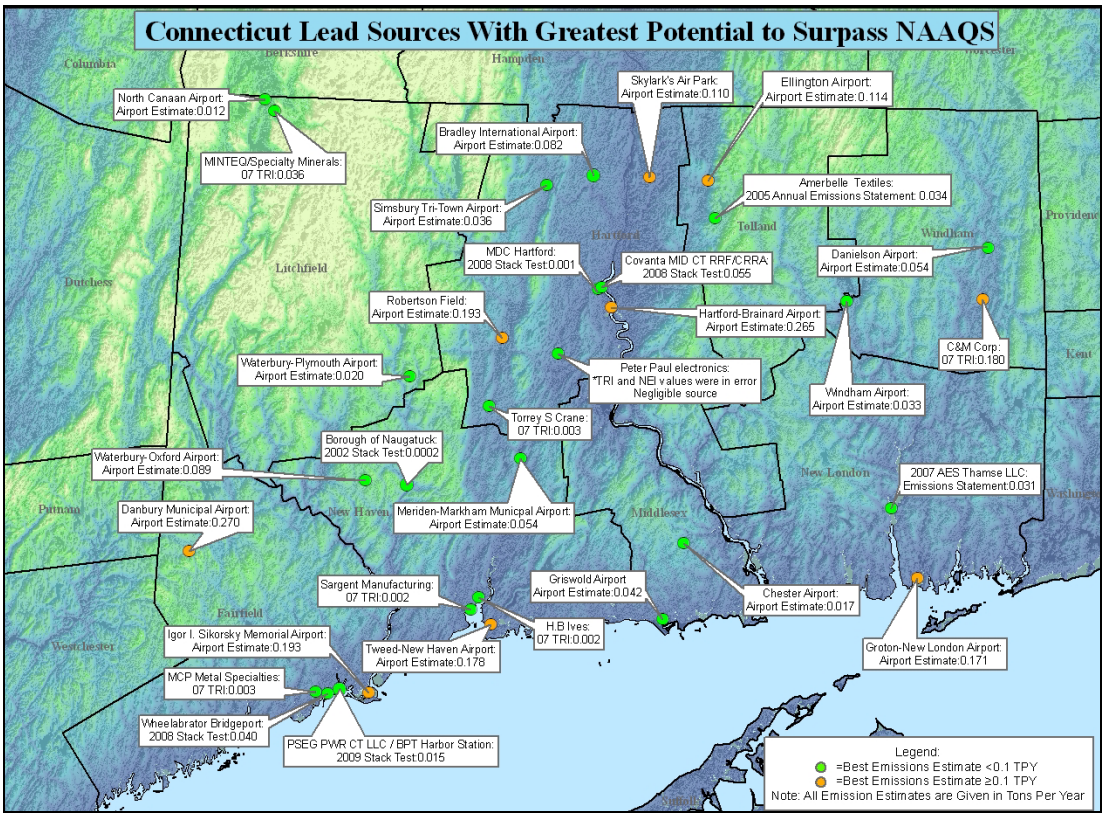
in Figure 2.1, the largest lead sources are fairly well distributed throughout the state, making it unlikely that a localized area would be exposed to a cumulative effect of concern. Therefore, CTDEP has concluded that no source-oriented lead monitoring is necessary in Connecticut. However, as described below, Connecticut's proposed population-oriented monitors are to be located in the vicinity of some of Connecticut's higher emitting lead sources, providing measurements that are representative of both population and source-oriented monitoring goals.

