National Emissions Inventory For Lead – Concepts and Quantities –

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Our Goals

- Present an overview of Lead in the NEI
- Discuss the NEI for Lead in context of
  - Importance of Source Categories
  - AQ Monitoring for Lead

Why is Lead of Interest?

- **Lead air emissions are:**
  - Both natural and anthropogenic
  - Emitted as particles small enough to stay suspended in the air
  - Inhaled directly or ingested after it settles onto surfaces or soils
    - Ingestion is the main route of human exposure

- **Heath Effects**
  - Health effects include damage to:
    - Central nervous system
    - Cardiovascular system
    - Kidneys
  - Children are more likely to be exposed to lead and are also the most vulnerable to health effects
  - Effects in children include:
    - IQ loss
    - Poor academic achievement, permanent learning disabilities, increased risk of delinquent behavior
  - Adults can also experience effects of lead exposure such as:
    - Increased blood pressure
    - Cardiovascular disease
    - Decreased kidney function

2008 Lead Standard

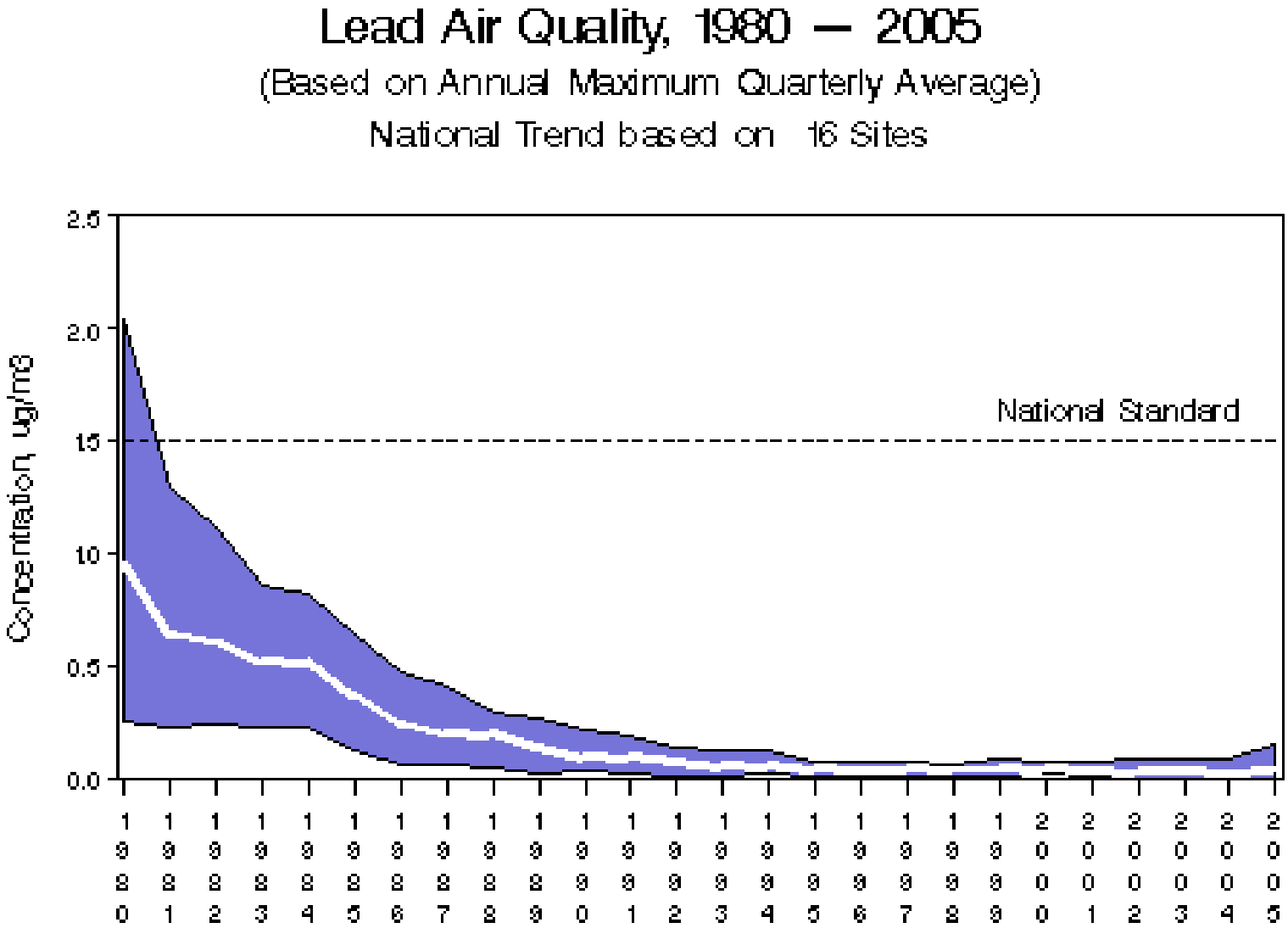
- **Promulgated October 15, 2008**

- **New primary and secondary standards are set at 0.15 μg/m^3**
  - revision to the lead standard of 1.5 μg/m^3 set in 1978
  - EPA followed the advice of the Clean Air Scientific Advisory Committee to set the standard no higher than 0.20 μg/m^3

- **Revisions to Lead Monitoring**
  - EPA is expanding and redesigning the monitoring network for lead.
  - Monitor location will be determined by considering sources of lead emissions greater than or equal to 1 ton per year
  - EPA will require monitors be operated in urban areas with populations > 500,000
  - EPA estimates that 236 new or relocated monitoring sites will be necessary
    - Approximately half of the new monitors to be operational by January 1, 2010
    - The rest of the new monitors to be operational by January 1, 2011

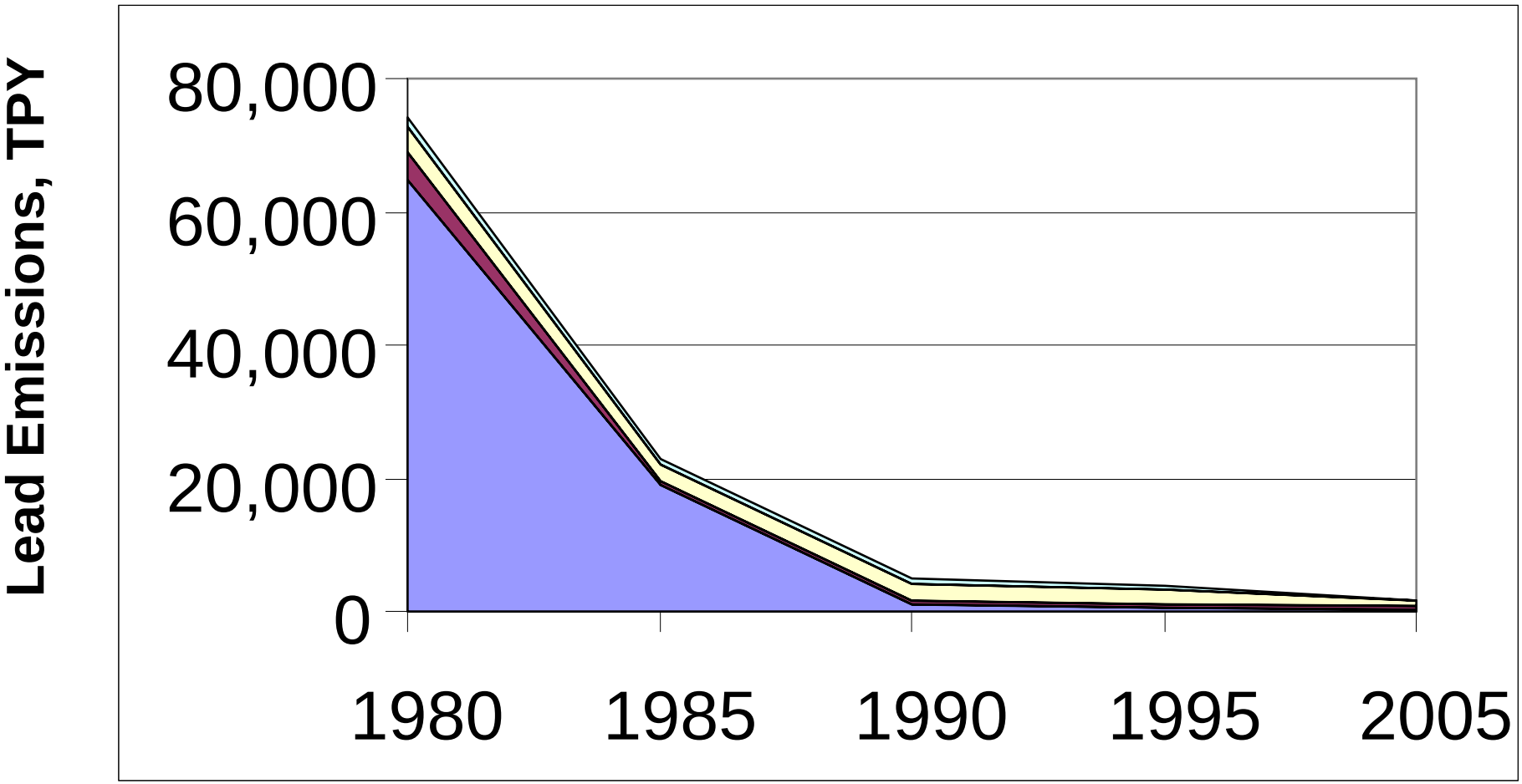
- **For more information, go to: www.epa.gov/air/lead/**

Lead, Mobile Sources and Clean Air

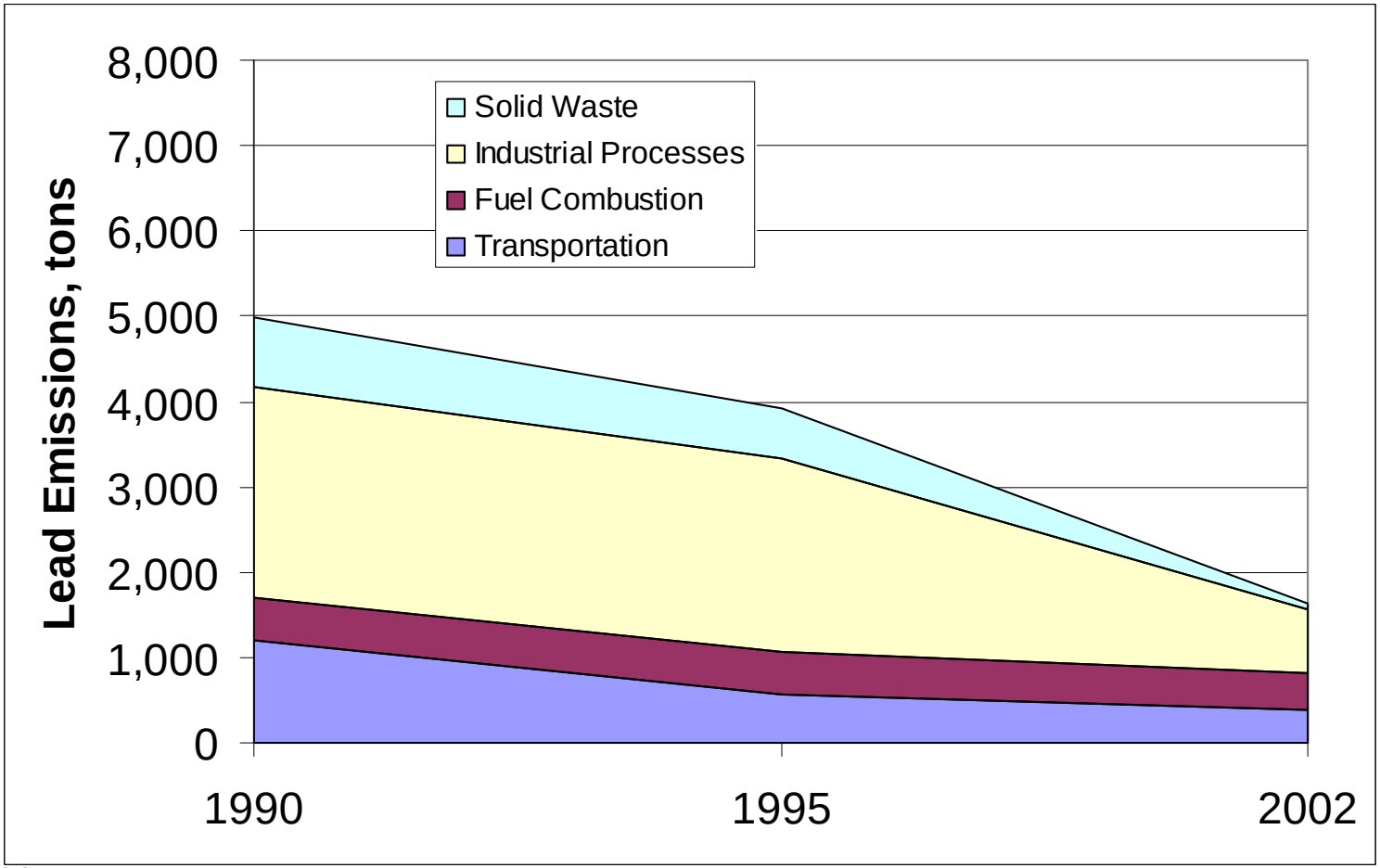


1980 to 2005 : 96% decrease in National Average

Trends in Lead Emissions

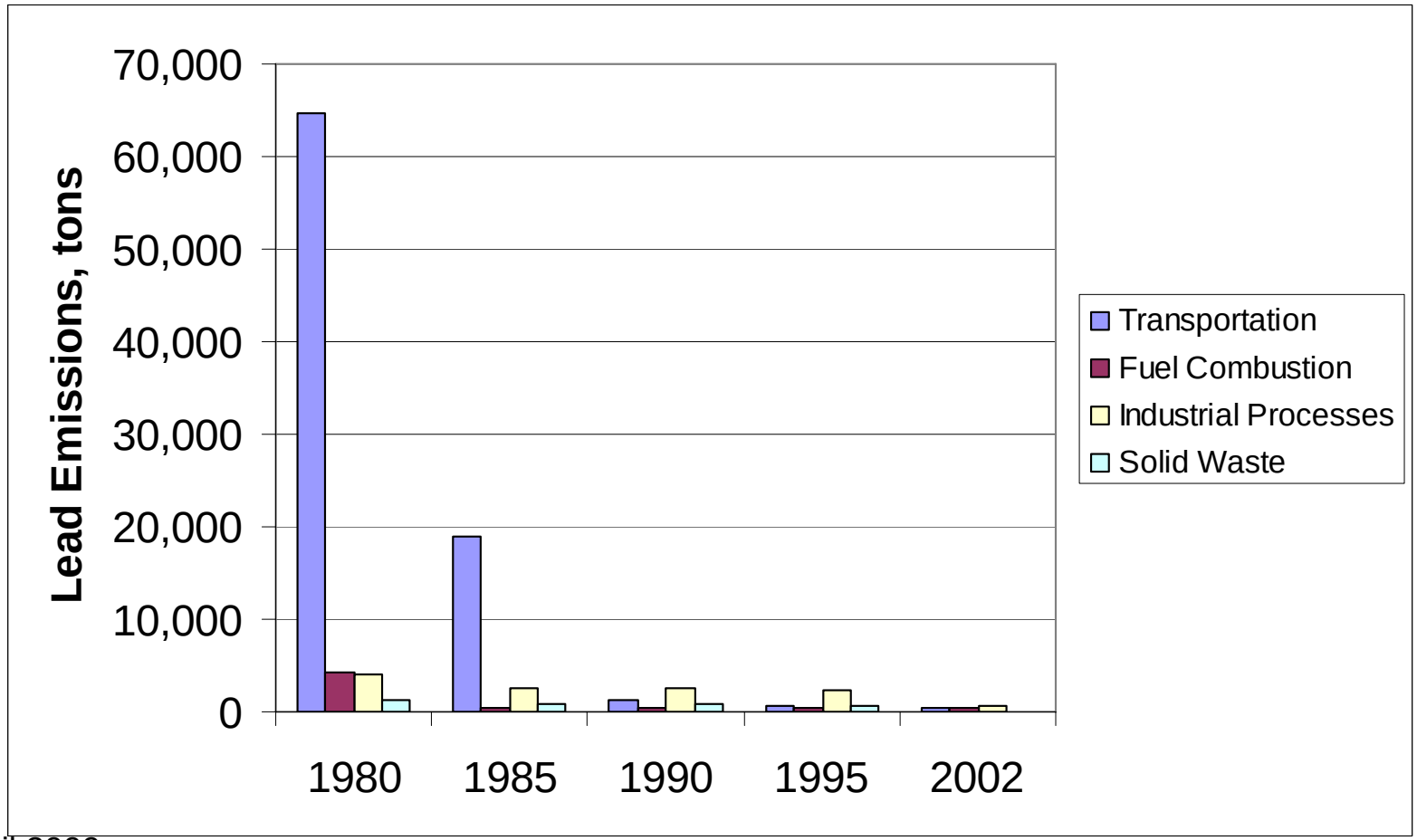


Trends in Lead Emissions



Trends in Lead Emissions

Removing lead from gasoline is considered one of the greatest successes for public and environmental health (Nriagu, 1990).



