US EPA ARCHIVE DOCUMENT

# Petcoke-Coal Test Results

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ENVIRONMENTAL HEALTH
& ENGINEERING, INC.

# Findings

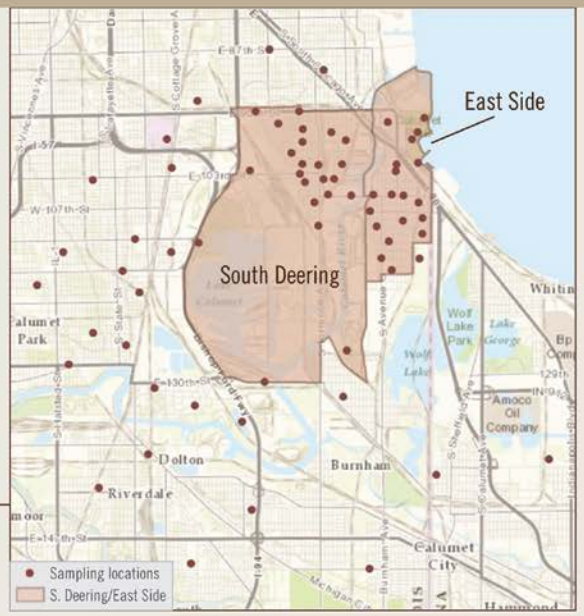
- No evidence of petcoke or coal on surfaces or in soil of East Side and South Deering neighborhoods based on indicators identified by testing petcoke and coal*

- Supporting Information
  - Composition of soil in East Side and South Deering neighborhoods similar to control neighborhoods, and was not different in any statistically significant way from levels in soil in the City of Chicago as reported by the U.S. Geological Survey or from background levels reported by the State of Illinois Environmental Protection Agency Tiered Approach for Corrective Action (TACO) program
  - Signature heavy metals and PAHs for petcoke and coal not found on surfaces sampled

* This presentation focuses on two key indicators of petcoke and coal: the vanadium to nickel ratio, and polynuclear aromatic hydrocarbon (PAH) ratios. Other indicators include vanadium, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, 1-chloronaphthalene, benzo(a)pyrene, benzo(g,h,i)perylene, dibenz(a,h)anthracene; proximity to petcoke/coal terminals; and markers of transportation-related impacts (*e.g.*, lead, proximity to roads, railroads, and asphalt)

# Polynuclear Aromatic Hydrocarbon Profiles

GREATER CHICAGO AREA



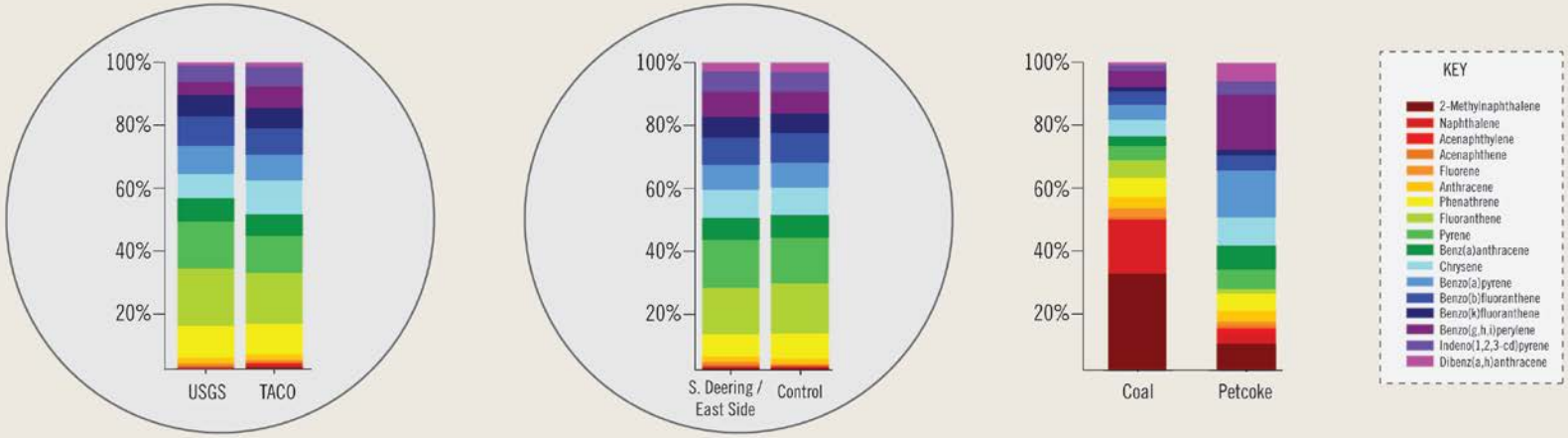

SAMPLED NEIGHBORHOODS - ABUTTING COAL SITES AND CONTROLS

**WHAT ARE POLYNUCLEAR AROMATIC HYDROCARBONS?**

Polynuclear aromatic hydrocarbons are a group of chemicals that occur naturally in coal and crude oil. Forest fires and volcanoes produce PAHs naturally as well.

