Inspection Report of

Hammond Lead and USS Lead Refining Soil Survey
Hammond and East Chicago, Indiana

October 15, 1985

Central District Office
Environmental Services Division
U.S. Environmental Protection Agency
Region V

Chicago, Illinois

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I. Site Identification/Location

a. Vicinity of Hammond Lead
165th St. and Summer St.
Hammond, Indiana

b. Vicinity of USS Lead Refining
5300 Kennedy Ave.
East Chicago, Indiana

c. Vicinity of Federated Metals (American Smelting Co.)
New York Ave. and Indianapolis Blvd.
East Chicago, Indiana

d. Vicinity of Amoco Oil Refinery - LTV Steel
129th St. and Indianapolis Blvd.
East Chicago, Indiana

II. Sampling Dates: July 30 and 31, August 1, 1985

III. Participants:

Facilities: All samples were taken off the Facilities' property. Thus, we did not contact the above Facilities.

U.S. EPA:

John McGuire, Environmental Engineer
Mark Wehling, Engineering Aid

Indiana Board of Health

Rod Thompson, Chief, Quality Assurance Section

Lake County Air Monitoring

Milan A. Kruszynski, Inspection Technician

East Chicago

John Tucker, Inspector

Hammond - The Hammond agency was contacted but did not participate in the soil collection.

Du Pont, East Chicago, Indiana

Gerald Myers, Senior Supervisor of Production

IV. Survey Objectives

At the request of the Air Management Division, the Central District Office conducted a soil lead survey in Lake County, Indiana, primarily in the vicinity of Hammond Lead in Hammond, and USS Lead Refining in East Chicago. The analytical results of these samples is an indication of the impact on the soils in these areas from deposition of airborne particulate.

At the suggestion of Woodard Smith of the Indiana State Board of Health, four sample points were moved from the above areas to an area, a number of miles north. These samples were taken near other possible lead using Facilities: 1) American Smelting Co., Division of Federated Metals (Facility not operating); 2) Amoco Refinery; and, 3) LTV Steel (formerly Jones and Laughlin Steel).

V. Findings & Conclusions

A. Vicinity of USS Lead Refining

The lead levels ranged from 100 mg/kg at point 11U to 11,000 mg/kg at point 12U with six locations containing lead levels in excess of 1100 mg/kg.

B. Vicinity of Hammond Lead

With the exception of sample point 2H (2900 mg/kg), the lead concentration ranged from 30 mg/kg (points 9H, and 19H) to 630 mg/kg (point 10H).

C. Samples taken in other areas

The lead levels in these samples were near the lower end of the ranges found above, with the concentration falling between 70 mg/kg (south end of Markstown Park) to 380 mg/kg (north end of Markstown Park).

VII. Description of Survey

A. Collection of Composite Samples

The following sampling method was used to collect the composite soil samples:

1) At each location shown in Figure 1, three soil plugs were taken approximately 3 feet apart, and roughly in a triangular shape.

2) Grass and other vegetation were trimmed, using a knife, at point each plug was to be taken. When removing the vegetation, care was used so as not to disturb the soil, thus grass was not pulled out of the ground bringing roots and the surface soil with it.

3) A tulip bulb planter, with a 2 1/4 inch diameter base and a slight tapper to a larger onening in the top, was pushed into the soil to a depth of one inch. This soil plug was then removed from the planter by pushing it out from the top, using a stainless steel splatula, onto an aluminium foil lined mixing pan. Fresh unused aluminium foil was used at each location.

4) After all three soil plugs are placed on the foil lined pan, stones, twigs, large roots and other non-soil material was removed. The soil was then mixed and transferred to a clean labeled sample bottle.

5) After sampling at each location the tulip bulb planter, knife, and stainless steel spatula were cleaned, first by using a bottle brush to remove large amounts of soil and then followed by a number of rinses with ASTM Type I Water.

B. Field QA Samples

For Quality Assurance purposes, the following samples was taken:

1) Duplicates. A duplicate was taken at three locations, two near USS Lead and one near Hammond Lead, using a different set of sample tools. These samples were taken at points adjacent to the regular sample points following the sampling procedure listed above.

2) Field Blank. One sample bottle was opened in the field near each Facility, filled with ASTM type one water, recapped and labeled as a field blank.