Current Sources of Lead Emissions

In NEI

Emissions from Point Source Facilities *(except resuspended soil)*

In NEI

Aviation Gas

NOT In NEI

Resuspended Soil Near / in Facilities (closed or open – w/ or w/out emission controls)

Roadside Lead (incl. resuspended "old Lead") - negligible unless soil is disturbed

Sources of Lead Emissions

- **Facility Emissions (mainly stack emissions)**
  - 55% of inventoried lead emissions in NEI from stacks
- **Aviation Gasoline**
  - 45% of NEI Emissions from Aviation Gasoline
- **Resuspended Emissions Near Facilities**
  - from material handling
    - usually inventoried – ceases upon source closure;
  - from resuspended contaminated soil (usually uninventoried);
    - can persist long after a source is controlled OR ceases operation;
- **Resuspended Lead Near Roadways**
  - No evidence of significant emissions unless soil is disturbed

Lead Emissions in 2002 NEI

Source Category Description	Total Emissions (tpy)	% of Total
ALL CATEGORIES	**1371**	**100%**
Aviation Gasoline	**623**	**45%**
Metallurgical Industries	**314**	**23%**
Manufacturing	**190**	**14%**
Incineration	**104**	**8%**
Boilers	**76**	**6%**
Misc smaller categories	**63**	**5%**

- 402 TPY from 130 Facilities emitting GTE 1 TPY *
- 100 TPY from 156 Facilities Emitting between 0.45 and 1 TPY

* 291 TPY from 100 Facilities emitting GTE 1 TPY (in 2005 NEI)

Aircraft Types

- Commercial Air Carriers
  - Aircraft used for scheduled service to transport passengers, freight, or both.
- Air Taxis
  - Smaller aircraft operating on a more limited basis to transport passengers and freight.
- General Aviation
  - Aircraft used on an unscheduled basis for recreational flying, personal transportation, and other activities, including business travel.
- Military Aircraft
  - Aircraft used to support military operations

Point Sources
Two Emission Inventories

- **National Emissions Inventory (NEI)**
  - CAP NEI is required by federal rules under the Clean Air Act
  - Currently, HAP NEI is not required
  - NEI Managed out of EPA's Office of Air Quality Planning and Standards (OAQPS)
- **Toxics Release Inventory (TRI)**
  - Required by federal law under SARA Section 313
  - Managed out of EPA's Office of Environmental Information (OEI)

TRI requirements at:
www.epa.gov/tri

NEI Information at:
www/epa.gov/ttn/chief

TRI and NEI – What are the differences?

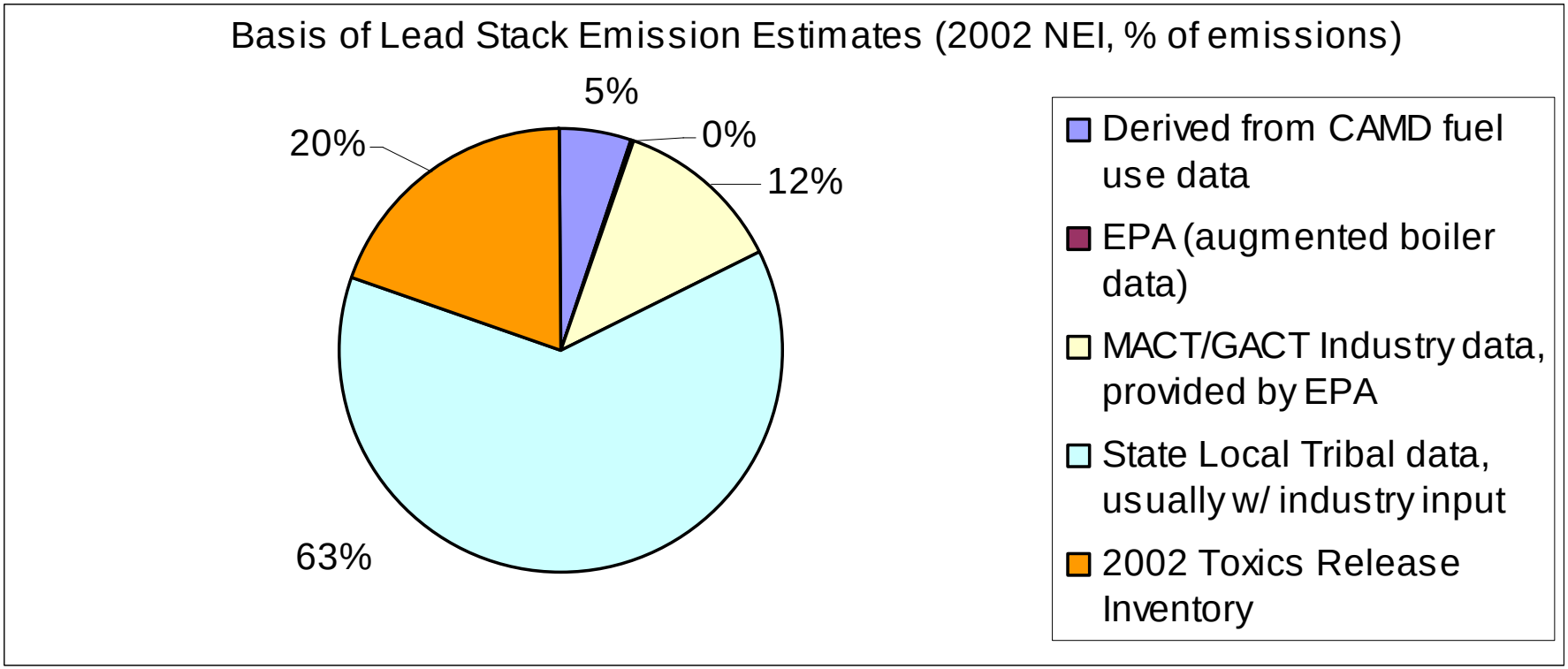
INVENTORY CHARACTERISTICS	TRI	NEI
Inventory Purpose	Right To Know Inventory	2 Primary purposes are: • Modeling Inventory to support regulatory development and risk assessments • Trends Analyses
Geographic Coverage	50 states, DC, Territories	50 states, DC, Territories
Media Coverage	Air Water Land	Air
Source Category Coverage	Facility	• Facility (major and area sources) • Nonpoint stationary emissions • Offshore Platforms (facility) • Fires – wildfires/prescribed burns (event) • Mobile Onroad • Mobile Nonroad • Mobile Airport (facility) • Mobile Commercial Marine Vessels • Mobile Railroad

TRI and NEI – What are the differences?

INVENTORY CHARACTERISTICS	TRI	NEI
Resolution of Air Data (level of detail)	• Facility sum of stack releases • Facility sum of fugitive releases	• Facility (point) data at individual process level with stack and fugitive releases • Offshore Platforms – point data at individual process level individual stack and fugitive releases • Airports (point) data at individual process level with fugitive releases for each runway • Fires – individual points with hourly data; lat/long • Nonpoint Stationary* – county level • Mobile Onroad * – county level • Mobile Nonroad * – county level • Mobile Marine Vessel * – county level • Mobile Railroad * – county level *Currently at county level; will be more refined in 2008
Pollutant Coverage	• Air toxics > 600 compounds • Includes all HAPs on CAA list	• CAPs: VOC, NOx, CO, NH3, PM10, PM2.5, SO2, Pb • HAPs: CAA list of HAPs and individual compounds for compounds groups (> 400 individual compounds), Pb and compounds

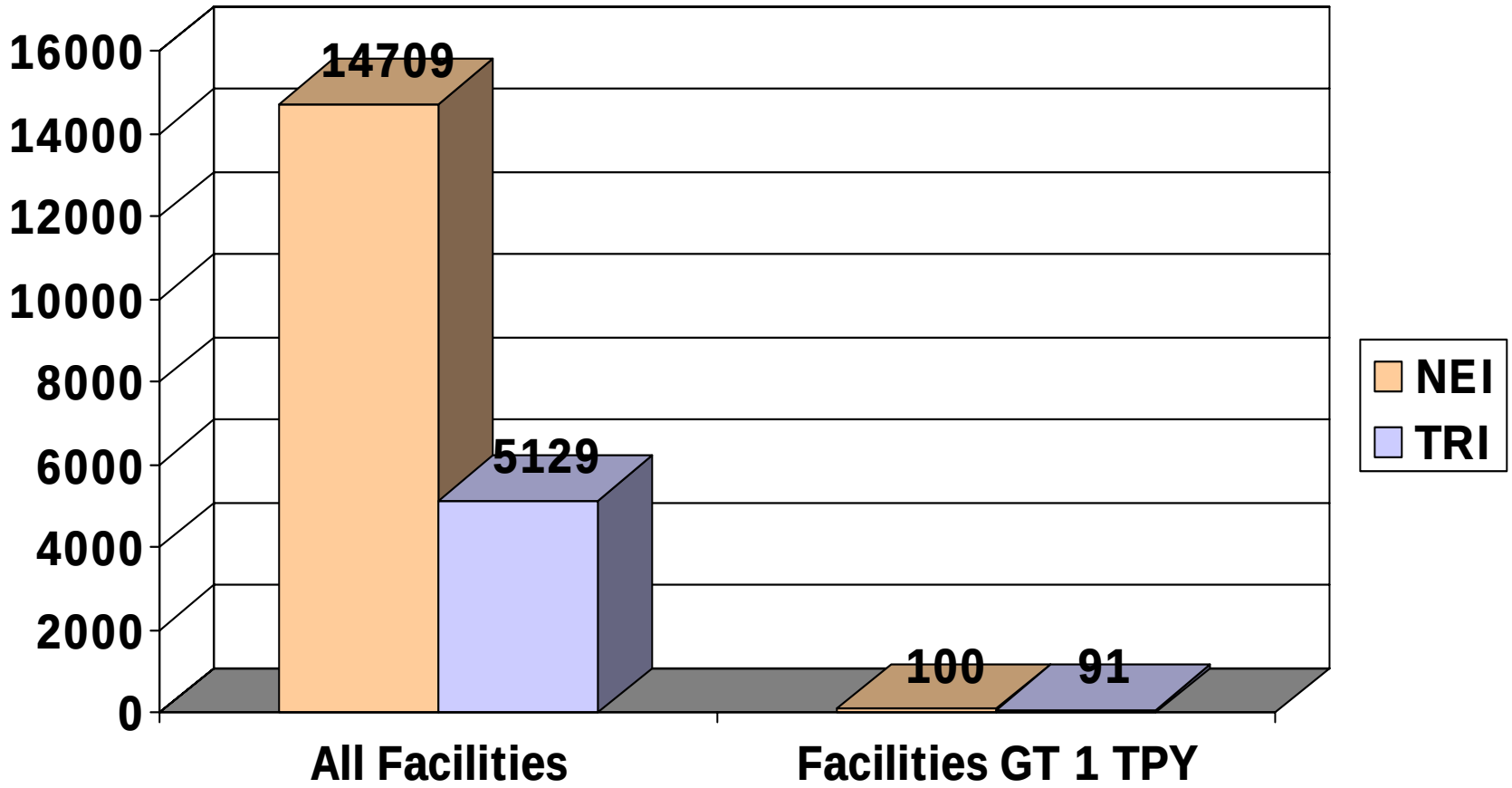
Where did EPA get the Pb Data in the 2002 NEI?

Point Source Stack Emissions

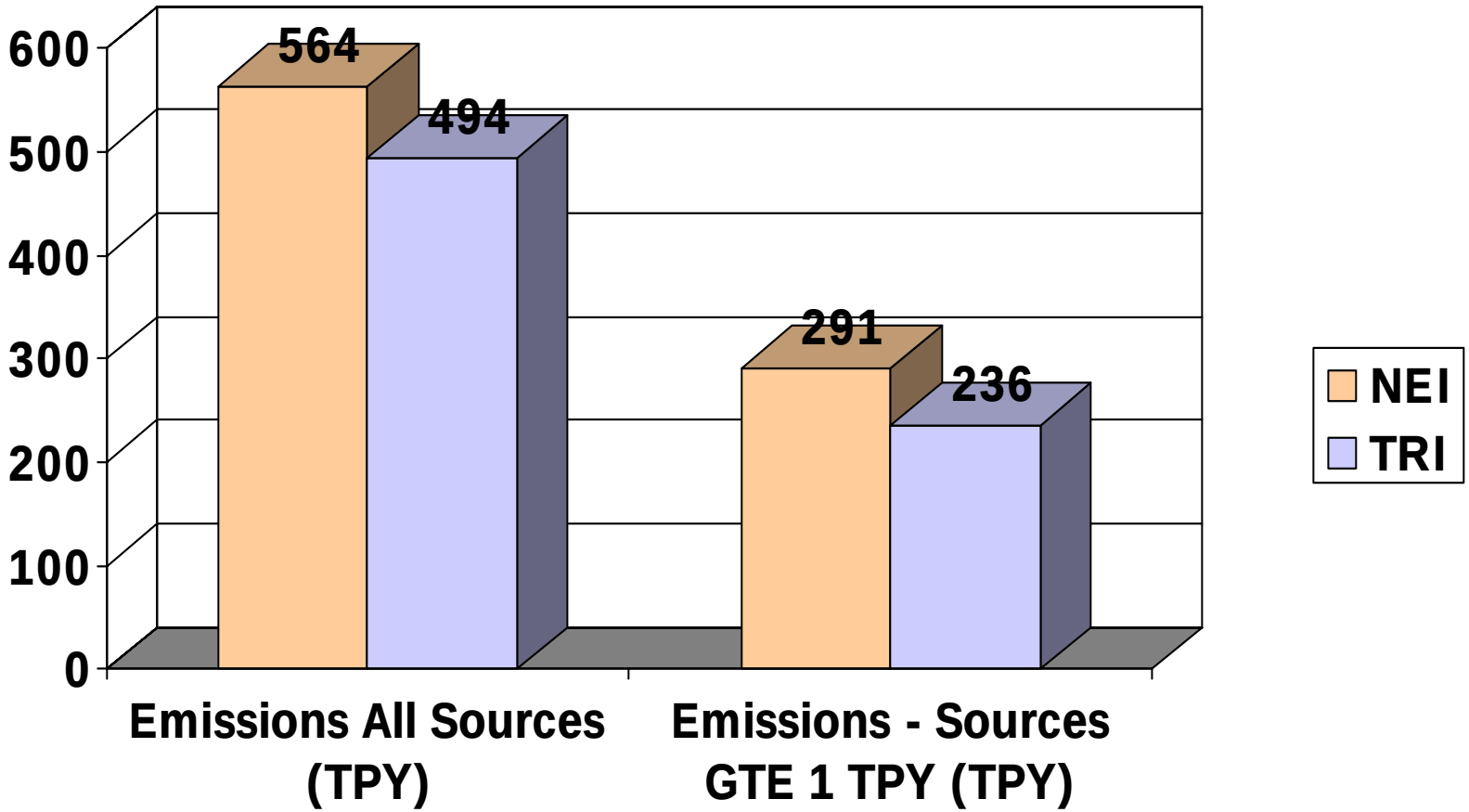


Aviation Gasoline Emissions are estimated by OTAQ based on leaded general aviation fuel use in piston aircraft, apportioned to specific airports using general aviation LTO data