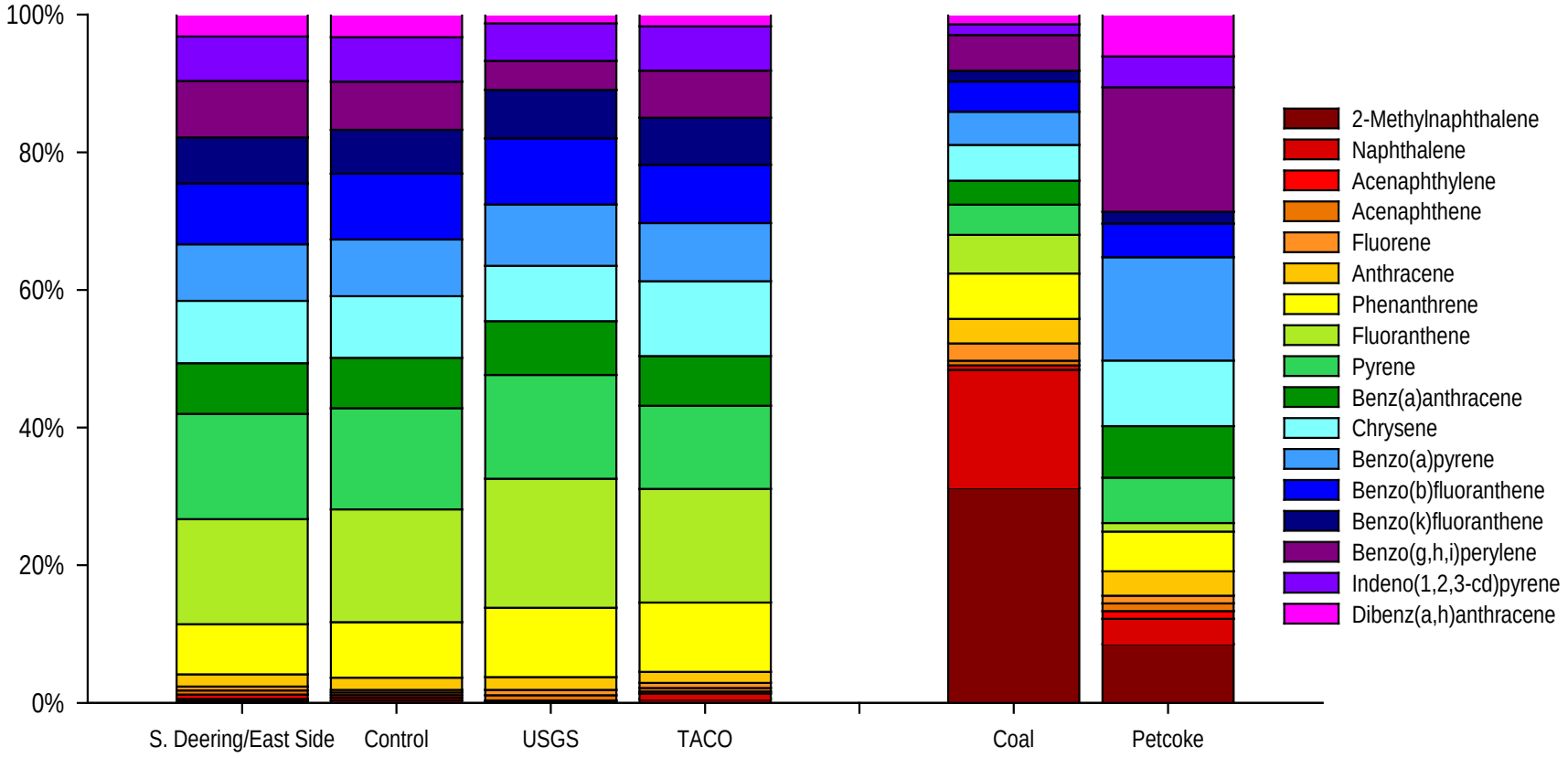
PAHs also are present in products made from fossil fuels, such as home heating oil, kerosene, gasoline, diesel fuel, and asphalt. PAHs are released into air and made whenever fossil fuels, petroleum products, wood, garbage, and other organic substances are burned. PAHs are widespread in soil, air, and water throughout the United States and the world.