3) Equipment Rinse Blank. At one location near each Facility, after the field equipment was cleaned, an additional rinse was made and the water collected to check field cleaning procedures.

4) Depth Sample. At two locations, one near each facility, after the regular sample was taken, the tulip bulb sampler was used to remove soil to approximately a depth of ten inches. A clean tulip bulb sampler was then used to take a sample at this depth, using the above procedures. This sample is to check the assumption that the lead does not migrate downward in the soil.

5) Split Samples. Neither of the two primary Facilities were contacted since no samples were taken from the property, and thus no split samples were taken.

C. Sample Locations

The proposed sampling points, as listed in the Quality Assurance Project Plan, are shown in Figure 1. Some of these sampling points had to be moved and the actual sample points are shown in Figure 2. Sample points 14H, 17H, 2U and 8U were dropped so samples could be taken at an area further north, as shown on Figure 3. A description of each sample location and the direction from the lead source, is provided in Table 1 (Vicinity of USS Lead), Table 2 (Vicinity of Hammond Lead), and Table 3 (North side of Lake County).

VII. Discussion of Results

A. Analytical Method

All samples were analyzed by the Central Regional Laboratory using CRL Method #413 - Determination of Total Metals in Sediments by Inductively Coupled Argon Plasma (ICAP) Atomic Emission Spectroscopy. Results are reported in mg Pb/kg on dry weight basis and are shown on Figures 2 and 3 and listed in Tables 1, 2 and 3.

B. Results - Vicinity USS Lead Refining

At six locations in this area, the lead levels were greater than or equal to 1100 mg/kg. Four of these points were to the north or northeast of the

Facility (12U- 11,000 mg/kg, 8,900 mg/kg, a duplicate sample point; 10U- 1,700 mg/kg; 5U- 1700 mg/kg; 4U- 1100 mg/kg). The two other points were southeast of the plant (14U- 8300 mg/kg; and one duplicate sample collected at 19U- 4900 mg/kg). It should be noted that sample point 5U is between 149th St. and an abandoned gas station.

Of the remaining 13 sample locations, the following ranges were found:

- Two locations with lead levels greater than 500 mg/kg (16U- 580 mg/kg, 3U- 540 mg/kg)
- Five locations with lead concentration ranging from 300 mg/kg to 500 mg/kg (15U- 440 mg/kg; 7U- 380 mg/kg; 19U - 370 mg/kg; 20U- 350 mg/kg, 18U- 320 mg/kg).
- Six locations with lead levels below 300, (17U- 220 mg/kg, 1U- 160 mg/kg; 6U- 110 mg/kg; 21U- 100 mg/kg; 11U- 100 mg/kg; 9U- 100 mg/kg)

C. Results - Vicinity of Hammond Lead

The lead levels in the vicinity of Hammond Lead were generally lower then those found near USS Lead. Only one location, 2H (2900 mg/kg), was greater than 1000 mg/kg. The lead concentrations at five locations, all north of the Facility, were over 300 mg/kg (7H- 470; 1H- 300, 4H- 400; 6H- 450 mg/kg; and 10H- 630 mg/kg). Of the remaining eleven sample locations only two, (11H- 250 mg/kg and 8H- 260 mg/kg), were over 200 mg/kg. The samples under 200 mg/kg ranged from 83 mg/kg at 3H to 180 mg/kg at 13H. The soils at sample locations 19H, 15H, 12H, 9H, and 5H were mostly sand, and a mixture of sand and small gravel at 3H. At the remaining sampling locations, soils were mostly black dirt with only small amounts of sand or gravel.

D. Results - Northern Lake County

Only one sample in this area, Markstown Park North (380 mg/kg), was greater than 200 mg/kg. The remaining three locations contained soil lead levels of 170 mg/kg at Calumet College, 170 mg/kg at Amoco Park and 70 mg/kg at Markstown Park South.

E. Depth Samples

Two samples were taken at a depth of ten inches below the surface. As shown below, both samples were lower then the surface samples taken at these locations.

Sample Location	Surface Sample	Depth Sample
2H	2900 mg/kg	170 mg/kg
17U	220 mg/kg	140 mg/kg

F. Duplicate Samples

At three locations, duplicate samples were taken by using clean sampling equipment to take a second set of soil samples at points adjacent to the first sample. A comparison of these results are listed below.