Comparison of 2005 NEI & TRI Pb: Number of Facilities

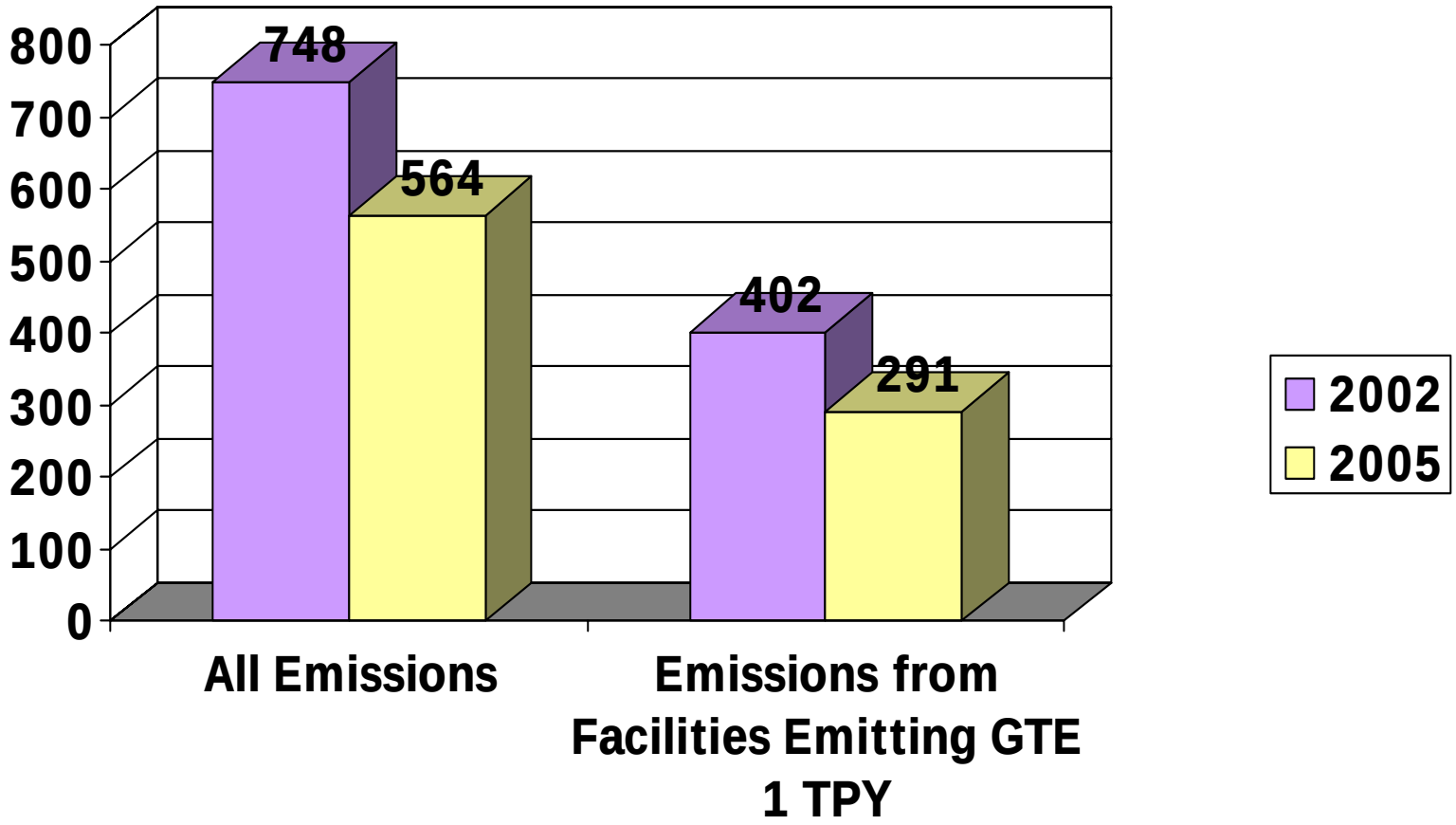


Comparison of 2005 NEI & TRI Pb: Emissions

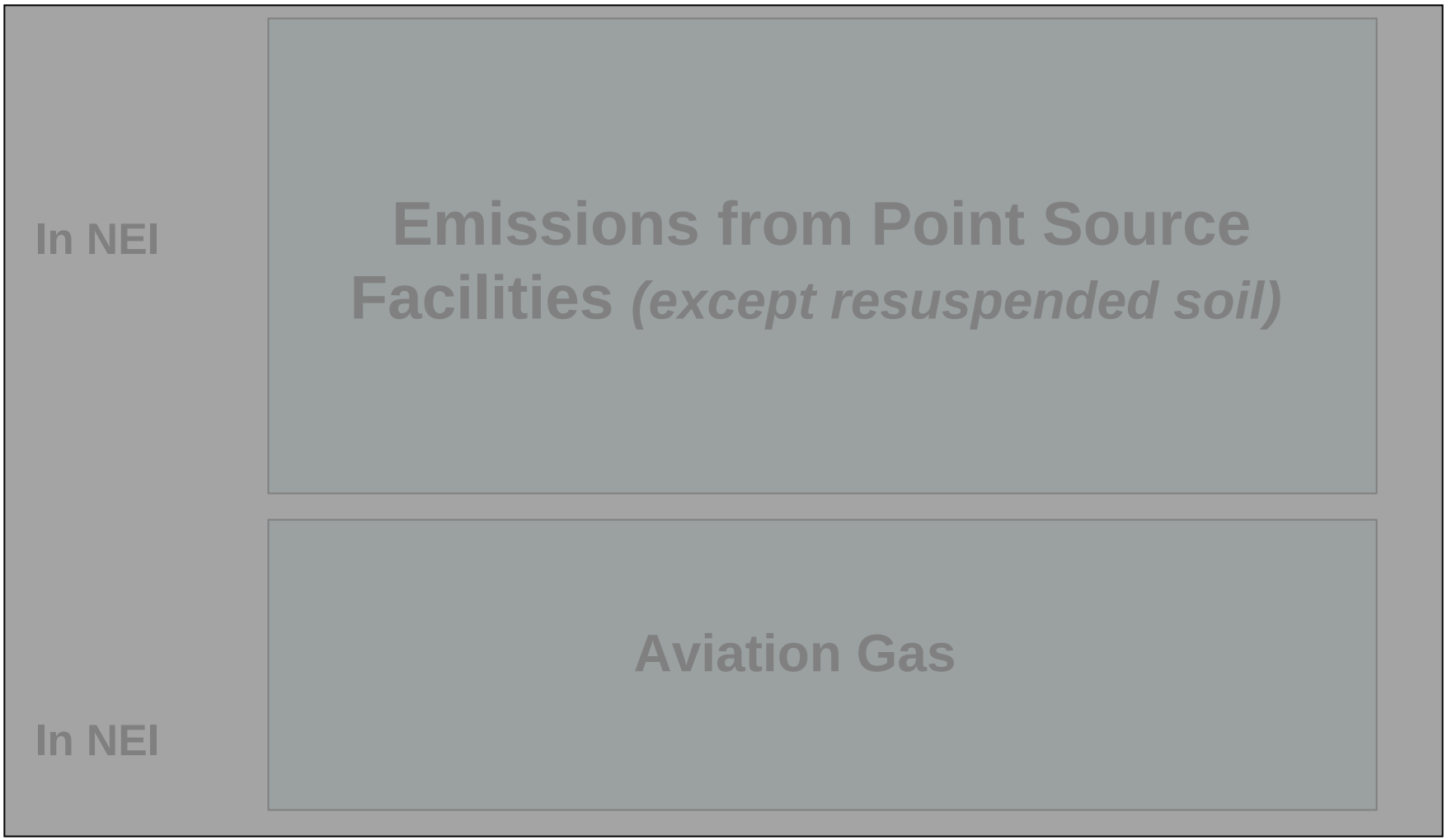


Note: S/L/T didn't always use the TRI data

Comparison of 2002 & 2005 NEI



Current Sources of Lead Emissions



NOT In NEI

- **Resuspended Soil Near / in Facilities (closed or open – w/ or w/out emission controls)**
- **Roadside Lead (incl. resuspended "old Lead") - negligible unless soil is disturbed**

Other Sources of Lead Emissions

(Resuspended Contaminated Soil - Facilities)

- **Contaminated soil within OR near facilities**
  - May be resuspended by wind gusts, earthmoving or vehicular activities on contaminated unpaved surfaces
  - Potential for emissions exists even if source controlled OR closed

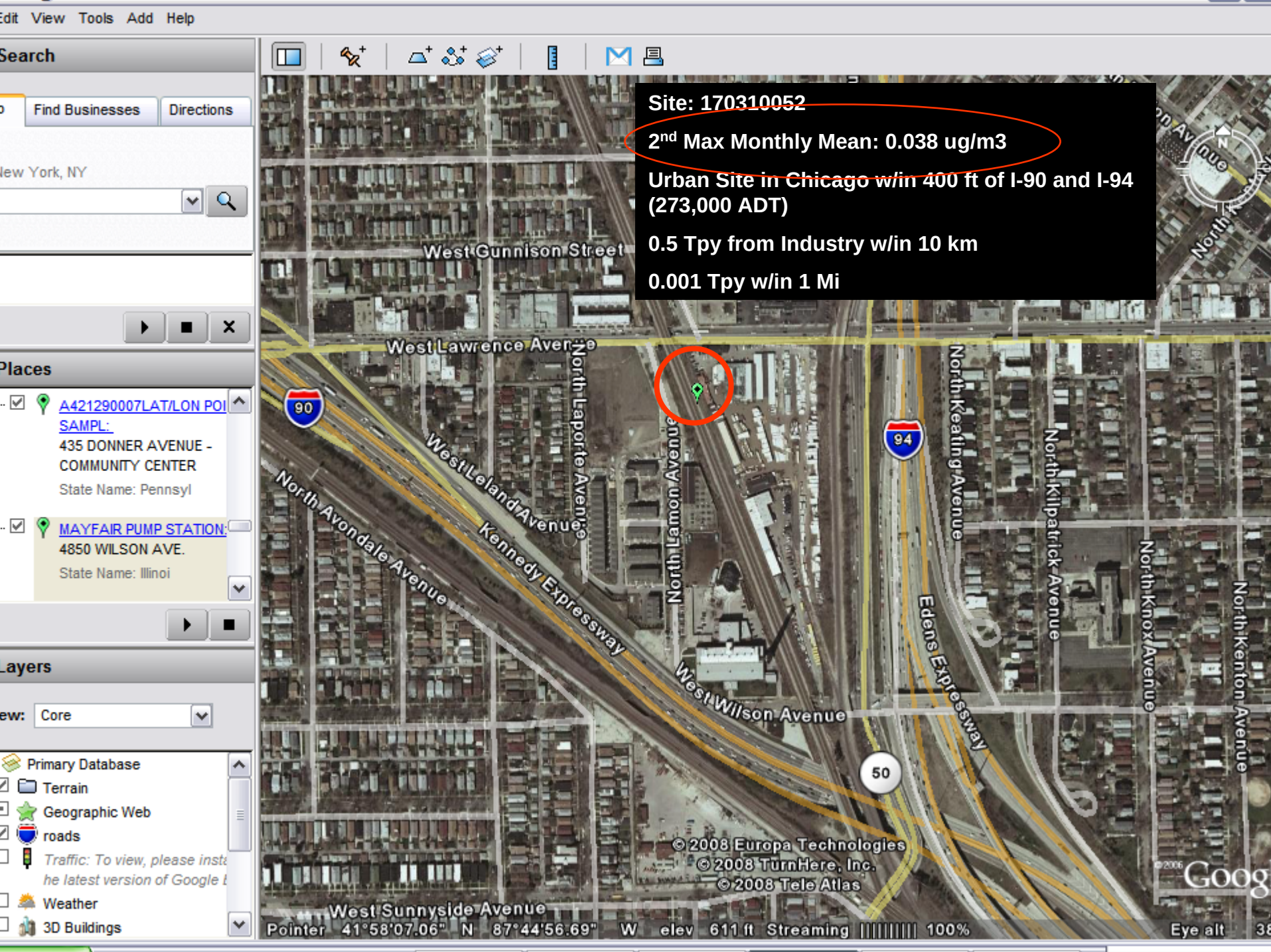
Other Sources of Lead Emissions

(Resuspended Contaminated Soil - Traffic)

Traffic-related Lead - *Generally uninventoried*

- **Road shoulders** contaminated by years of lead-laden exhaust from vehicles
  - Resuspension unlikely unless earthmoving or other soil disturbance mechanism is active.
  - NO evidence of significant widespread impact from “old Lead” near roadways.
- **Fresh lead emissions** from brake and tire wear, lubricating oils, dislodged lead tire weights
  - Ambient data analysis suggests insignificant contribution to ambient Lead concentrations sited for general population exposure monitoring