Source: adapted from the Illinois Department of Public Health




Soil of South Deering and East Side neighborhoods is similar to the rest of Chicago, and different from coal and petcoke.

# PAH Profiles



# Study Outline

- Conducted an investigation with the objective of examining surfaces and soil in the East Side and South Deering neighborhoods for the presence of petcoke and coal.
- Examined the soil and surfaces for chemical indicators (signatures) of petcoke and coal, including certain metal (vanadium to nickel) and polynuclear aromatic hydrocarbon (PAHs) ratios.
- Samples were collected and tested in accordance with ASTM and EPA methods by independent environmental professionals and laboratories.
- Collected 69 samples of soil and surface dust in late November-early December 2013 from the East Side and South Deering neighborhoods and control areas.
  - Publicly accessible locations: parks and rights of way
  - Many locations near the petcoke/coal terminals
  - Benches, bleachers, bus stop shelters, sides of storage buildings, and green space
  - Selected to be representative of homes, buildings and yards on private property

# Snapshot of Sampling Locations

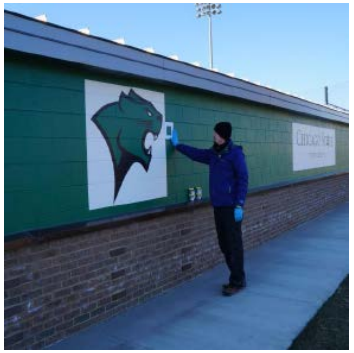
| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | ID | Location Type | Location Description | Surface Type | Description | Area |
| 2 | 110 | Bus Stop | Michigan & 115th Street | Metal | Bus sign pole | Control |
| 3 | 60 | Intersection | 107th Street & S. Hoxie Street | Metal | Stop sign | S. Deering / East Side |
| 4 | 20 | Park | Camulet Park | Metal | Vertical bar | S. Deering / East Side |
| 5 | 85 | Park | Rowan Park | Painted wood | Bench | S. Deering / East Side |
| 6 | 107 | Park | Langston Hughes Elementary | Metal | Bench | Control |
| 7 | 55 | Bus Stop | 3033 E 106th Street | Metal | Bent bus sign | S. Deering / East Side |
| 8 | 98 | Bus Stop | Ewing & 102nd Street | Metal | Bus sign | S. Deering / East Side |
| 9 | 76 | Bus Stop | Avenue C & 109th Street | Metal | Bus stop | S. Deering / East Side |
| 10 | 102 | Park | Burnside Park | Painted wood | Bench | Control |
| 11 | 37 | Park | Trumbell Park | Painted wood | Bench | S. Deering / East Side |
| 12 | 109 | Park | Morgan Field Park | Painted wood | Fountain | Control |
| 13 | 86 | Park | Off of E 126th St | Painted wood | Bench | S. Deering / East Side |
| 14 | 95 | Park | Lion Field | Painted Concrete | Building | Control |
| 15 | 82 | Bus Stop | Avenue O & 114th Street | Glass | Bus shelter | S. Deering / East Side |
| 16 | 88 | Bus Stop | 103rd Street CTA Terminal | Plastic | Glass wall panel | S. Deering / East Side |
| 17 | 43 | Bus Stop | Ewing & 103rd St | Metal | Bus sign | S. Deering / East Side |
| 18 | 87 | Park | Harborside International Golf Center | Metal | Guardrail | S. Deering / East Side |
| 19 | 53 | Bus Stop | 2801 E 106th Street | Metal | Bus stop sign | S. Deering / East Side |
| 20 | 57 | Park | Krause Park | Concrete | Barrier | S. Deering / East Side |
| 21 | 29 | Bus Stop | Yates & 102nd Street | Metal | Bus sign | S. Deering / East Side |
| 22 | 32 | Bus Stop | Commercial & 102nd St | Metal | Bus sign | S. Deering / East Side |
| 23 | 6 | Park | Veteran's Memorial Park | Painted wood | Bench | S. Deering / East Side |
| 24 | 12 | Bus Stop | Yates & 99th St | Metal | Bus sign | S. Deering / East Side |
| 25 | 84 | Park | Eggers Woods | Wood | Table | S. Deering / East Side |
| 26 | 21 | Park | Luella Park | Painted wood | Bench | S. Deering / East Side |
| 27 | 100 | Bus Stop | Commercial & 104th Street | Metal | Bus sign | S. Deering / East Side |
| 28 | 46 | Bus Stop | 2700 E 104th Street | Metal | Bus sign | S. Deering / East Side |