Table 2. 5 Connecticut DEP's Facility Review Summary

Facility Name	Town	Data Source	Best Estimate (TPY)
Danbury Municipal Airport	Danbury	CT Airport Survey Estimate	0.270
Hartford-Brainard Airport	Hartford	CT Airport Survey Estimate	0.265
Robertson Field	Plainville	CT Airport Survey Estimate	0.193
Igor I. Sikorsky Memorial Airport	Bridgeport	CT Airport Survey Estimate	0.193
C&M Corp	Wauregan	TRI 2007	0.180
Tweed-New Haven Airport	New Haven	CT Airport Survey Estimate	0.178
Groton-New London Airport	Groton	CT Airport Survey Estimate	0.171
Ellington Airport	Ellington	CT Airport Survey Estimate	0.114
Skylark's Air Park	East Windsor	CT Airport Survey Estimate	0.110
Waterbury-Oxford Airport	Waterbury	CT Airport Survey Estimate	0.089
Bradley International Airport	Windsor	CT Airport Survey Estimate	0.082
Covanta MID CT RRF/CRRA	Hartford	May 7 2008 Stack Test	0.055
Danielson Airport	Danielson	CT Airport Survey Estimate	0.054
Meriden-Markham Municipal Airport	Meriden	CT Airport Survey Estimate	0.054
Griswold Airport	Essex	CT Airport Survey Estimate	0.042
Wheelabrator Bridgeport	Bridgeport	June 24 2008 Stack Test	0.040
MINTEQ/Specialty Minerals	North Canaan	TRI 2007	0.036
Simsbury Tri-Town Airport	Simsbury	CT Airport Survey Estimate	0.036
Amerbelle Textiles	Vernon	Annual Emissions Estimate (LPEG) 2005	0.034
Windham Airport	Windham	CT Airport Survey Estimate	0.033
AES Thames LLC	Uncasville	Emissions Statement 2007	0.031
Waterbury-Plymouth Airport	Waterbury	CT Airport Survey Estimate	0.020
Chester Airport	Chester	CT Airport Survey Estimate	0.017
PSEG PWR CT LLC / BPT Harbor Station	Bridgeport	March 17 2009 Stack Test	0.017
North Canaan Airport	North Canaan	CT Airport Survey Estimate	0.011
Torrey S Crane	Plantsville	TRI 2007	0.003
MCP Metal Specialties	Fairfield	TRI 2007	0.003
H.B Ives	New Haven	TRI 2007	0.002
Sargent Manufacturing	New Haven	TRI 2007	0.001
MDC Hartford	Hartford	October 29 2008, Stack Test	0.001
Borough of Naugatuck	Naugatuck	July 31 2002, Stack Test	negligible
Ameteck	Wallingford	Emissions Statement 2008	negligible
Radcliff Wire	Bristol	Lead use negligible	negligible
Turner & Seymour	Torrington	No lead use reported	negligible
Peter Paul electronics	New Britain	TRI 2007*corrected*	negligible
H Krevit & Company	New Haven	No lead use reported	negligible

* Facilities in ***bold italics*** are those that have been determined to have zero to negligible lead emissions.

Figure 2. 1 Map Of Connecticut's Largest Lead Sources



3. Population-Oriented Ambient Pb Monitors

EPA's final rule establishing the revised lead NAAQS requires at least one non-source-oriented monitor in each urban area (or "core based statistical area", CBSA) with a population of at least 500,000 people.[11] EPA's rule also specifies that the preferred monitoring method employ total suspended particulate matter monitors (TSP) to determine lead concentrations. However, EPA will allow the use of particulate monitors designed to measure particles up to 10 microns in diameter (PM10) if historical monitoring data indicate that Pb-TSP or Pb-PM10 concentrations do not exceed an arithmetic 3-month mean of 0.10 µg/m^3 (2/3rds of the 2008 Pb NAAQS). Monitoring agencies choosing this option are required to begin monitoring for Pb-TSP within six months of a measured Pb-PM10 concentration reaching or exceeding that value.