Sample Location	Sample	Duplicate
18H	160 mg/kg	160 mg/kg
12U	11000 mg/kg	8900 mg/kg
19U	370 mg/kg	4600 mg/kg

G. Blanks

Four blank samples were submitted with the other samples, two were bottle blanks and the other two were equipment rinse blanks. All four samples were below the detection limit of the method, 0.2 mg/l. These sample results were reported in mg/l instead of mg/kg, since they contained water and not soil and are for checking for possible contamination from cleaning of the equipment and the bottles.

Table 1

Site Descriptions, and Lead Concentration in Soil in the Vicinity of USS Lead Refining

Direction from Facility	Location	Concentration (mg Pb/kg)
Northwest	1U- On southwest corner of park, 115 ft. northwest of street sign on corner of Magnolia and Aster Streets and 37 ft. west of baseball field backstop.	160
North	2U- Site dropped and sample taken on north side of Hammond and East Chicago.	-
North	3U- 62 ft. south of 149th St. and 50 ft. west of Alexander Ave. in vacant lot.	540
North	4U- 75 ft. west of Kennedy Ave. 6 ft. north of 149th St. and 4 ft. from NISCO electric pole No. 93/291.	1100
North	5U- Near abandoned gas station, 90 ft. east of Huish St. and 4 ft. south of 149th St.	1700
North	6U- On south end of Riley Park 235 ft. west of Grassell Ave. and 52 ft. north of 148th St.	110
Northeast	7U- 3 ft. east of Ivy St. and 18 ft. north of 150th St.	380
Northwest	8U- Site dropped and sample taken on northside of Hammond and East Chicago.	
North	9U- 28 ft. south of 150th St. and 50 ft. east of Alexander Ave. in vacant lot.	100
Northeast	10U- On north end of Du Pont property, 75 ft. northeast of nitrogen pipeline marker and 20 feet south of fence.	1700

Table 1 Continued

Northeast	11U- On northeast of Du Pont property, 8 ft. south of gate and 25 ft. northeast of pipeline marker.	100
North	12U- 25 ft. east of Kennedy Ave. and 55 ft. south of NIPSCO pole No. 91/606, between railroad tracks and Coneco Fence near intersection of 151st St. and Kennedy Ave.	11,000
North	12U- See above, duplicate sample.	8,900
Southeast	13U- 100 ft. south of the southeast corner of the fence at Harrison Walker Refactory, and 290 ft. north of dirt road along the Indiana Toll Road.	120
South	14U- Between Kennedy Ave. and railroad tracks. 35 ft. west of Kennedy Ave. and 37 ft. from billboard. Billboard is next to NIPSCO pole No. 843/99.	8300
South	15U- Between Kennedy Ave. and railroad tracks, 12 ft. north of billboard, and 25 ft. west of Kennedy Ave. Billboard near NIPSCO pole No. 70/941.	440
South	16U- 38 ft. east of Kennedy Ave., 73 ft. north of dirtroad. Dirtroad runs just north of the Indiana Toll Road.	580
Southwest	17U- 60 ft. north of Route 20 and 62 ft. east of dirt road that runs under Indiana Toll Road. Site north of Shell Oil office.	220
Southwest	17U- See above, but taken ten inches below surface.	140
South	18U- 60 ft. north of Route 20, and 63 ft. southeast of NIPSCO pole No. 9119 west of Kennedy/Route 20 interchange.	320
South Southeast	19U- 41 ft. north of Route 20, and 42 ft. southwest of NIPSCO pole No. 48/148, just east of Kennedy Ave./Route 20 interchange.	370

Table 1 Continued

South Southeast	19U- See above, duplicate	4600
Southeast	20U- North of Halstab Company parking lot entrance, 60 ft. north of Route 20, 69 ft. west of NIPSCO pole No. 96/577.	350
Northeast	21U- In park south of Arrie Gosh School, 24 ft. north of pool fence and 34 ft. west of sidewalk out side of pool.	100