Rowan
Park

STOP

Mann Park

Pine Park



# Technical Review

- All sampling and testing designed by David L. MacIntosh, Sc.D, C.I.H, Chief Science Officer with Environmental Health & Engineering, Inc.
  - Adjunct Associate Professor at the Harvard School of Public Health
  - Technical advisor to government agencies and the World Health Organization
  - 20 years experience as an active member of the environmental health profession
  - Author of numerous publications in the area of exposure assessment, risk analysis, and environmental management

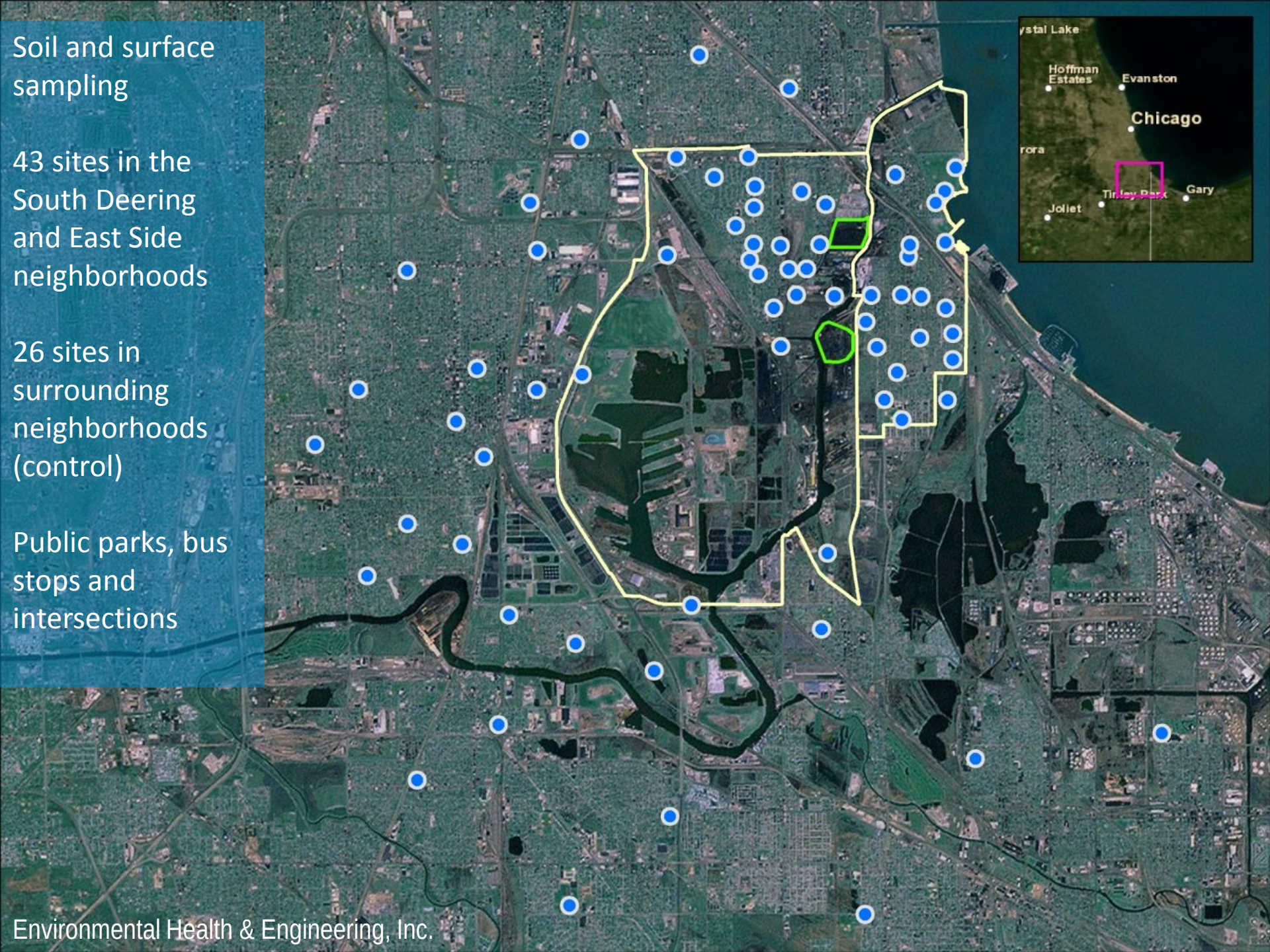
- Test results interpreted and analyzed by Dr. MacIntosh