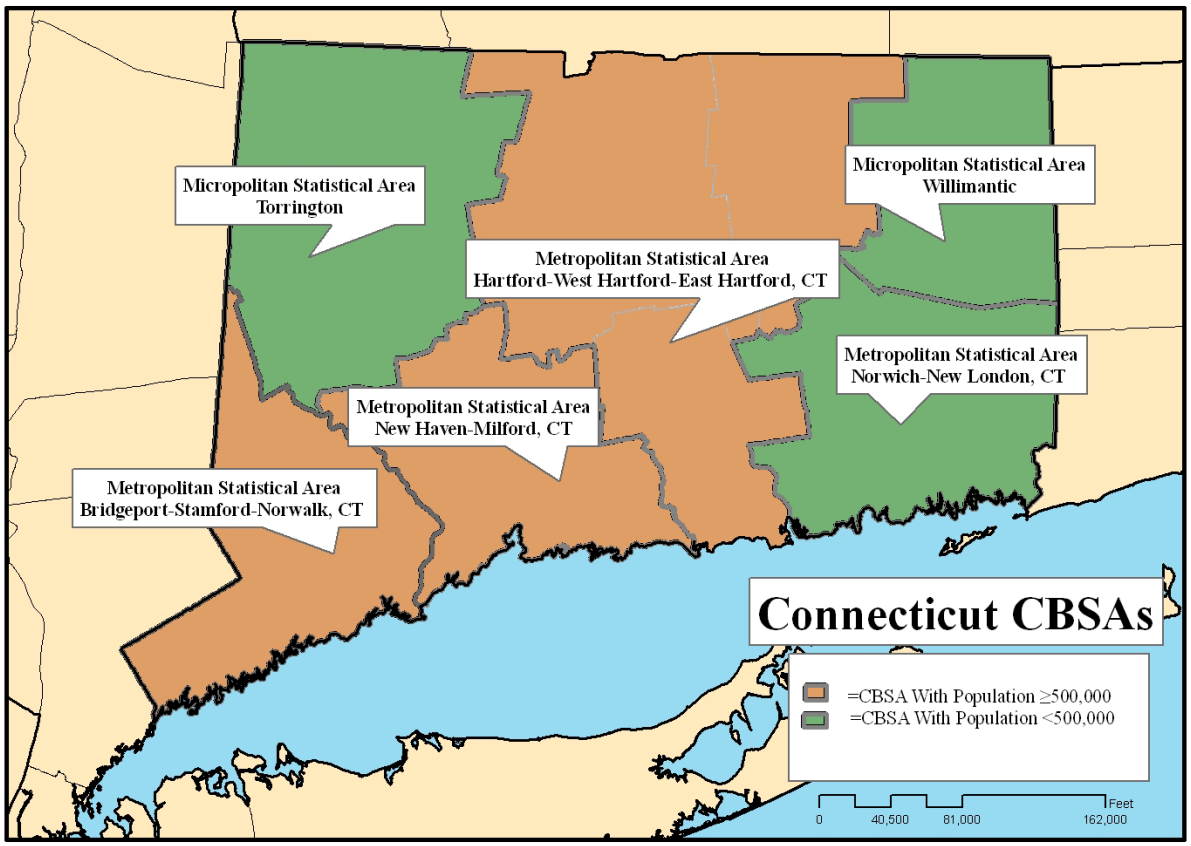
Recent U.S. Census Bureau population estimates identify three Connecticut CBSAs meeting EPA's 500,000 or greater population threshold[12]: Hartford-West Hartford-East Hartford CBSA (July 1, 2008

[11] Federal Register November 12 2008 vol 73 No 213 (page 67,029)

[12] U.S Census Bureau Population Estimates (see: http://www.census.gov/popest/metro/CBSA-est2008-annual.html.)

estimated population of 1,190,512), Bridgeport-Stamford-Norwalk CBSA (895,030) and New Haven-Milford CBSA (846,101). To satisfy these requirements, CTDEP will establish Pb monitoring in each of these three urban areas, which are depicted in Figure 3.1.

Figure 3. 1 Connecticut Core Based Statistical Areas



Although CTDEP does not currently operate any TSP monitors or routinely analyze PM10 filters for Pb, available data (summarized below) suggest that ambient Pb levels in Connecticut are well below both the 2008 NAAQS and EPA's Pb-PM10 monitoring threshold of 0.10 µg/m^3. As a result, CTDEP proposes to conduct Pb monitoring at one site in each of the required CBSAs using existing PM10 monitors.

3.1 Previous Measured Pb-TSP Concentrations

CTDEP's most recent TSP monitoring for Pb levels was conducted in downtown Waterbury through the end of 2002. As summarized in Table 3.1, running 3-month Pb concentrations in 2002 were more than a full order of magnitude below the 2008 NAAQS of 0.15 µg/m^3 and less than 15% of EPA's threshold for allowing the use of Pb-PM10 sampling.

3.2 Current Estimates of Pb-PM10 Concentrations

Although CTDEP does not currently analyze PM10 filters to determine ambient Pb concentrations, PM2.5 chemical speciation measurements are being obtained at four sites in the CTDEP air monitoring network, two of which monitor for lead. Lead monitoring is done through the EPA STN (Speciation Trends Network) site at Criscuolo Park in New Haven and an IMPROVE (Interagency Monitoring of Protected Visual Environments) site located in Cornwall. Both sites are operated on the same 1-in-3 day sample schedule and provide 24-hour integrated filter-base measurements.