BUT, IS THIS AN IMPORTANT SOURCE CATEGORY?
Lets look at a few examples of traffic-related monitoring…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COMMUNITY CENTER
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4850 WILSON AVE.
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Site: 170310052
2nd Max Monthly Mean: 0.038 ug/m3
Urban Site in Chicago w/in 400 ft of I-90 and I-94 (273,000 ADT)
0.5 Tpy from Industry w/in 10 km
0.001 Tpy w/in 1 Mi
West Gunnison Street
West Lawrence Avenue
North Laporte Avenue
North Lamon Avenue
West Leland Avenue
North Avondale Avenue
Kennedy Expressway
West Wilson Avenue
West Sunnyside Avenue
North Keating Avenue
North Kilpatrick Avenue
North Knox Avenue
North Kenton Avenue
Edens Expressway
90
94
50
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Pointer 41°58'07.06" N 87°44'56.69" W elev 611 ft Streaming 100%
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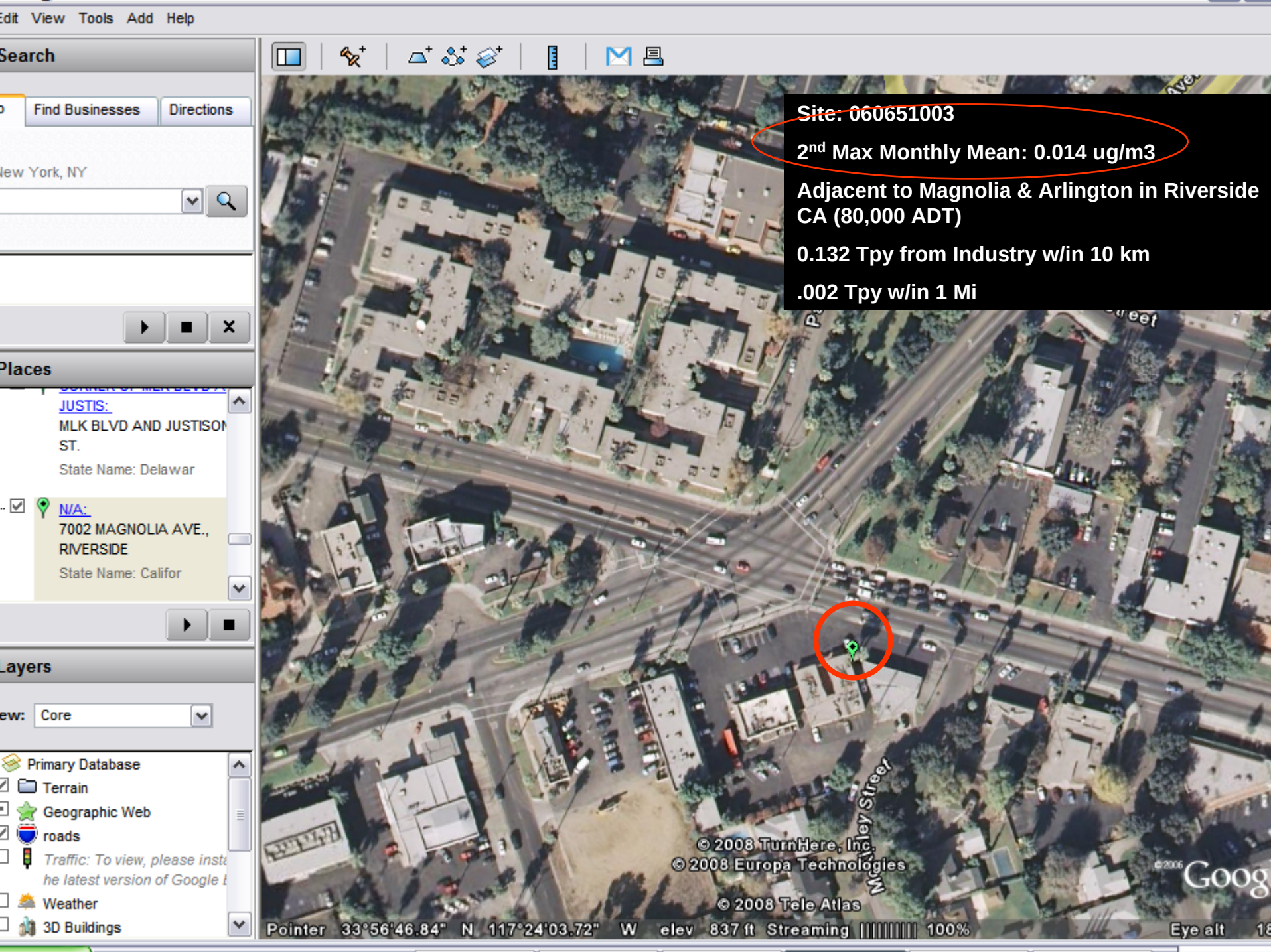
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Traffic: To view, please insta
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Site: 060651003
2nd Max Monthly Mean: 0.014 ug/m3
Adjacent to Magnolia & Arlington in Riverside CA (80,000 ADT)
0.132 Tpy from Industry w/in 10 km
.002 Tpy w/in 1 Mi
Magnolia Street
© 2008 TurnHere, Inc.
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Pointer 33°56'46.84" N 117°24'03.72" W elev 837 ft Streaming 100%
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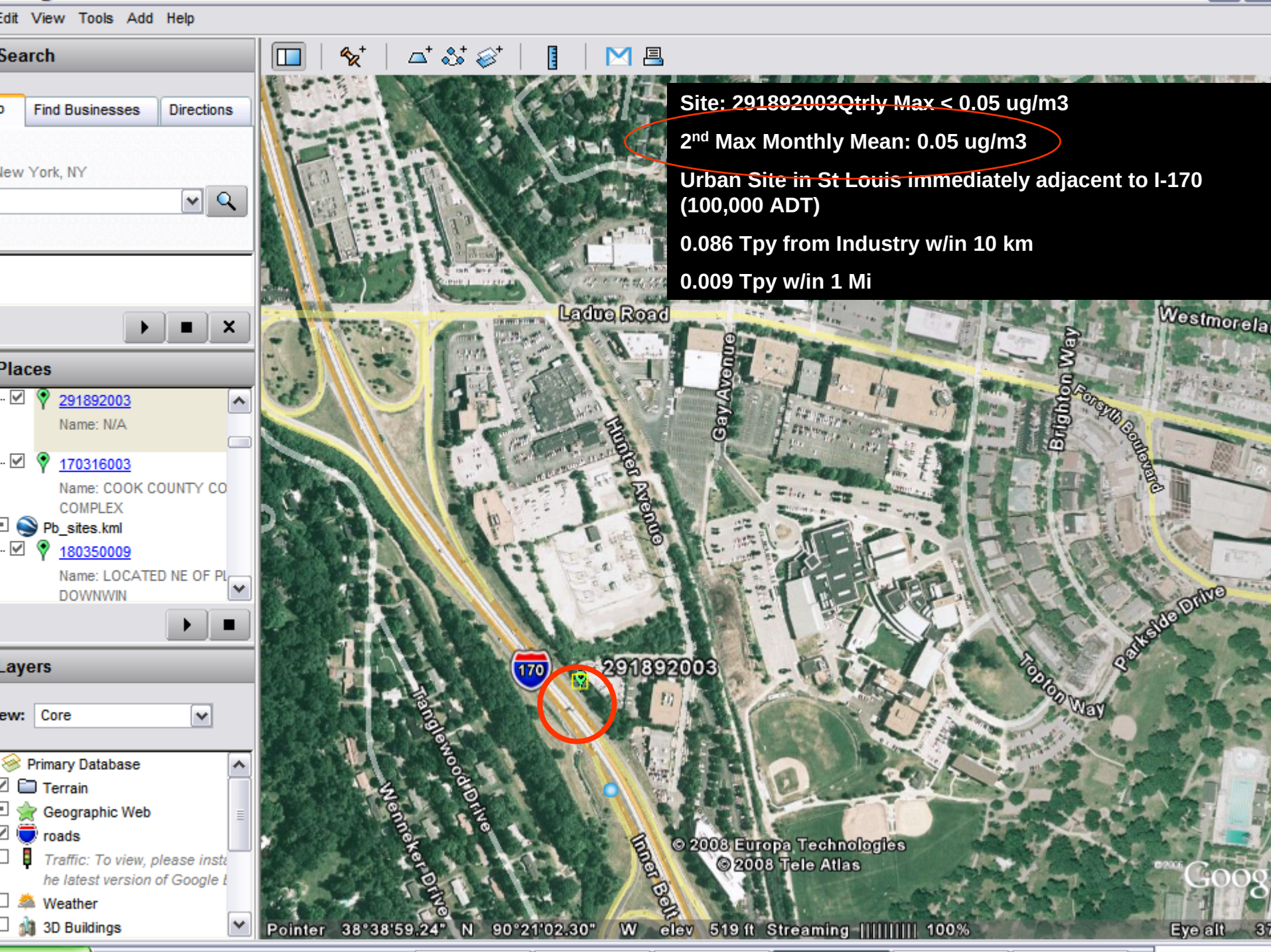
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Site: 291892003Qtrly Max < 0.05 ug/m3
2nd Max Monthly Mean: 0.05 ug/m3
Urban Site in St Louis immediately adjacent to I-170 (100,000 ADT)
0.086 Tpy from Industry w/in 10 km
0.009 Tpy w/in 1 Mi
Ladue Road
Gay Avenue
Hunter Avenue
Brighton Way
Forsyth Boulevard
Westmorela
Parkside Drive
Topton Way
Tanglewood Drive
Wenneker Drive
Inner Belt
170
291892003
© 2008 Europa Technologies
© 2008 Tele Atlas
Pointer 38°38'59.24" N 90°21'02.30" W elev 519 ft Streaming 100%
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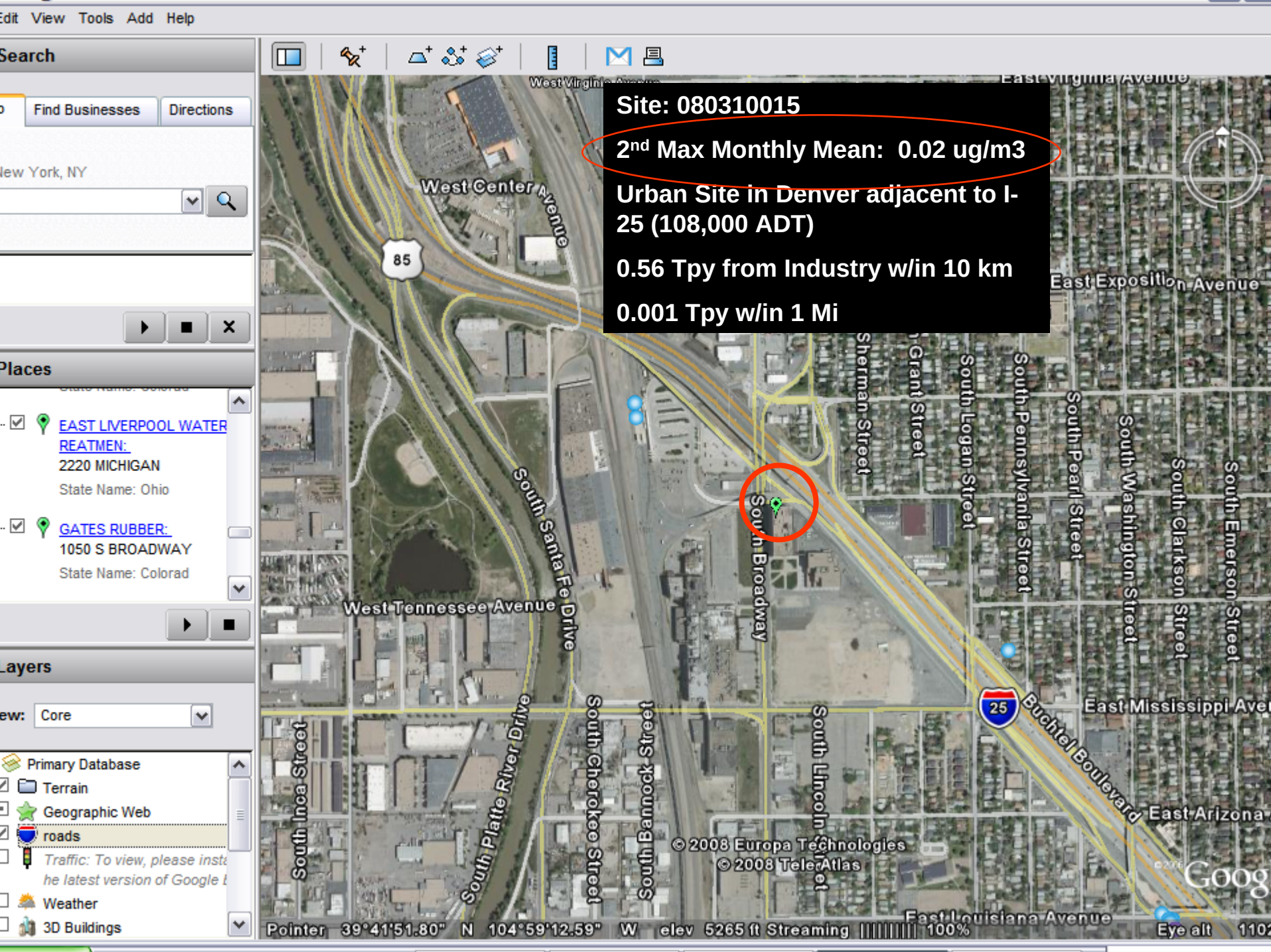
Site 291892003 – 77 Hunter Road, St. Louis, MO
Current Monitor Location
New platform built since this picture
Monitors at roof level on platform