Soil and surface sampling

43 sites in the South Deering and East Side neighborhoods

26 sites in surrounding neighborhoods (control)

Public parks, bus stops and intersections

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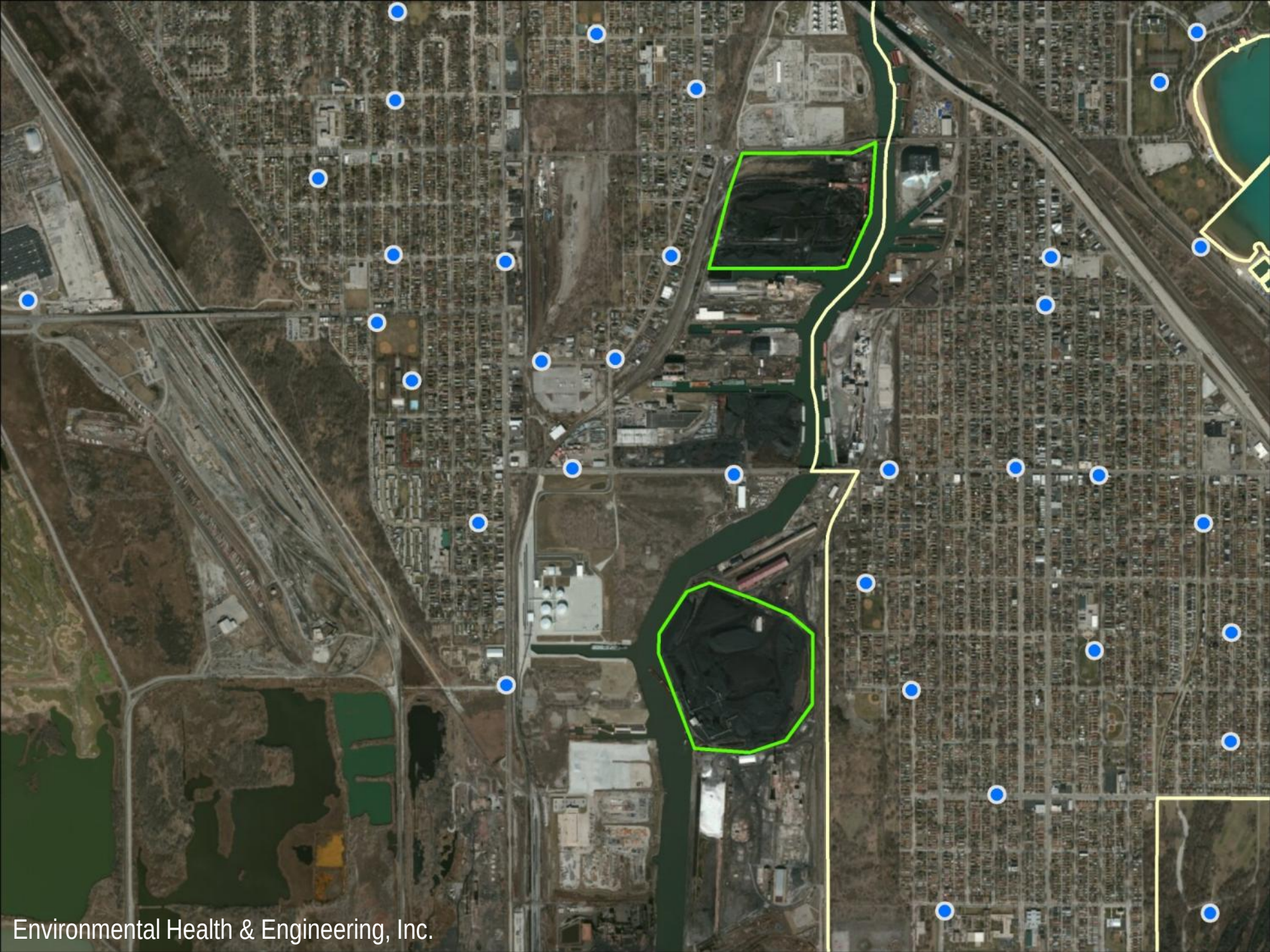