Monthly and 3-month rolling average speciation results for Pb-PM2.5 are provided in Table 3.2 (and presented in Figure 3.4) for the New Haven and Cornwall sites for the period from June 2005 through December 2008. Also listed are estimated Pb-PM10 3-month rolling averages, calculated by assuming that, on average, the PM2.5 portion of aerosol lead is two-thirds of PM10 portion.[13,14,15] Based on these calculated results, which are graphically displayed in Figure C, the highest estimated Pb-PM10 3-month average is 0.01 µg/m^3, an order of magnitude less than the 0.10 µg/m^3 threshold at which EPA no longer allows the use of PM10 monitoring for determining ambient Pb levels.

3.3 Regional TSP Lead Concentrations

Although CTDEP terminated TSP lead monitoring in 2002, several states in the eastern U.S. continue to operate Pb monitoring networks. Figure 3.3, displays the location of Pb-TSP monitors along with isopleths of reported 2007 design values in the region. The closest Pb-TSP monitoring sites to Connecticut, located in the Boston, New York City and Poughkeepsie (NY) areas, all recorded 2007 design values[16] less than 0.1 µg/m^3. These regional Pb-TSP design values are consistent with the Connecticut Pb levels discussed earlier.

3.4 CTDEP's Proposed Pb-PM10 Monitoring Locations

As discussed above, CTDEP plans to establish a monitoring network consisting of three population-oriented Pb-PM10 sites, one in each of Connecticut's CBSAs with a population of at least 500,000 people. Based on a review of potential monitor locations, existing PM10 sites in Bridgeport (Roosevelt School), New Haven (Criscuolo Park), and East Hartford (McAulliffe Park) have been identified as providing an optimal combination of population exposure and proximity to potential lead sources, as shown in Figure 3.2. Pursuant to the required time schedules established by EPA's final Pb rule[17],

---

[13] Fernandez et al 2001. Size Distribution of Metals in Urban Aerosols in Seville. Atmospheric Environment. **35**. 2595-2601.

[14] Singh et al. 2002. Size Distribution and Diurnal Characteristics of Particle-Bound Metals in Source and Receptor Sites of the Los Angeles Basin. Atmospheric Environment.**36**. 1675-1689.

[15] Allen et al. 2001. Size Distributions of Trace Metals in Atmospheric Aerosols in the United Kingdom. Atmospheric Environment. **35**. 4581-4591.

[16] Design value data obtained from EPA's web site at: http://www.epa.gov/air/airtrends/values.html.

[17] Federal Register November 12 2008 vol 73 No 213 (pages 67,029).

CTDEP proposes to begin operation of Pb-PM10 monitoring at these three non-source-oriented monitoring sites by no later than January 1, 2011.