Site: 080310015
2nd Max Monthly Mean: 0.02 ug/m3
Urban Site in Denver adjacent to I-25 (108,000 ADT)
0.56 Tpy from Industry w/in 10 km
0.001 Tpy w/in 1 Mi
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EAST LIVERPOOL WATER
REATMEN:
2220 MICHIGAN
State Name: Ohio
GATES RUBBER:
1050 S BROADWAY
State Name: Colorad
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Traffic: To view, please insta
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3D Buildings
West Center Avenue
85
South Santa Fe Drive
West Tennessee Avenue
South Broadway
Sherman Street
Grant Street
South Logan Street
South Pennsylvania Street
South Pearl Street
South Washington Street
South Clarkson Street
South Emerson Street
East Exposition Avenue
East Mississippi Ave
25
Buchtel Boulevard
East Arizona
East Louisiana Avenue
South Inca Street
South Platte River Drive
South Cherokee Street
South Bannock Street
South Lincoln Street
© 2008 Europa Technologies
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Pointer 39°41'51.80" N 104°59'12.59" W elev 5265 ft Streaming 100%
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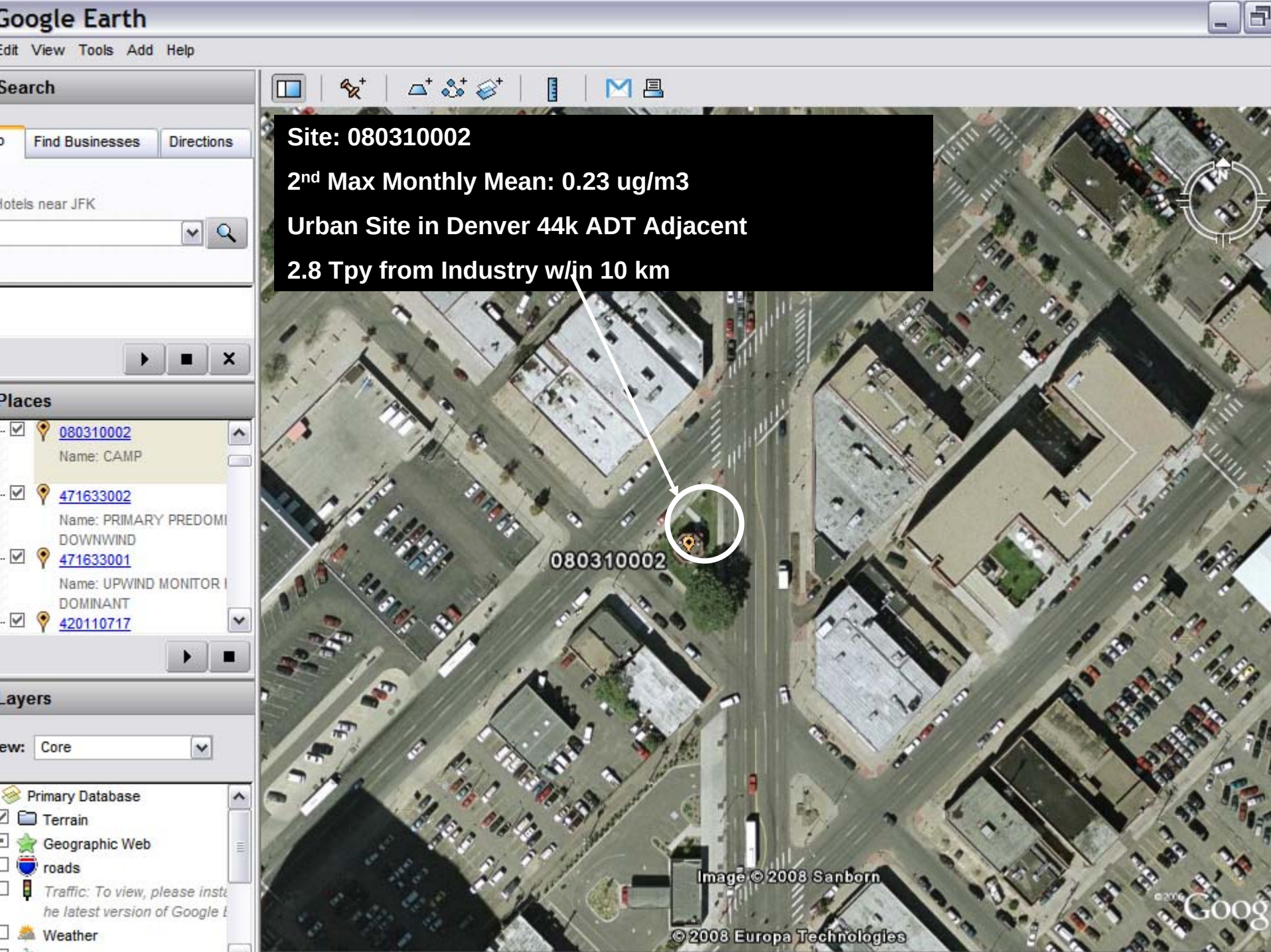
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Hotels near JFK
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Name: CAMP
471633002
Name: PRIMARY PREDOMI
DOWNWIND
471633001
Name: UPWIND MONITOR
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Site: 080310002
2nd Max Monthly Mean: 0.23 ug/m3
Urban Site in Denver 44k ADT Adjacent
2.8 Tpy from Industry w/in 10 km
080310002
Image © 2008 Sanborn
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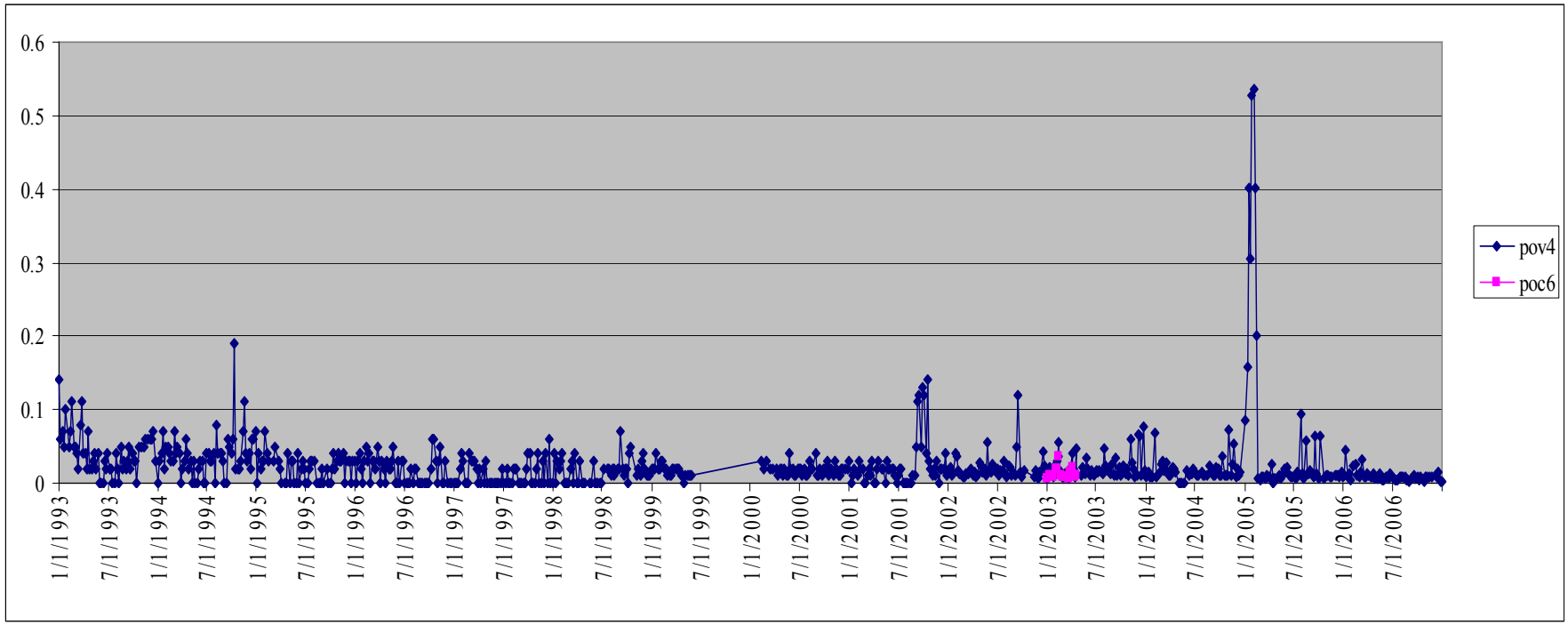
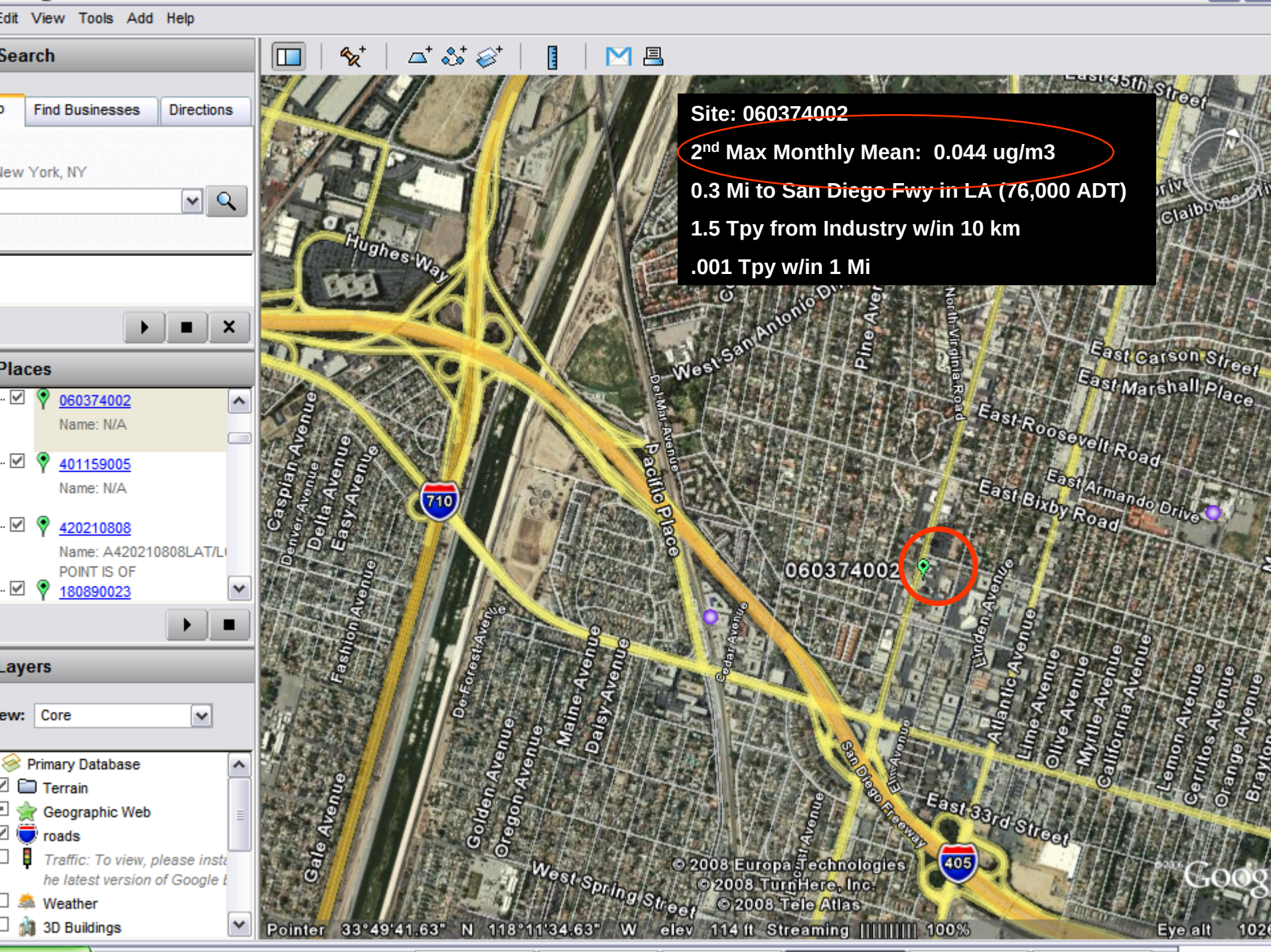
Denver Site 080310002 – 24-hr averages, 1993 to 2006



3-year metrics, 2003-2005					
annual mean	max quarterly mean	max monthly mean	2nd max monthly mean	average of 3 overall highest monthly means	average of 3 annual max monthly means
0.0315	0.1780	0.2955	0.2297	0.1906	0.1254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401159005
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420210808
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Site: 060374002
2nd Max Monthly Mean: 0.044 ug/m3
0.3 Mi to San Diego Fwy in LA (76,000 ADT)
1.5 Tpy from Industry w/in 10 km
.001 Tpy w/in 1 Mi
060374002
Hughes Way
West San Antonio Dr
Pine Ave
North Virginia Road
East 45th Street
East Carson Street
East Marshall Place
East Roosevelt Road
East Armando Drive
East Bixby Road
Del Mar Avenue
Pacific Place
Cedar Avenue
Linden Avenue
Atlantic Avenue
Lime Avenue
Olive Avenue
Myrtle Avenue
California Avenue
Lemon Avenue
Cerritos Avenue
Orange Avenue
Caspian Avenue
Denver Avenue
Delta Avenue
Easy Avenue
Fashion Avenue
De Forest Avenue
Golden Avenue
Oregon Avenue
Maine Avenue
Daisy Avenue
Gale Avenue
West Spring Street
San Diego Freeway
East 33rd Street
710
405
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Pointer 33°49'41.63" N 118°11'34.63" W elev 114 ft Streaming 100%
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Lead Emissions at Traffic-related Sites *What does Lead Monitoring Data Tell us?*

- **Examples above have 3 common themes:**
  - Lots of traffic in area around monitor
  - Pb concentrations ***were*** high, trended down
  - All have Pb concentrations < 0.05 ug/m3 2nd Max Monthly Mean
- **Other traffic-related sites** do have higher concentrations, but due to industrial source influence
- **What do these data tell us** about traffic-related impacts?
  - Traffic-related source impacts (if significant) should show up as elevated concentrations at these sites, but….
  - *No evidence* of contribution of more than 0.05 ug/m3 from collective impact of ALL uninventoried sources (including traffic-related Lead) at any of the following sites
- **Reasonable conclusion** ~ the impact of traffic-related Lead is very low -- much less than some have suggested

Point Source Lead Emissions are a Work in Progress

- Pb was “not a priority” for many S/L/Ts for 2002 NEI
- Some Updates Recently Made to 2002 NEI:
  - 2002 NEI sources emitting GTE 1 TPY were screened for obvious problems
  - Emissions from Boilers were adjusted down – issue with emission factors
  - Regional Offices were asked comment on point source emissions
  - Some EPA Regional Offices involved their States
  - Locations of sources were verified using Google Earth where possible
- 2005 NEI has been improved due to more active Region/State/Local/Tribal participation
- These improvements and other ongoing work by States, Locals, Tribes and Industry will clarify the need for Pb Air Quality Monitoring

What is being done by SLT to Prepare for AQ Monitoring Decisions ?

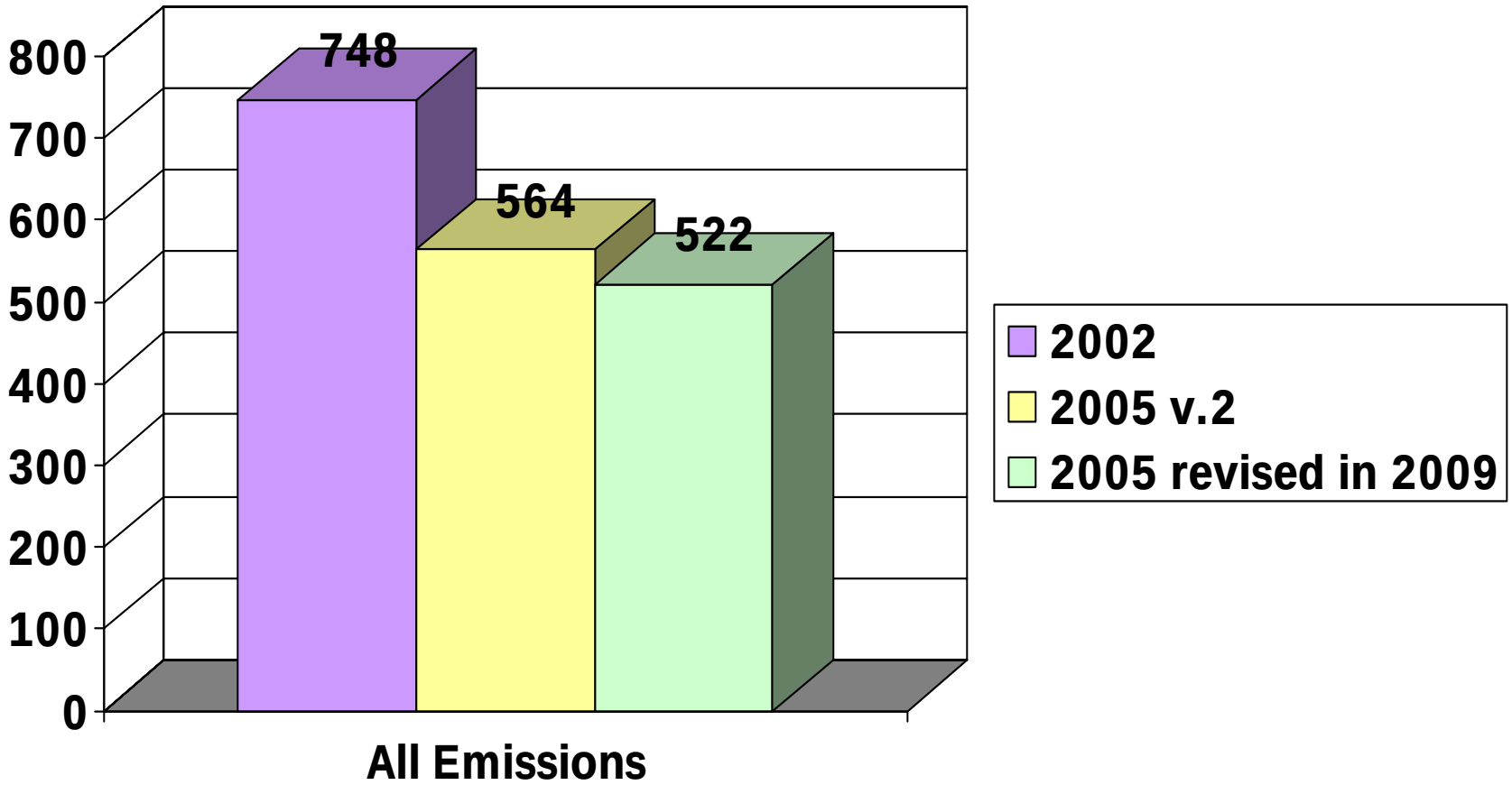
- **Industrial Stack Emissions** – further review of the EI
- **Aviation Gasoline** – OTAQ prepared & vetted the EI
- **Lead Emissions near Facilities** – qualitative review to establish likelihood of fugitive emissions from contaminated soil
- **Lead Emissions from near Roadways** – qualitative review if contaminated soil is disturbed by construction

Compare 2005 v2 with revisions

- **Revisions received after release of 2005 NEI v2 (10/01/08 – 03/15/09)**
  - Result of Lead NAAAQS, RTR, and Air Toxics School Monitoring Study Review by SLTs, ROs, EPA, and Industry
  - Includes:
    - Closures
    - Removal of double counted facilities
    - Removal of emissions reported as elemental lead and as lead and compounds for the same facility
    - Revised emissions
    - Revised latitude/longitude
- Summary of Revisions

  262 facilities
    - 2005 NEI v2 emissions: 110 tpy
    - Revised 2005 emissions: 68 tpy

Comparison of 2002, 2005 NEI v2, and Revised 2005 NEI



Thank You!