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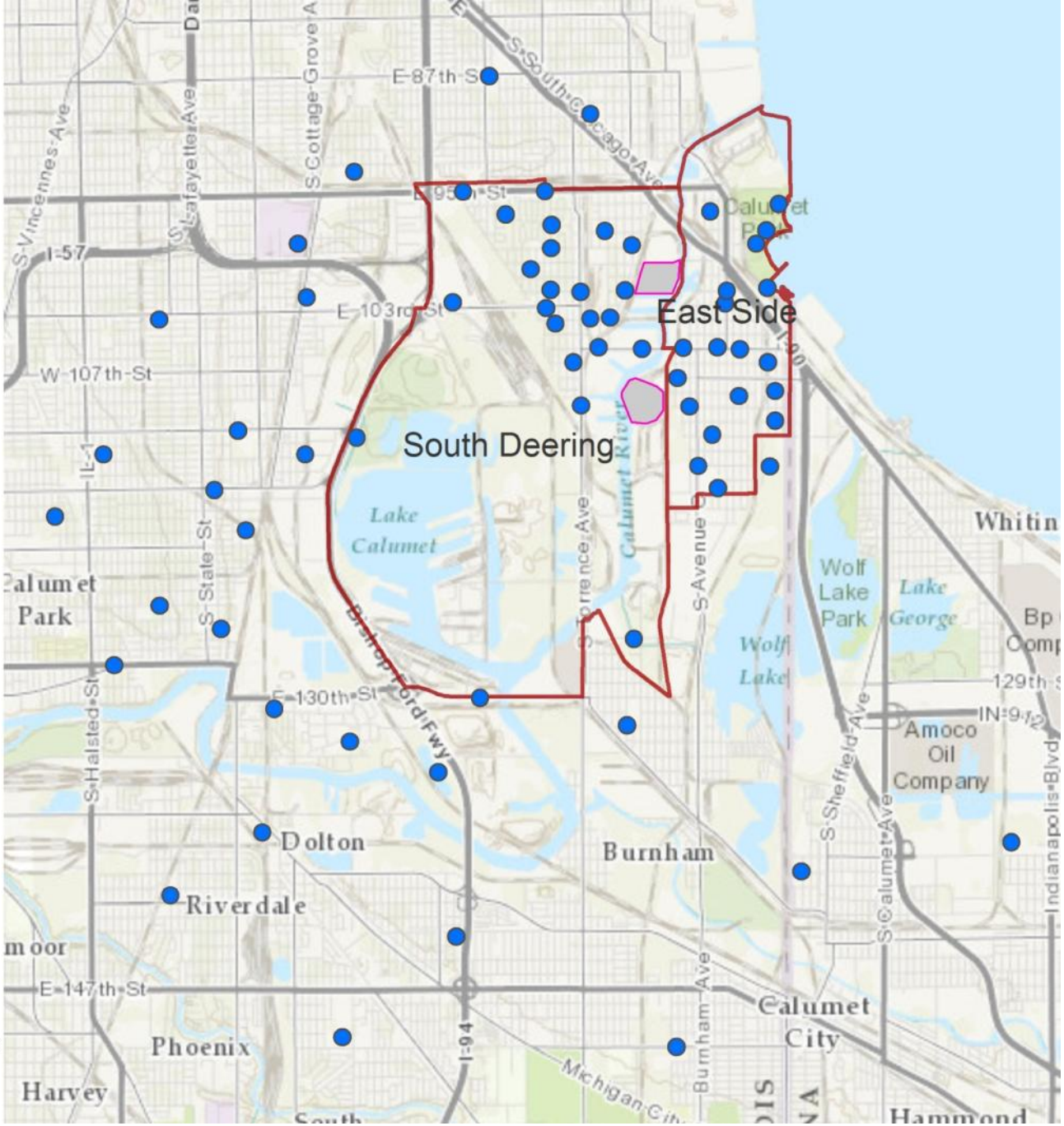
## Sampling Locations