Table 2

Site Description and Lead Concentration in Soil Near Hammond Lead

Direction from Hammond Lead	Location	Concentration (mg Pb/kg)
North	1H- On north end of truck depot 126 ft. south of fence, 105 ft. west of gate in fence.	300
North	2H- On northeast corner of truck depot, 69 feet south of northern fence and 20 ft. west of gate in east fence.	2900
North	2H- See above, 10 inches below surface.	170
North	3H- On east side of truck depot along American Can fence line, 309 ft. north of the northern most building and 5 ft. west of fence.	83
Northeast	4H- Northeast of T intersection of 161st St. and McCook Ave., 42 ft. north of 161st.	400
Northeast	5H- 64 ft. west of McCook Ave. just before it curves to the east, between 162nd St. and 162 Pl., 32 ft. north of large power line support.	120
Northeast	6H- 300 ft. west of the new Kennedy Ave. bridge over railroad, and 72 ft. north of gravel road along parking lot for Indiana Harbor Belt Railroad office building.	450
Northeast	7H- Along parkway near fence at 2117 Sherman St., 6 ft. north of street and 11 ft. east of the Western Fence line.	470
North	8H- 138 ft. west of second building and 15 ft. north of this building's south wall.	260

Table 2 Continued

Northeast	9H- 62 ft. west of McCook Ave. near 163rd St. and 28 ft. northwest of power line pole.	30
Northeast	10H- Between alley and Painters Union Local 460 Building. 19 ft. from alley and 4 ft. from wall, 130 ft. north of Kenwood St.	630
West	11H- Between railroad tracks and 165th St. 15 ft. south of street, 22 ft. north of tracks and 45 ft. west of railroad sign indicating 2 tracks.	250
Northeast	12H- 600 ft. north of switching station on 164th St. and 60 ft. west of McCook Ave.	50
Southeast	13H- 35 ft. west of alley and 291 ft. north of 167th St. in vacate lot. Alley is only a few hundred feet west of Kennedy Ave.	180
West	14H- This point dropped to take samples on the north side of Hammond and East Chicago.	--
East	15H- West of the end of Vine St. under power lines. 50 ft. west of ally 15 ft. northeast of rounded power pole and 150 ft. east of the North-South railraod tracks.	90
South	16H- Near church on northeast corner of Lealand and 169th St. 36 ft. east of Lealand and 18 ft. south of ally.	120
South	17H- This point dropped to take samples on north side of Hammond and East Chicago.	-
South	18H- 250 ft. west of Osborn Ave. and 50 ft. south of railroad and north of the Kennco Supply Company.	160
South	18H- See above, duplicate sample taken.	160