Questions, Comments?

Traffic-related Sources of Lead and Their Contribution to Ambient Lead Levels

Purpose of This Discussion is to…

- Clarify the terminology we are using for traffic-related Lead sources
- Discuss the nature of traffic-related Lead emissions and our estimate of the range of Air Quality impacts of traffic-related Lead
- To show evidence that the combined impact of traffic-related Lead sources is much less an issue than previously suspected

Traffic-related Lead Emissions

(Uninventoried Sources)

- **Short-duration / occasional sources –**
  - **"Earthmoving"** of contaminated soil from road shoulders during road widening and building construction activities.
    - Short term effects could be seen on monitors *if* source is nearby
    - No evidence of this occurring but it is certainly possible
  - **Wind blowing of disturbed, contaminated roadside soil** onto road surface or into surrounding air

- **Ubiquitous, continuous sources of traffic-related Lead –**
  - **Road Shoulders –** *"Old"* Lead resuspended by
    - Wake of vehicles & off-road traffic
  - **Traffic lanes and shoulders –** "*Fresh*" Lead emissions from
    - Tire and brake wear, engine oil, wheel weights

Lead Monitoring at Traffic-related Sites

- **Six traffic-related monitoring sites are shown below**
  - Riverside, CA
  - Chicago, IL
  - St Louis, MO
  - Denver, CO (2, w/ short term “spike” due to superfund site cleanup nearby)
  - LA site near Long Beach Municipal & 5 km from source

- **Note: Other uninventoried sources** (**ubiquitous &/or short duration / occasional sources)** are potentially impacting these sites as well

Lead Monitoring at Traffic-related Sites

(Continued)

- **3 common themes**
  - Lots of traffic in area around monitor
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  - All have Pb concentrations < 0.05 ug/m3 2nd Max Monthly Mean
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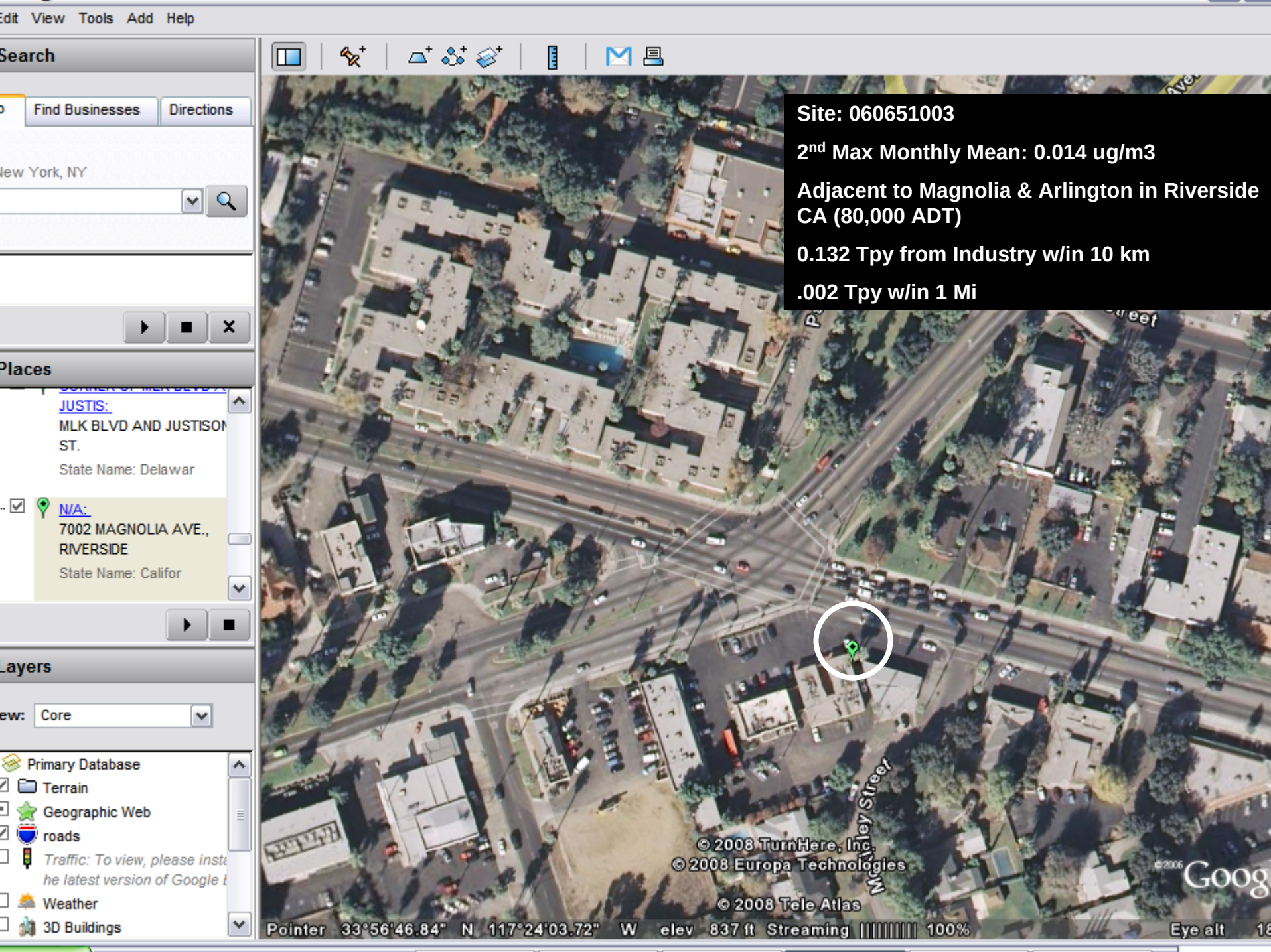
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3D Buildings
Site: 060651003
2nd Max Monthly Mean: 0.014 ug/m3
Adjacent to Magnolia & Arlington in Riverside CA (80,000 ADT)
0.132 Tpy from Industry w/in 10 km
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Magnolia Street
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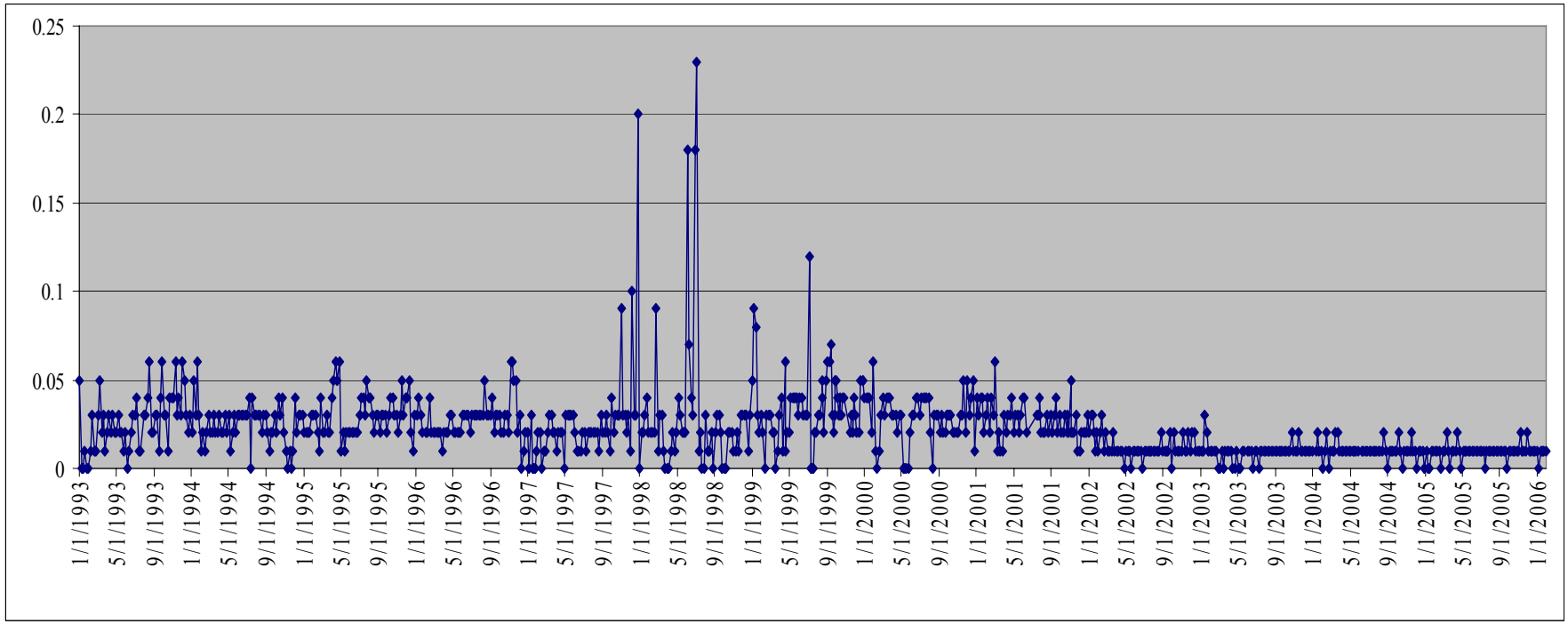
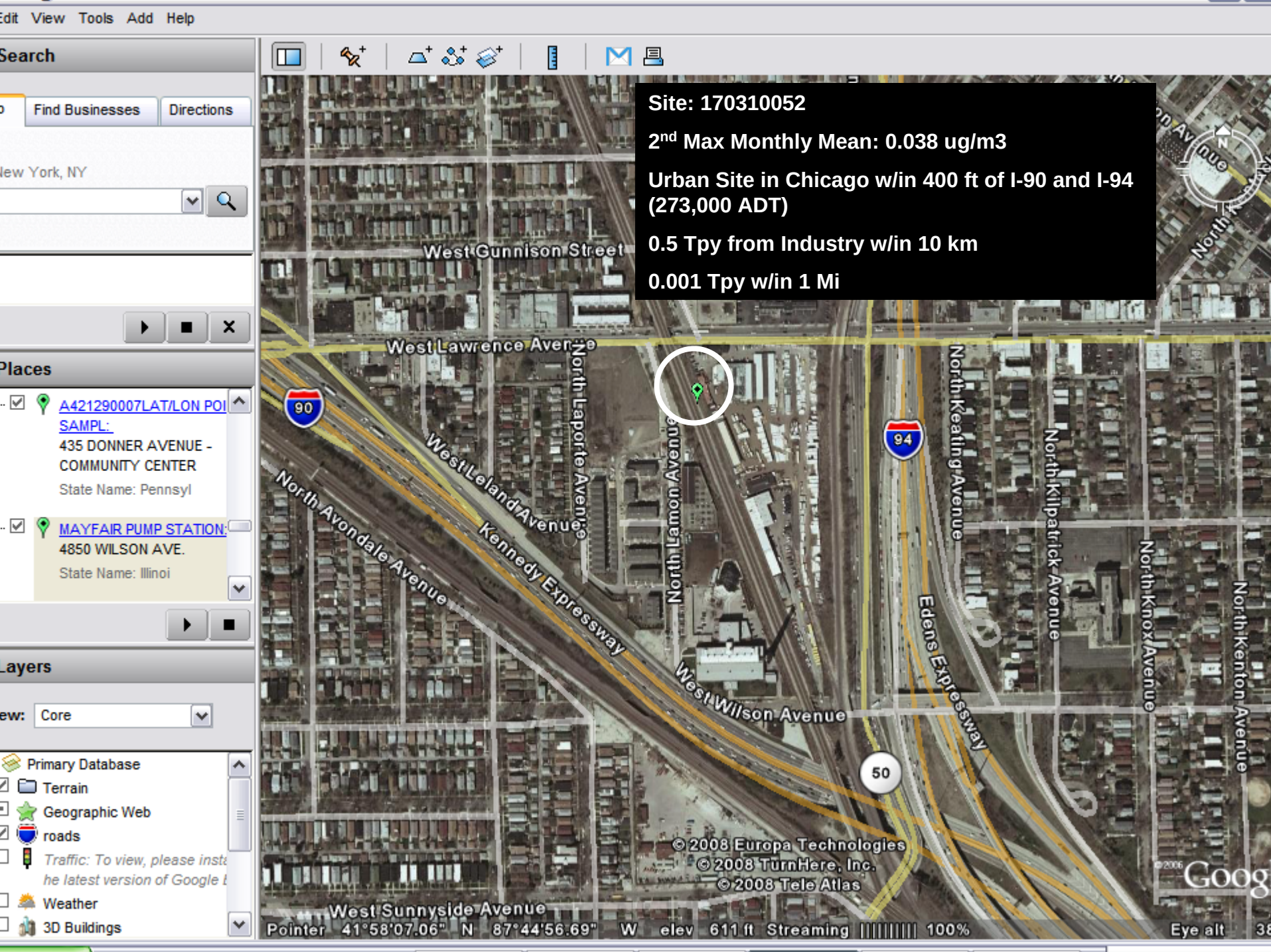
Pointer 33°56'46.84" N 117°24'03.72" W elev 837 ft Streaming 100%
Eye alt

Los Angeles Site 060651003 – 24-hr averages, 1993 to 2006



Sample day

3-year metrics					
annual mean	max quarterly mean	max monthly mean	2nd max monthly mean	average of 3 overall highest monthly means	average of 3 annual max monthly means
0.0097	0.0114	0.0160	0.0140	0.0147	0.0147