Figure 3. 2 Connecticut CBSAs and Future Lead Monitoring Sites

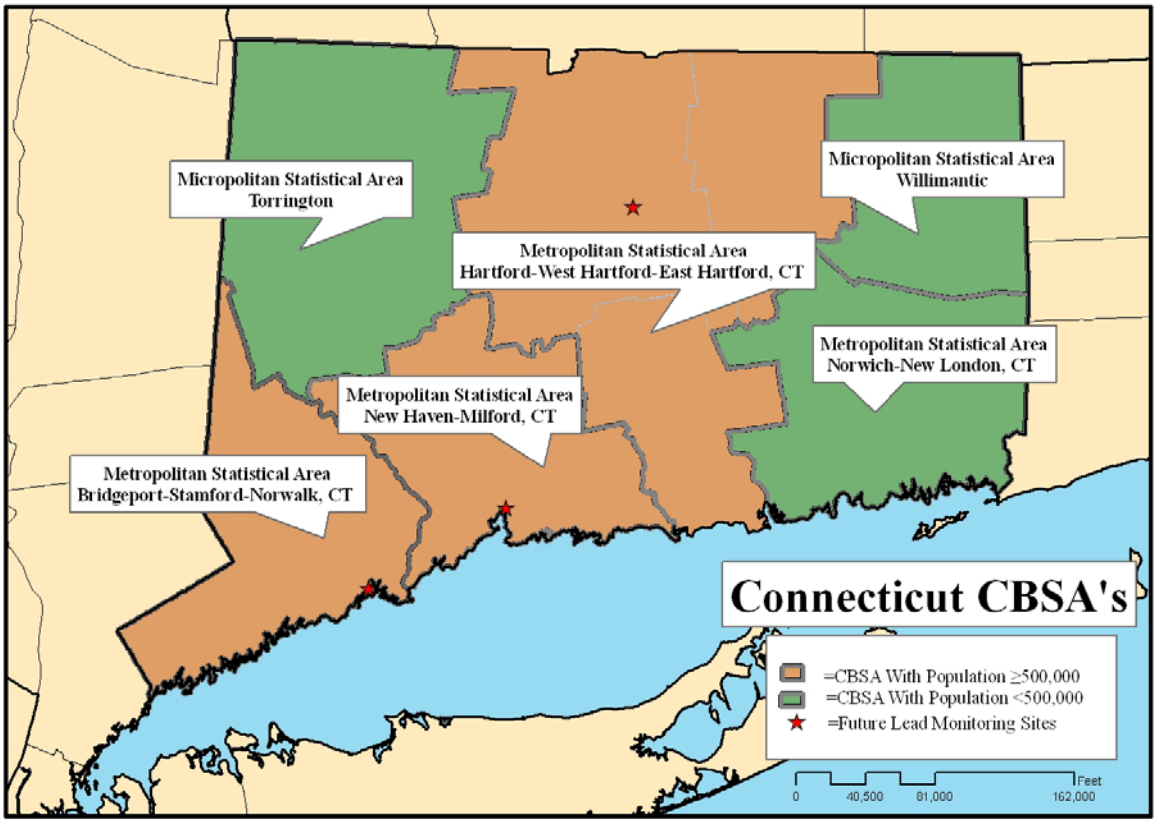


Table 3. 12002 Lead Monitoring Data at Waterbury, CT

Date	Monthly Pb-TSP Concentration (µg/m^3)	3 Month Running Average Pb-TSP Concentration (µg/m^3)
Jan-02	0.016	0.012
Feb-02	0.018	0.014
Mar-02	0.006	0.013
Apr-02	0.006	0.010
May-02	0	0.004
Jun-02	0.015	0.007
Jul-02	0.005	0.007
Aug-02	0.006	0.009
Sep-02	0.01	0.007
Oct-02	0.0058	0.007
Nov-02	0	0.005
Dec-02	0.0029	0.003
Annual Average:		0.008

Figure 3. 3 Map of Eastern US 2007 Lead Design Values.