Table 2 Continued

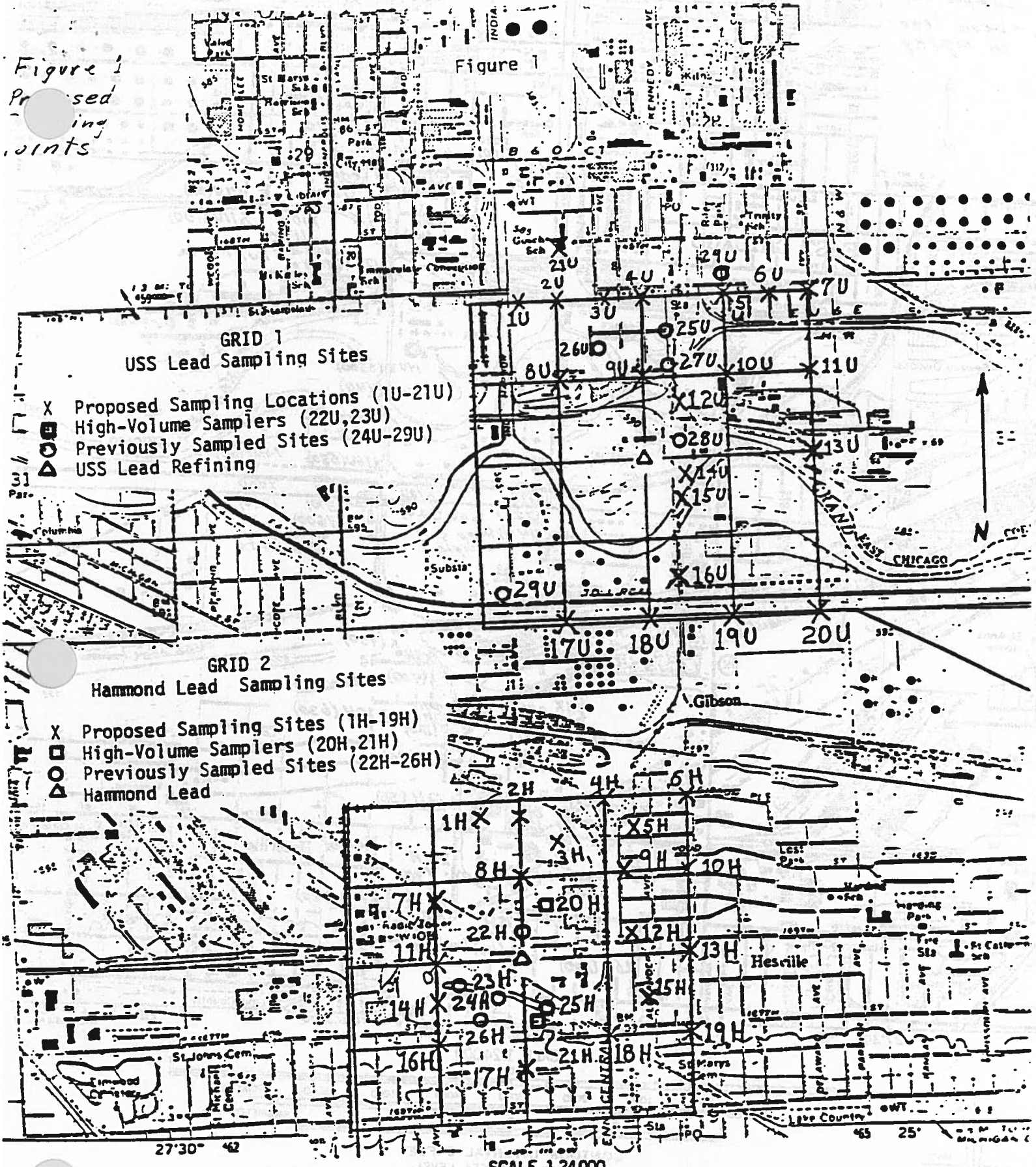
Southeast	19H- West of the end of 167th St., 35 ft. east of second wooden telephone pole north of railroad tracks that run to the northwest, and under the west edge of power lines.	30