- Sampling Locations
- Site Locations
- Neighborhood Boundaries

Soil and surface sampling

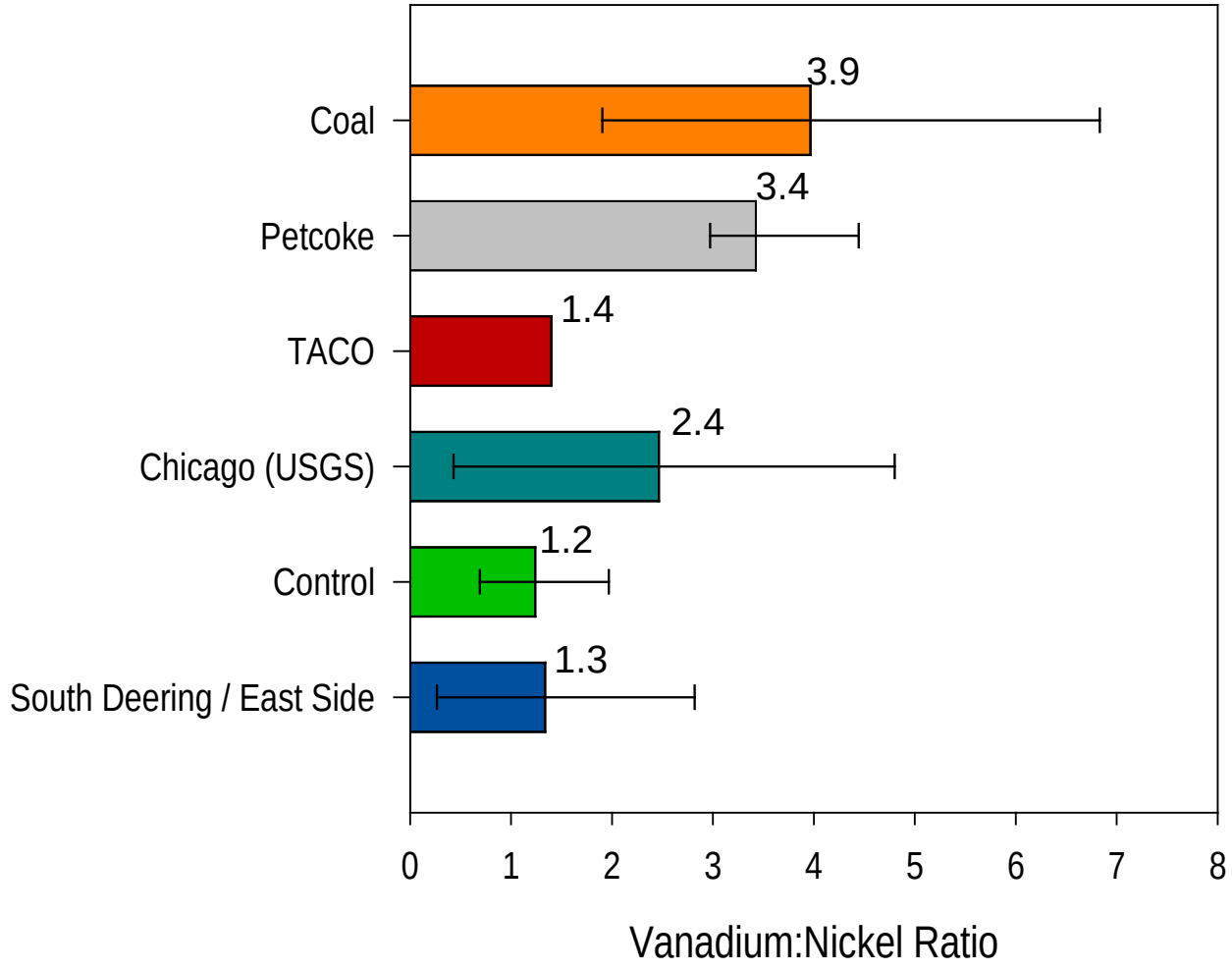
69 total sites, 26 sites in control area