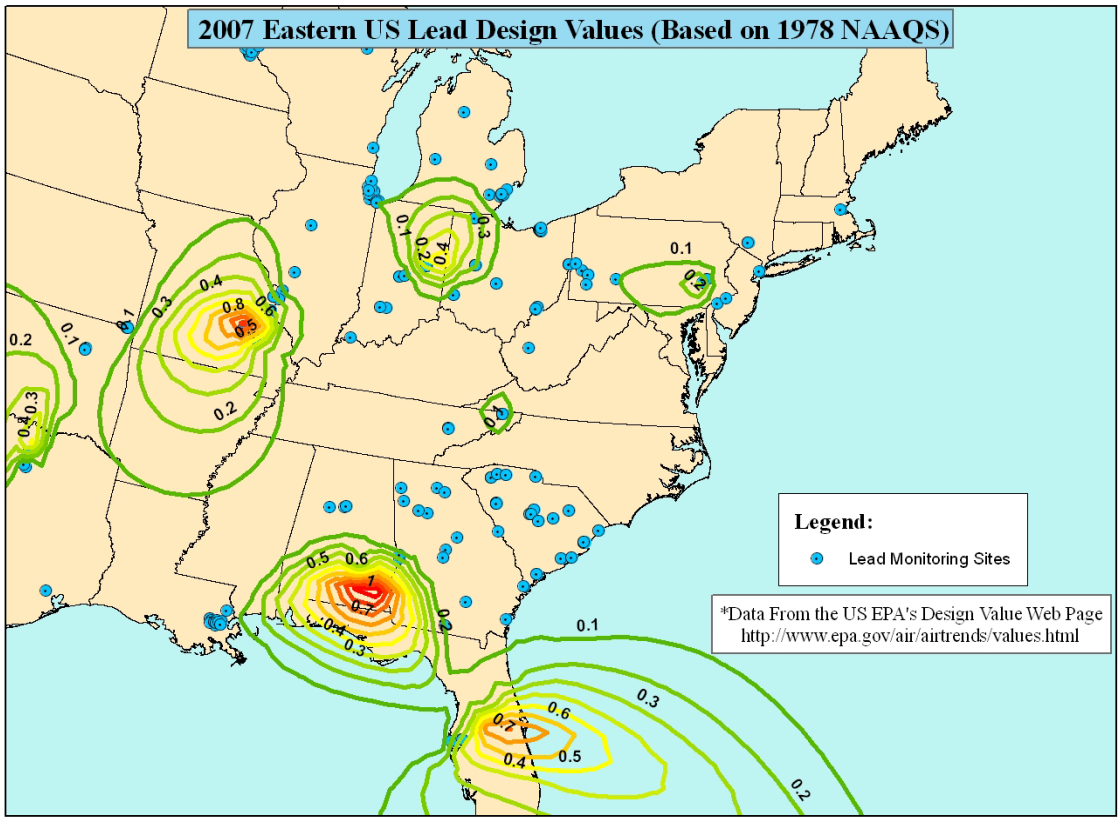
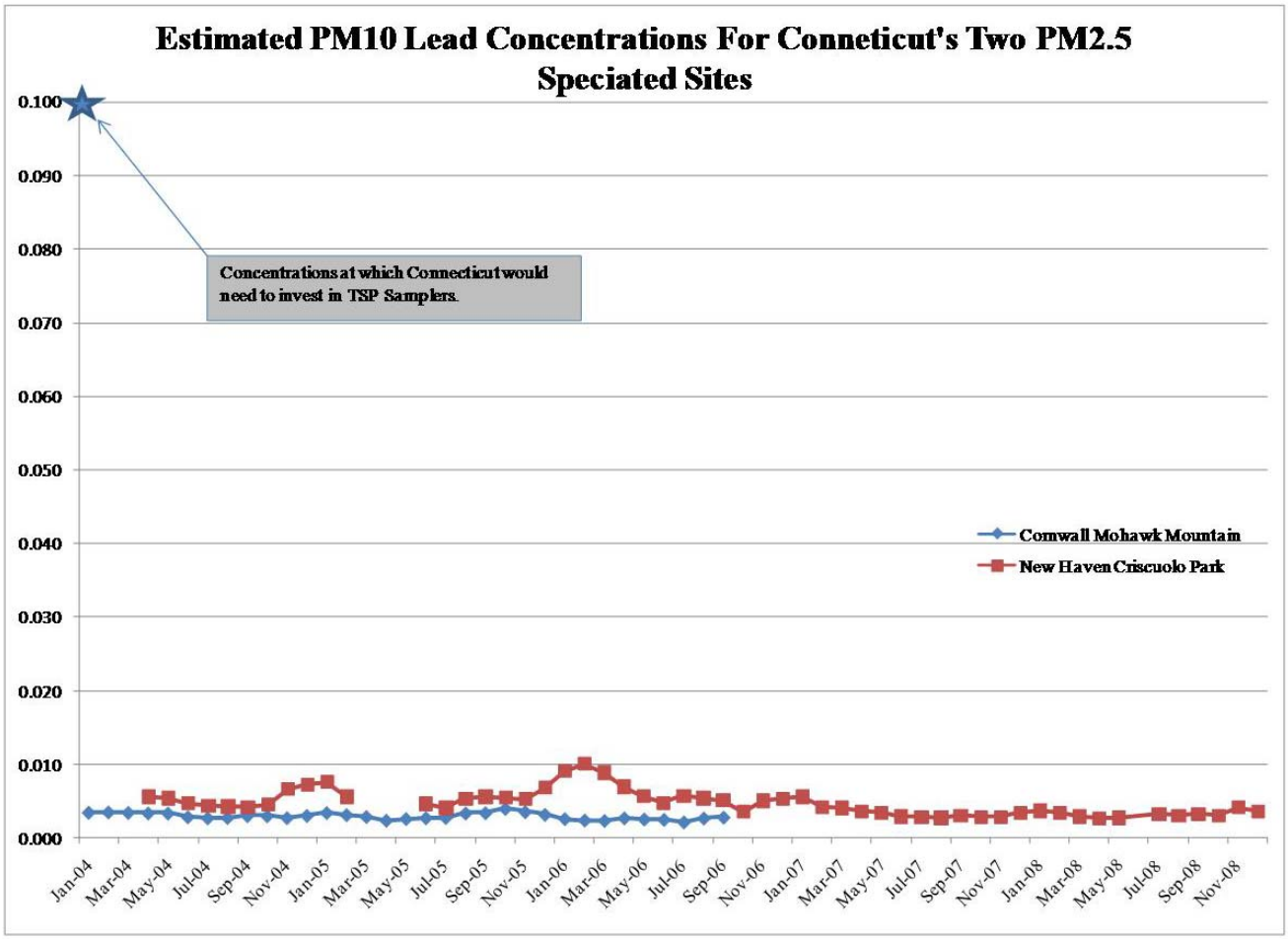