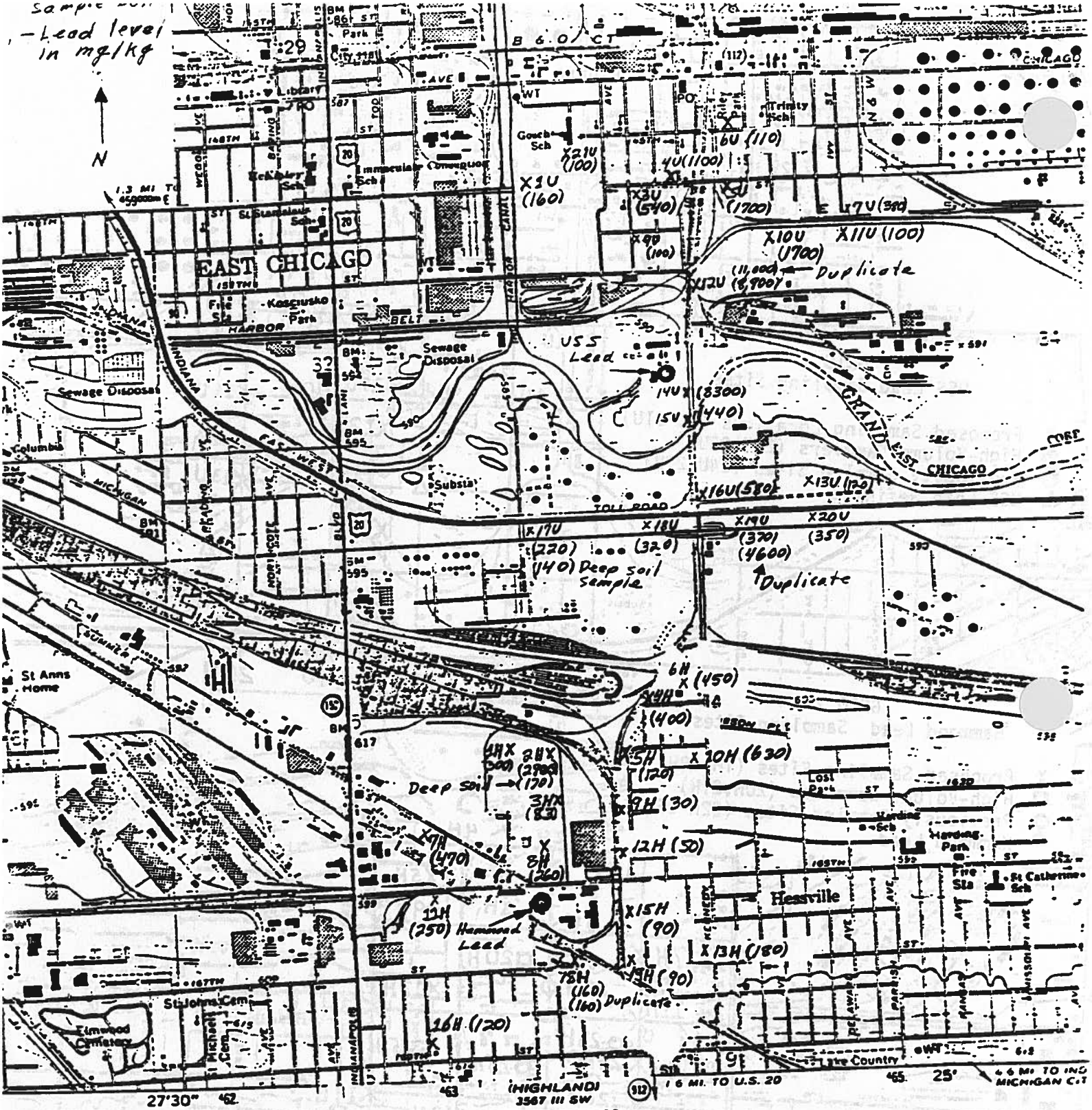
Table 3

Site Description and Lead Concentration in Soil at Sites on North Side of Lake County

Location	Concentration (mg Pb/kg)
Near Calumet College and southeast of the old Federated Metals plant. 21 ft. west of New York Ave. and 20 ft. north of bus stop outside of Calumet College office building.	170
North end of Amoco Park, 57 ft. south of 128th St. and 67 ft. east of Birch Ave. Park is south of old Federated Metals plant and west of Amoco Oil Refinery.	170
South end of Markstown Park, 37 ft. west of Pine Ave. and 10 ft. south of Park St. Site is south of Amoco Oil Refinery and there are a number of LTV Steel buildings to the east, south and west.	70
North end of Markstown Park, south of the intersection of 129th St. and Dickey Rd., 48 ft. north of Broad St. and 42 ft. northeast of NIPSCO pole No. 35/871. Large mound between intersection and sample point. Amoco Oil Refinery to north and LTV Steel to the west, south and east.	380

Figure 1
Proposed
Sampling
Points




Sample ... - Lead level in mg/kg
N
EAST CHICAGO
Kosciusko Park
Sewage Disposal
USS Lead
Deep soil sample
Duplicate
Deep Soil
Hammond Lead
Hessville
Harding Park
St Anns Home
St Johns Cem
Elmwood Cemetery
Highland Country
GRAND EAST CHICAGO
TOLL ROAD
HARBOR BELT
INDIANA HARBOR CANAL
1 6 MI. TO U.S. 20
4 6 MI TO IND MICHIGAN C.T
(HIGHLAND) 3567 III SW
27'30"
SCALE 1:24000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS LOW WATER 578.5 FEET
GN
MN
0°17'
5 MILS
14°
27 MILS