Edit View Tools Add Help
Search
Find Businesses
Directions
New York, NY
Places
A421290007LAT/LON POI
SAMPL:
435 DONNER AVENUE -
COMMUNITY CENTER
State Name: Pennsyl
MAYFAIR PUMP STATION:
4850 WILSON AVE.
State Name: Illinoi
Layers
View: Core
Primary Database
Terrain
Geographic Web
roads
Traffic: To view, please insta
he latest version of Google E
Weather
3D Buildings
Site: 170310052
2nd Max Monthly Mean: 0.038 ug/m3
Urban Site in Chicago w/in 400 ft of I-90 and I-94 (273,000 ADT)
0.5 Tpy from Industry w/in 10 km
0.001 Tpy w/in 1 Mi
West Gunnison Street
West Lawrence Avenue
North Laporte Avenue
North Lamon Avenue
West Leland Avenue
North Avondale Avenue
Kennedy Expressway
West Wilson Avenue
West Sunnyside Avenue
North Keating Avenue
North Kilpatrick Avenue
North Knox Avenue
North Kenton Avenue
Edens Expressway
North Avenue
90
94
50
© 2008 Europa Technologies
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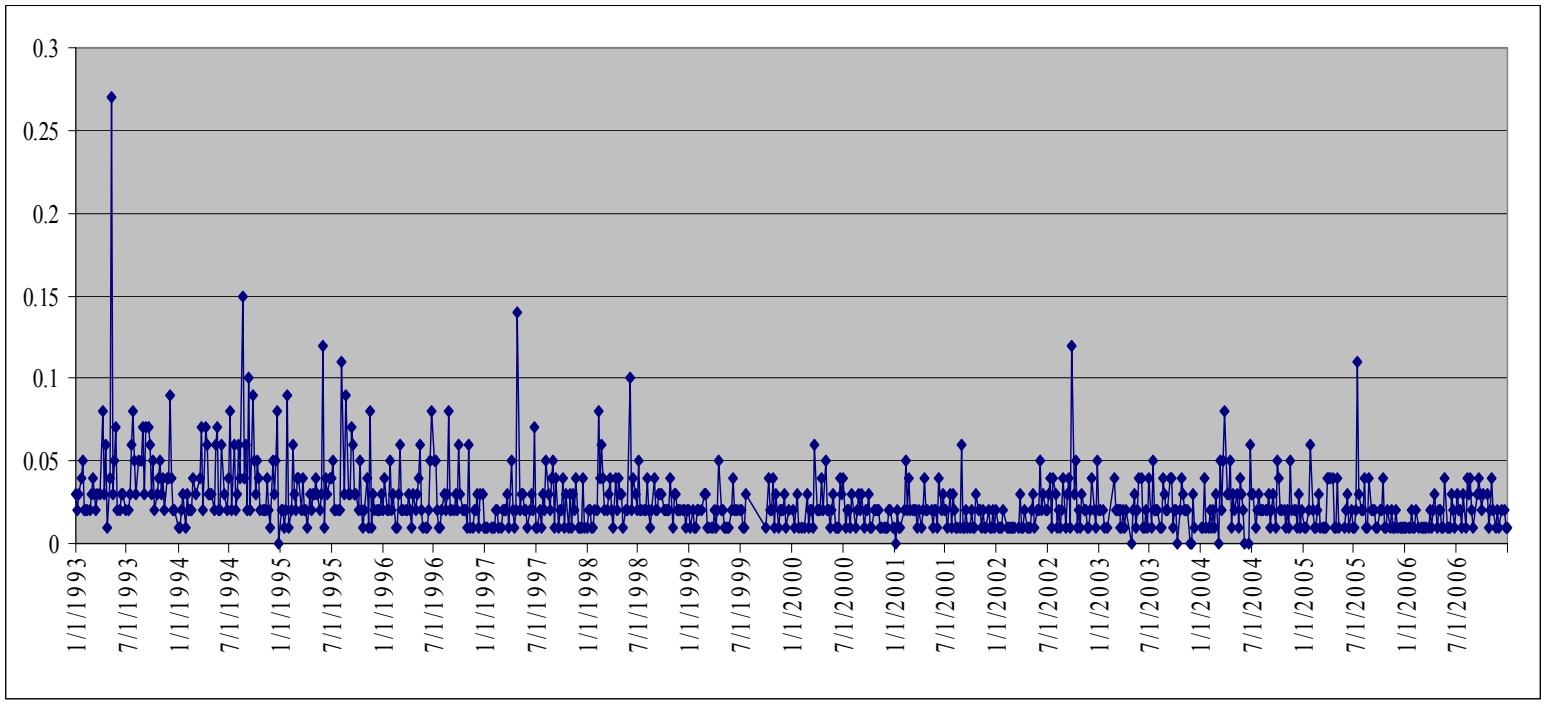
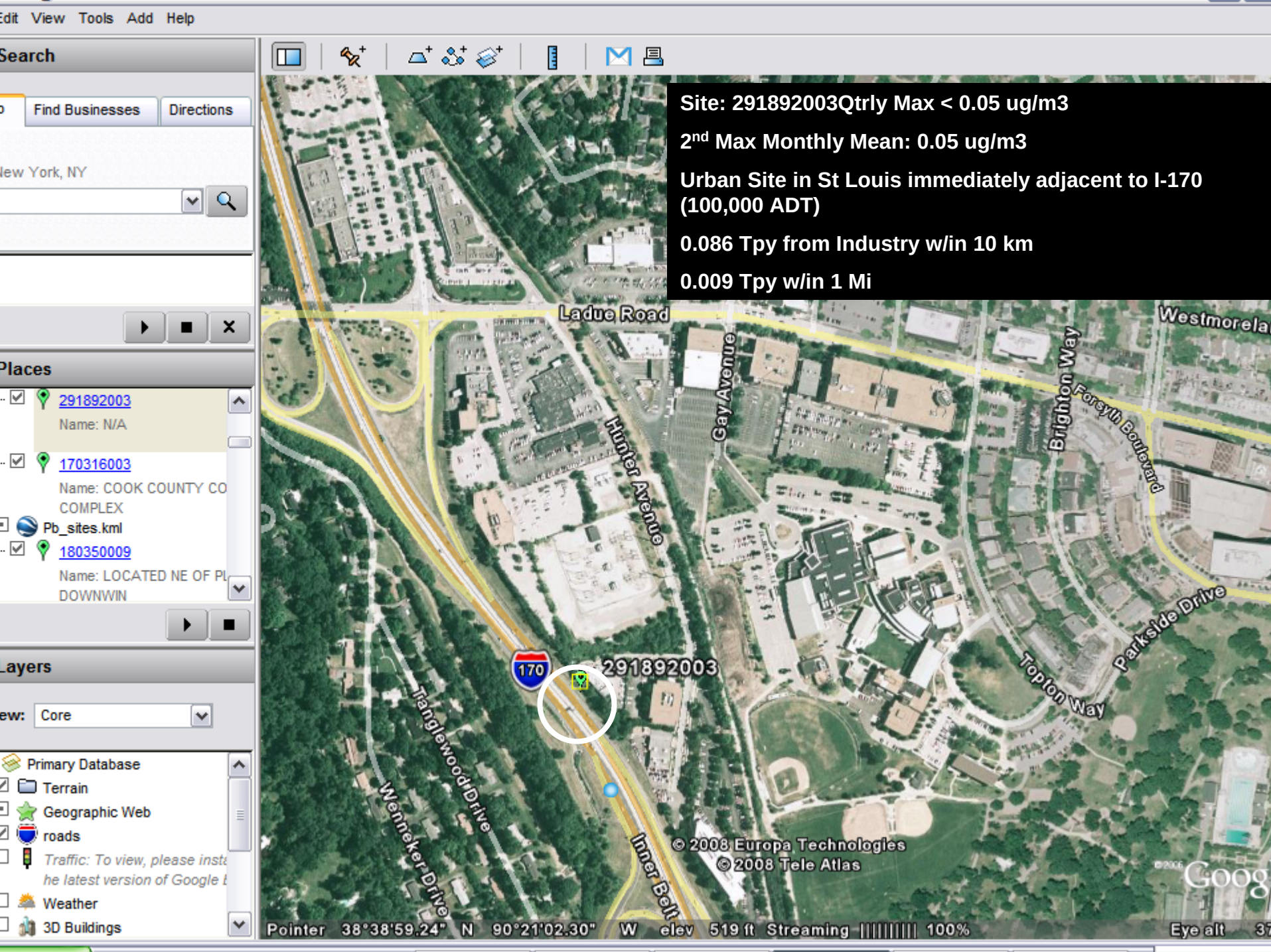
© 2008 Tele Atlas
Pointer 41°58'07.06" N 87°44'56.69" W elev 611 ft Streaming 100%
Eye alt

Chicago Site 170310052 – 24-hr averages, 1993 to 2006



Sample day

3-year metrics					
annual mean	max quarterly mean	max monthly mean	2nd max monthly mean	average of 3 overall highest monthly means	average of 3 annual max monthly means
0.0214	0.0260	0.0400	0.0380	0.0360	0.0353


Edit View Tools Add Help
Search
Find Businesses
Directions
New York, NY
Places
291892003
Name: N/A
170316003
Name: COOK COUNTY CO
COMPLEX
Pb_sites.kml
180350009
Name: LOCATED NE OF PL
DOWNWIN
Layers
ew: Core
Primary Database
Terrain
Geographic Web
roads
Traffic: To view, please insta
he latest version of Google E
Weather
3D Buildings
Site: 291892003Qtrly Max < 0.05 ug/m3
2nd Max Monthly Mean: 0.05 ug/m3
Urban Site in St Louis immediately adjacent to I-170 (100,000 ADT)
0.086 Tpy from Industry w/in 10 km
0.009 Tpy w/in 1 Mi
Ladue Road
Gay Avenue
Hunter Avenue
Brighton Way
Forsyth Boulevard
Westmorela
Parkside Drive
Topton Way
Tanglewood Drive
Wenneker Drive
Inner Belt
170
291892003
© 2008 Europa Technologies
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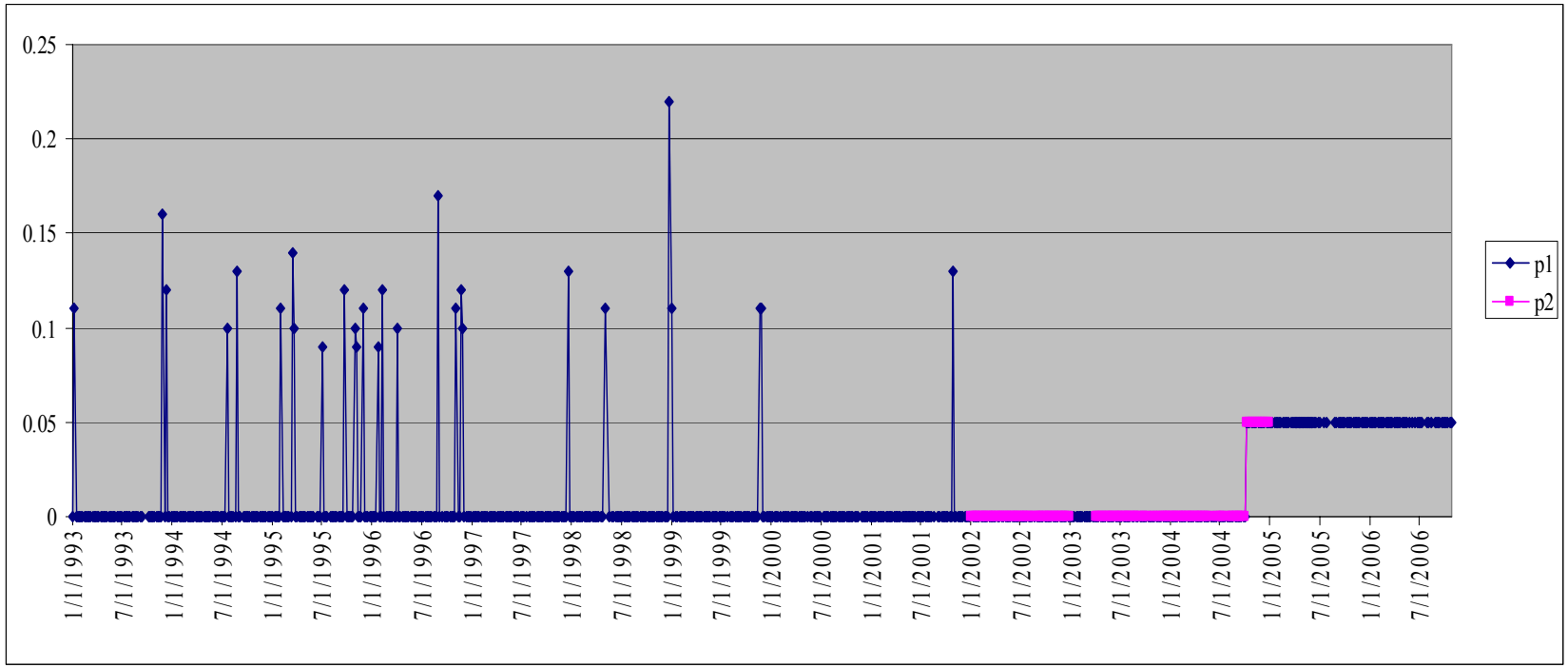
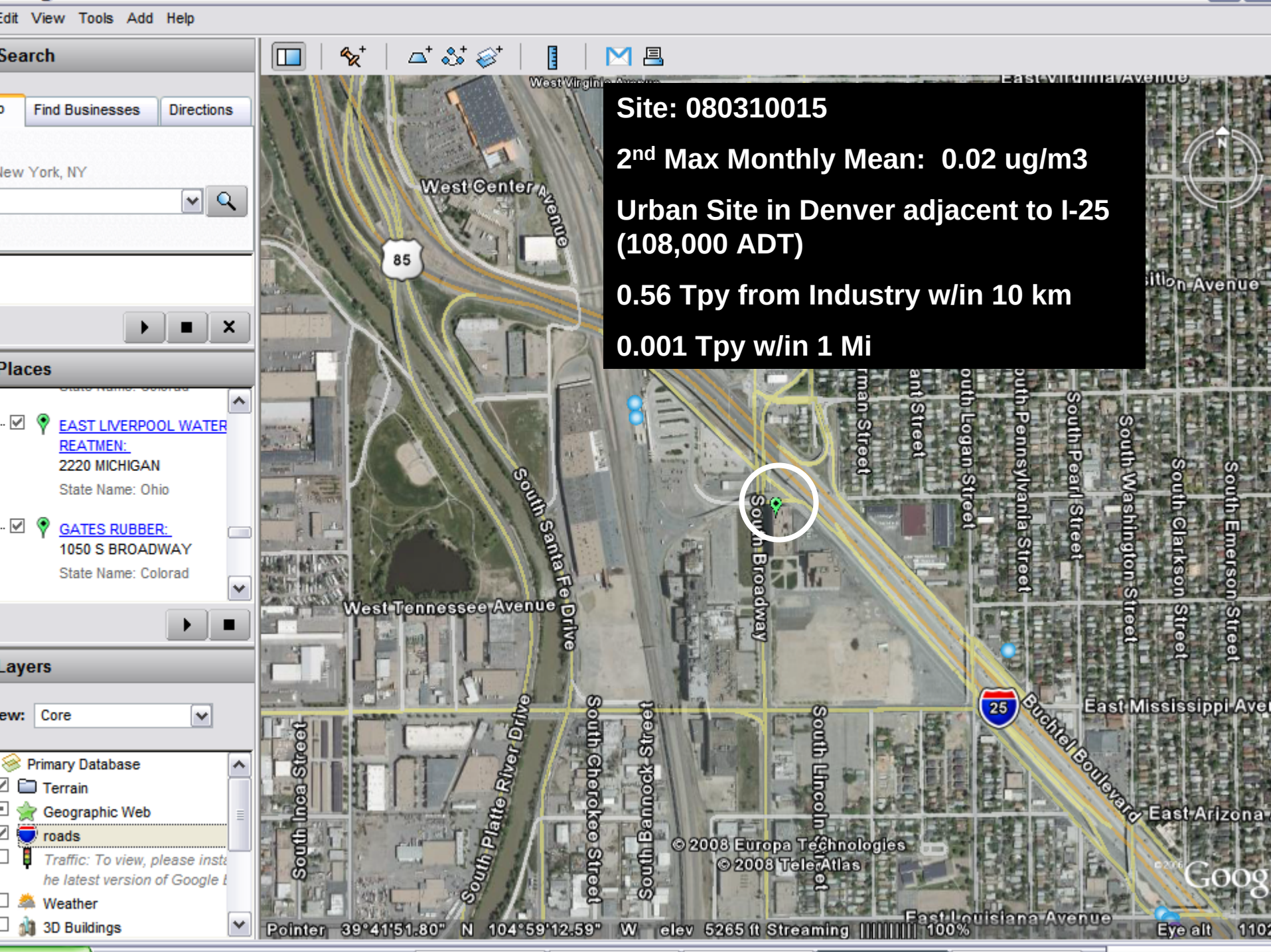
Pointer 38°38'59.24" N 90°21'02.30" W elev 519 ft Streaming 100%
Eye alt