Table 3. 2 Connecticut's Lead Portion of the PM2.5 Speciated Samplers & PM10 Portion Estimates (µg/m3).

	New Haven Criscuolo Park			*Cornwall Mohawk Mountain*		
Date	$PM_{2.5}$ Monthly Average	$PM_{2.5}$ 3 Month Rolling Average	Pb-PM_{10} Estimate*	$PM_{2.5}$ Monthly Average	$PM_{2.5}$ 3 Month Rolling Average	Pb-PM_{10} Estimate*
Jun-05	0.003	0.003	0.005	0.002	0.002	0.003
Jul-05	0.003	0.003	0.004	0.001	0.002	0.002
Aug-05	0.005	0.004	0.005	0.002	0.002	0.003
Sep-05	0.003	0.004	0.006	0.002	0.002	0.003
Oct-05	0.003	0.004	0.005	0.001	0.002	0.003
Nov-05	0.004	0.003	0.005	0.003	0.002	0.003
Dec-05	0.006	0.004	0.007	0.002	0.002	0.003
Jan-06	0.008	0.006	0.009	0.003	0.003	0.004
Feb-06	0.006	0.007	0.010	0.002	0.002	0.004
Mar-06	0.004	0.006	0.009	0.002	0.002	0.003
Apr-06	0.004	0.005	0.007	0.002	0.002	0.003
May-06	0.003	0.004	0.006	0.002	0.002	0.002
Jun-06	0.002	0.003	0.005	0.002	0.002	0.002
Jul-06	0.006	0.004	0.006	0.002	0.002	0.003
Aug-06	0.003	0.004	0.005	0.001	0.002	0.003
Sep-06	0.002	0.003	0.005	0.001	0.002	0.002
Oct-06	0.003	0.002	0.004	0.002	0.001	0.002
Nov-06	0.005	0.003	0.005	0.002	0.002	0.003
Dec-06	0.003	0.004	0.005	0.002	0.002	0.003
Jan-07	0.003	0.004	0.006			
Feb-07	0.002	0.003	0.004			
Mar-07	0.003	0.003	0.004			
Apr-07	0.002	0.002	0.004			
May-07	0.002	0.002	0.003			
Jun-07	0.002	0.002	0.003			
Jul-07	0.002	0.002	0.003			
Aug-07	0.002	0.002	0.003			
Sep-07	0.002	0.002	0.003			
Oct-07	0.002	0.002	0.003			
Nov-07	0.002	0.002	0.003			
Dec-07	0.003	0.002	0.003			
Jan-08	0.002	0.002	0.004			
Feb-08	0.002	0.002	0.003			
Mar-08	0.001	0.002	0.003			
Apr-08	0.002	0.002	0.003			
May-08	0.002	0.002	0.003			
Jul-08	0.002	0.002	0.003			
Aug-08	0.002	0.002	0.003			
Sep-08	0.002	0.002	0.003			
Oct-08	0.002	0.002	0.003			
Nov-08	0.004	0.003	0.004			
Dec-08	0.002	0.002	0.004			

*PM10 Estimate is determined on the basis of the 2/3rds average discussed above.

Figure 3. 4 PM10 Lead Estimates 2004-2008



Appendix A: Methodology Behind Stack Test Values:

Concentrations of a pollutant of concern are measured following the methodology outlined in the State of Connecticut DEP's Emissions Testing Guidelines[18]. Once a concentration is determined an emissions rate is calculated using the known flows of the stack tested. The final step is to calculate a yearly emissions rate by applying the activity of the particular facility for that year. All stack test data and methodology is validated by the CT DEP Air Management Source Emissions Monitoring Group.

[18] State of Connecticut DEP's Emissions Testing Guidelines, http://www.ct.gov/dep/lib/dep/air/compliance_monitoring/emission_test/emission_test_guidelines.pdf