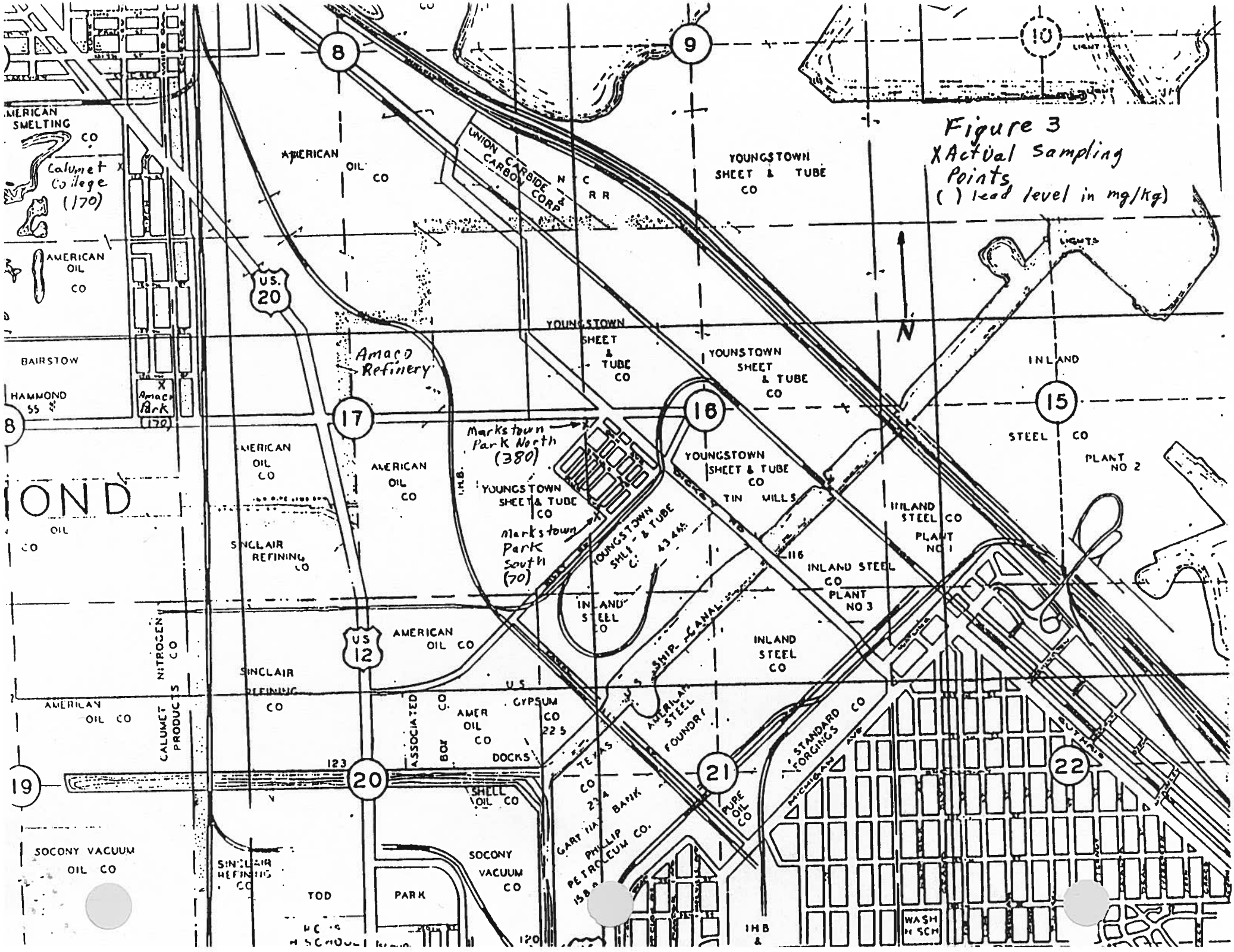


Figure 3
X Actual Sampling Points
( ) lead level in mg/kg)
Calumet College (170)
Amaco Refinery
Amaco Park (170)
Marks town Park North (380)
Marks town Park South (70)
AMERICAN SMELTING CO
AMERICAN OIL CO
UNION CARBIDE CORP
N C R R
YOUNGSTOWN SHEET & TUBE CO
YOUNGSTOWN SHEET & TUBE CO TIN MILLS
INLAND STEEL CO PLANT NO 1
INLAND STEEL CO PLANT NO 2
INLAND STEEL CO PLANT NO 3
INLAND STEEL CO
BAIRSTOW
HAMMOND
SINCLAIR REFINING CO
NITROGEN PRODUCTS CO
CALUMET
ASSOCIATED BOX CO
AMER GYPSUM CO
AMERICAN STEEL FOUNDRIES
STANDARD FORGINGS CO
TEXAS CO
PURE OIL CO
SHELL OIL CO
SOCONY VACUUM OIL CO
SOCONY VACUUM CO
PHILLIP PETROLEUM CO.
GARY RAILWAYS
I.H.B.
SHIP CANAL
MICHIGAN AVE
PARK
TOD
WASH H SCH
US 20
US 12
8
9
10
15
16
17
19
20
21
22
123
N
LIGHTS