Public parks, bus stops and intersections

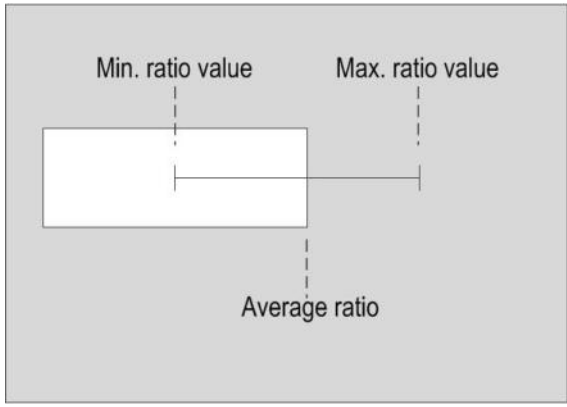



0 1 2 4 Miles

# Signature Metal Ratios




Key

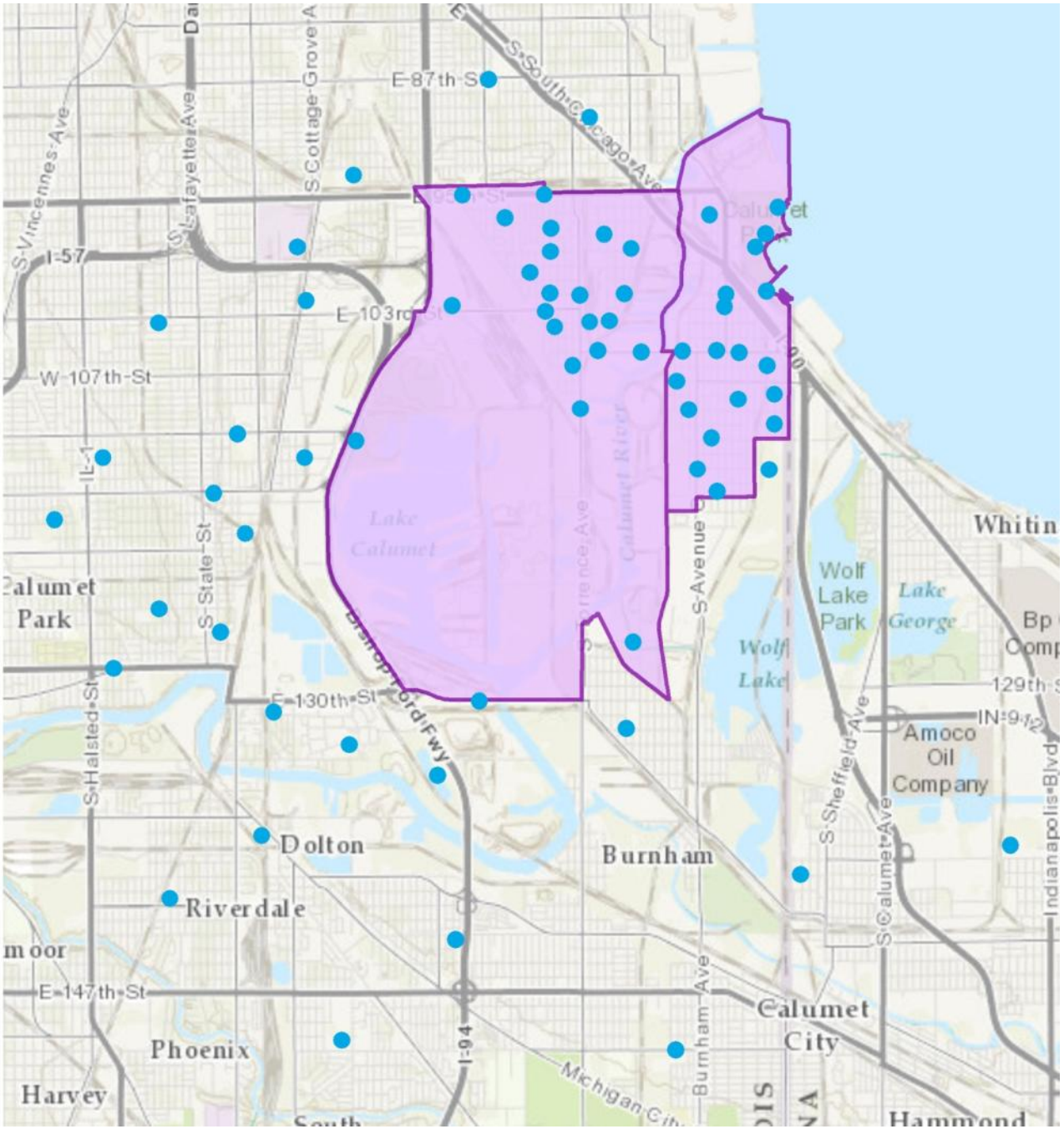


Sampling Locations

S. Deering / East Side

| Mean V:Ni Ratio | |
|---|---|
| S. Deering/East Side | 1.3 |
| Control | 1.2 |
| Chicago (USGS) | 2.4 |
| TACO | 1.4 |
| Petcoke | 3.4 |
| Coal | 3.9 |

0 1 2 4 Miles

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