St. Louis Site 291892003 – 24-hr averages, 1993 to 2006



Sample day

3-year metrics					
annual mean	max quarterly mean	max monthly mean	2nd max monthly mean	average of 3 overall highest monthly means	average of 3 annual max monthly means
0.0063	0.0500	0.0500	0.0500	0.0500	0.0333


Edit View Tools Add Help
Search
Find Businesses
Directions
New York, NY
Places
EAST LIVERPOOL WATER
REATMEN:
2220 MICHIGAN
State Name: Ohio
GATES RUBBER:
1050 S BROADWAY
State Name: Colorad
Layers
ew: Core
Primary Database
Terrain
Geographic Web
roads
Traffic: To view, please insta
he latest version of Google E
Weather
3D Buildings
Site: 080310015
2nd Max Monthly Mean: 0.02 ug/m3
Urban Site in Denver adjacent to I-25 (108,000 ADT)
0.56 Tpy from Industry w/in 10 km
0.001 Tpy w/in 1 Mi
West Center Avenue
85
South Santa Fe Drive
West Tennessee Avenue
South Broadway
South Platte River Drive
South Cherokee Street
South Bannock Street
South Lincoln Street
South Inca Street
South Logan Street
South Pennsylvania Street
South Pearl Street
South Washington Street
South Clarkson Street
South Emerson Street
25
Buchtel Boulevard
East Mississippi Ave
East Arizona
East Louisiana Avenue
© 2008 Europa Technologies
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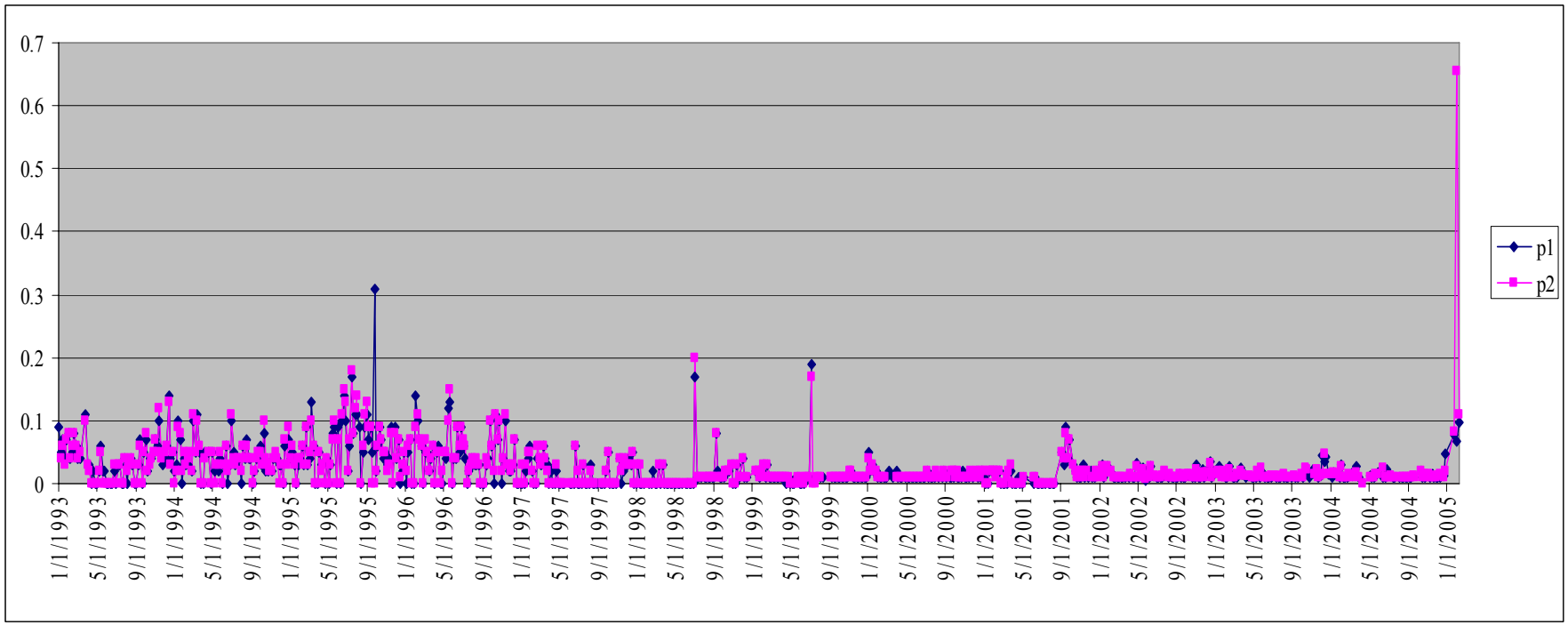
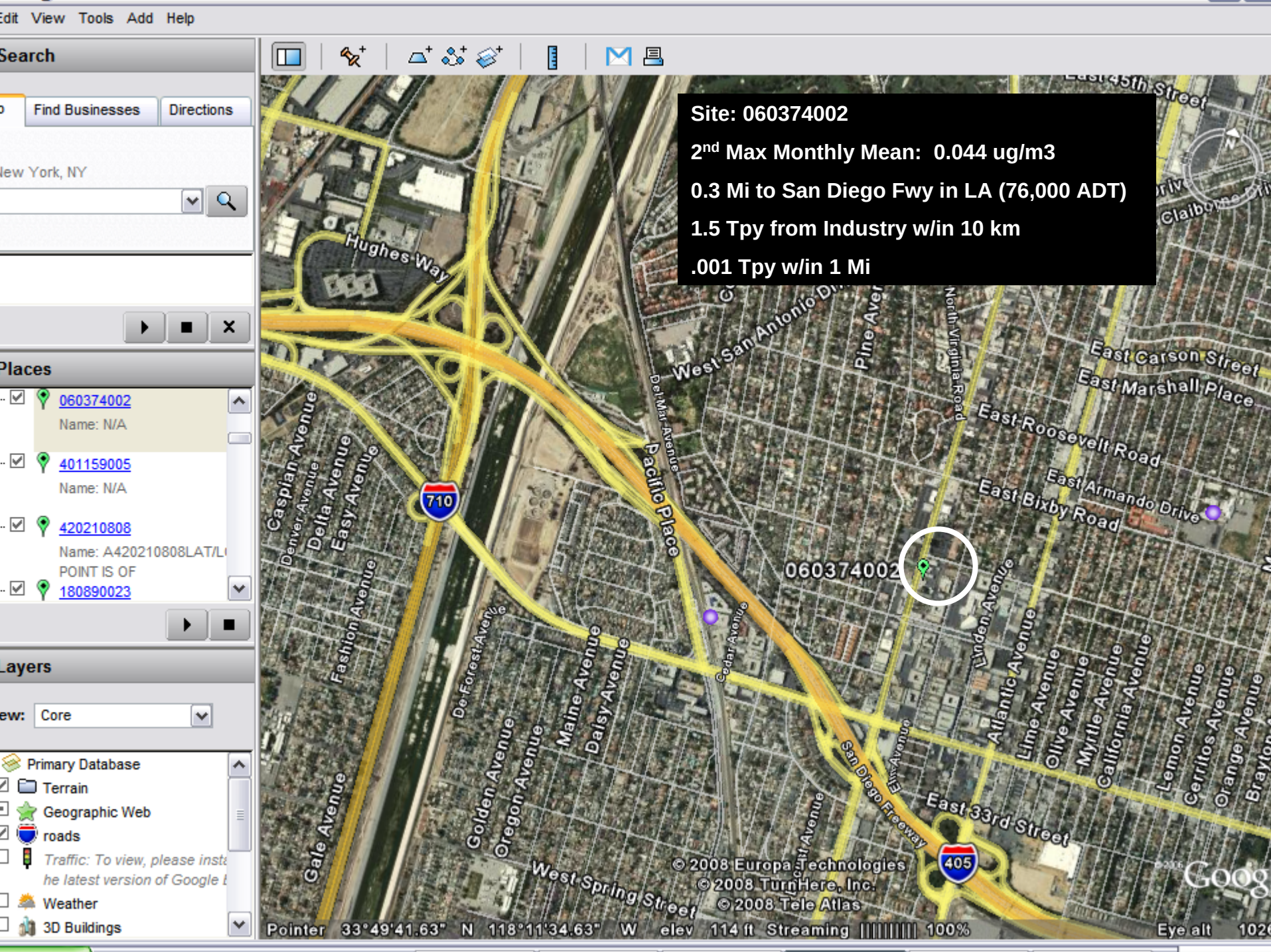
Pointer 39°41'51.80" N 104°59'12.59" W elev 5265 ft Streaming 100%
Eye alt

Denver Site 080310015 – 24-hr averages, 1993 to 2005



Sample day

3-year metrics					
annual mean	max quarterly mean	max monthly mean	2nd max monthly mean	average of 3 overall highest monthly means	average of 3 annual max monthly means
0.0153	0.0212	0.0305	0.0196	0.0228	0.0244


Edit View Tools Add Help
Search
Find Businesses
Directions
New York, NY
Places
060374002
Name: N/A
401159005
Name: N/A
420210808
Name: A420210808LAT/L
POINT IS OF
180890023
Layers
View: Core
Primary Database
Terrain
Geographic Web
roads
Traffic: To view, please inst
he latest version of Google E
Weather
3D Buildings
Site: 060374002
2nd Max Monthly Mean: 0.044 ug/m3
0.3 Mi to San Diego Fwy in LA (76,000 ADT)
1.5 Tpy from Industry w/in 10 km
.001 Tpy w/in 1 Mi
Hughes Way
West San Antonio Dr
Pine Ave
North Virginia Road
East 45th Street
East Carson Street
East Marshall Place
East Roosevelt Road
East Armando Drive
East Bixby Road
Del Mar Avenue
Pacific Place
Caspian Avenue
Denver Avenue
Delta Avenue
Easy Avenue
Fashion Avenue
710
060374002
Cedar Avenue
De Forest Avenue
Maine Avenue
Daisy Avenue
Golden Avenue
Oregon Avenue
Gale Avenue
Linden Avenue
Atlantic Avenue
Lime Avenue
Olive Avenue
Myrtle Avenue
California Avenue
Lemon Avenue
Cerritos Avenue
Orange Avenue
Elm Avenue
San Diego Freeway
405
East 33rd Street
West Spring Street
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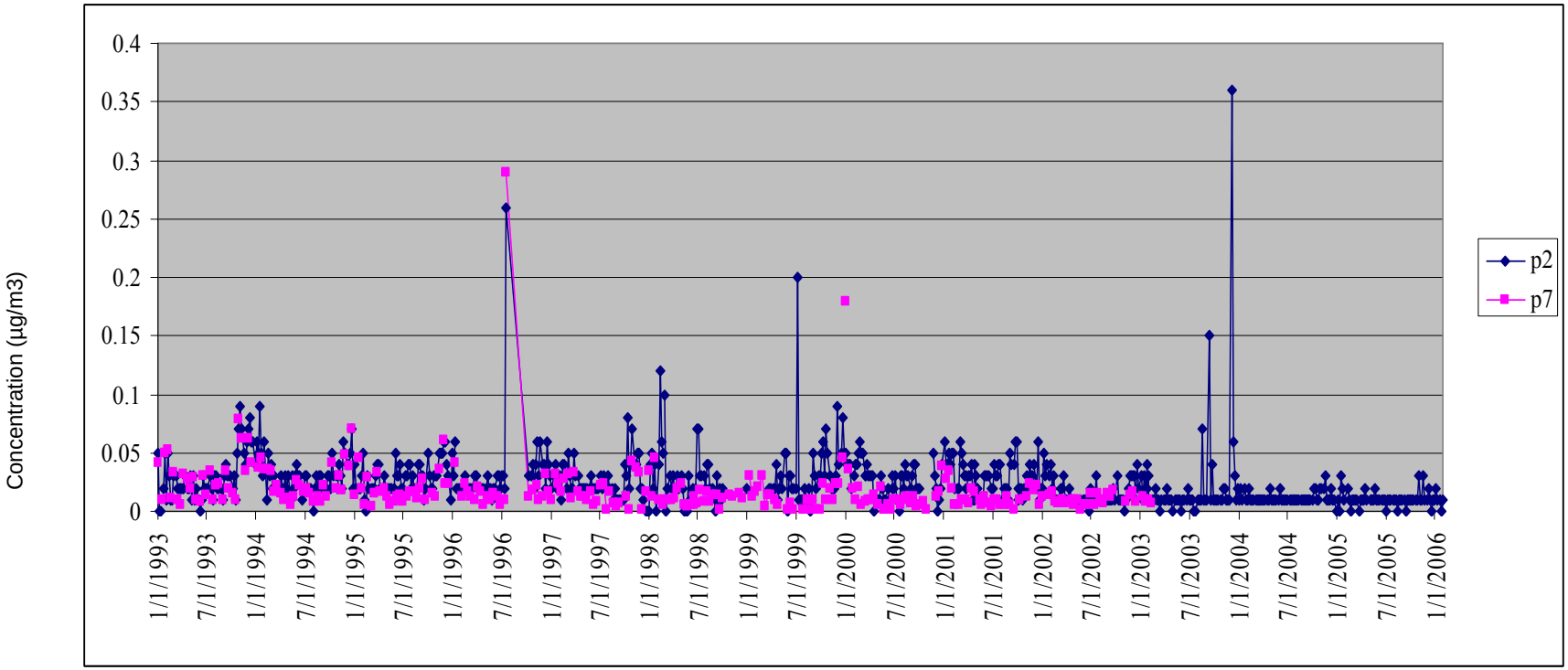
Pointer 33°49'41.63" N 118°11'34.63" W elev 114 ft Streaming 100%
Eye alt

Los Angeles Site 060374002 – 24-hr averages, 1993 to 2006



Sample day

3-year metrics, 2003-2005					
annual mean	max quarterly mean	max monthly mean	2nd max monthly mean	average of 3 overall highest monthly means	average of 3 annual max monthly means
0.0149	0.0400	0.0960	0.0440	0.0552	0.0427

Conclusion

- If there were a significant impact from traffic-related Lead, it would be very unlikely to find sites like these with such low Lead concentrations

What Is an Air Pollutant Emission Inventory?

Inventory - comprehensive listing by sources of air pollutant emissions in a geographic area during a specific time period

Point Sources …
Emission Estimation Methods

Include:

- Continuous Emission Monitor (CEM)
- Material balance
- Emission factor x activity factors
- Engineering judgment
- Source tests
- Fuel analysis
- Emission estimation models