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SIGNATURE PAGE

Title: SITE REASSESSMENT for CHICAGO COPPER AND CHEMICAL

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CHICAGO COPPER AND CHEMICAL
COOK
CALUMET PARK, ILLINOIS
ILD984774968
LPC#0310420002
SUPERFUND/HRS

CERCLA

Site Reassessment

Other Clean-up Activity

Prepared by:
Office of Site Evaluation
Division of Remediation Management
Bureau of Land

CERCLA
SITE REASSESSMENT
Other Clean-up Activity

for:

CHICAGO COPPER AND CHEMICAL COMPANY
CALUMET PARK, ILLINOIS
ILD984774968
LPC0310420002

PREPARED BY:
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
BUREAU OF LAND
OFFICE OF SITE EVALUATION

December 3, 2009

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1.0 INTRODUCTION

On April 11, 2007, the Illinois Environmental Protection Agency's (Illinois EPA) Office of Site Evaluation was tasked by the United States Environmental Protection Agency (U.S. EPA) Region V to conduct a Site Reassessment at the Chicago Copper and Chemical Site located in Calumet Park, Illinois. The site is located on the northwest corner of the intersection of Winchester Road and Burr Oak Avenue (127th Street) in Calumet Park. The coordinates for the site are 41.66459 degrees latitude, and -87.67042 degrees longitude. The site is located in the southeast ¼ of Section 30, Township 37 North, Range 14 East of the Third Principal Meridian, Cook County, Illinois. Figure 1 of this report shows the general site location and surroundings.

Current U.S. EPA policy stipulates that a Site Reassessment be conducted to determine the current status of Chicago Copper and Chemical. This Site Reassessment will consist of an evaluation of recent information to determine if further investigation is warranted under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The Site Reassessment is designed to provide necessary information that will help determine if the site qualifies for possible inclusion on the National Priorities List, or should receive a No Further Remedial Action Planned (NFRAP) designation. The reassessment process will result in a recommendation that the site may be given a NFRAP designation, receive further Superfund investigation, or referred to another state or federal cleanup program. The Site Reassessment is performed under the authority of CERCLA, commonly known as Superfund.

The Chicago Copper and Chemical site was placed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) in June of 1989 (IEPA, 1990) at the request of Illinois EPA. The most recent CERCLA work conducted on the site was in 1990 when Illinois EPA completed a Preliminary Assessment (PA) on the facility. The Site Reassessment Report will describe current site conditions and illustrate how the site has changed since the PA was completed. The Site Reassessment will also support emergency response or time-critical removal activities if it is determined that they are warranted.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The Chicago Copper and Chemical Company is the former location of a copper smelting and refining company. The triangle-shaped property is approximately 16 acres in size (IEPA, 1990). The site is centrally located in Calumet Park, in an area with both residential and commercial properties. Residential properties exist directly east and south of the facility, however pedestrian travel to the south is limited due to the presence of 127th Street, an elevated four-lane thoroughfare. The west part of the site is bounded by railroad tracks and a switching yard owned by Northern Illinois Rail Corp (also known as Metra). A public park named Troublemakers Park is located adjacent to the far northern extent of the property. Figure 2 provides an aerial photo of the site.

The property owner J.R. Bramlett was contacted by telephone regarding the current condition of the property. Bramlett stated the he currently owns and operates the property (Bramlett, 2009). Two permanent structures are located on the southern-most

portion of property and are used to store tow trucks and associated equipment for Airline Towing Company. The southwestern portion of the property is currently used for vehicle impoundment and storage. Bramlett rents out central and northern portions of the 16-acre parcel to four or five different entities all involved in transportation, shipping, or storage businesses. Numerous semi-truck trailers, portable metal storage compartments, and stackable metal freight containers can be seen from outside the property and from the 2005 aerial photograph included in Figure 2.

The site and surrounding area is generally flat. The site is completely covered with crushed asphalt materials and limestone gravel. Surface water runoff from the site is controlled by ditches abutting the railroad tracks to the west and north of the site while curbs and sewers handle run-off to the south. A small strip of gravel, sparse grass, shrubs and trees (approximately 10 feet wide), and Winchester Road separate the site from the residential properties to the east and also minimize surface water run-off in that direction. Access to the property is limited by a cyclone fence and motorized entrance gate.

According to a water well database maintained by the Illinois State Water Survey, five water wells are located within a one-mile radius of the site (ISGS, 2009). Four of the wells are owned by local municipalities and are not used for private drinking water purposes. The fifth well, owned by a local boating club is not used for private drinking water purposes. Residents in the area receive their drinking water from a community water supply source operated by the City of Chicago (IEPA, 2009). Chicago utilizes Lake Michigan as its source water via two water treatment plants (IEPA, 2009). Both plants have two intakes that draw water from Lake Michigan (IEPA, 2009).

Figure 3 of this report shows the historical location of private drinking water wells and community water supply wells in relation to the site. (The location and existence of the wells on Figure 3 are based on historical information which in most cases has not been field-verified or updated. However, the city of Calumet Park has a long-standing policy requiring private wells to be abandoned or at least disconnected before homes are connected to the public water supply system [Griffin, 2009].)

2.2 Site History

Information obtained from Sanborn Fire Insurance Maps indicates that Chicago Copper and Chemical Company began operations on the site at some time before 1886 (Sanborn, 1886). The company manufactured barium hydrate and other barium compounds along with the smelting and refining of other metals, ores, and alloys (IEPA, 1990). In accordance with the 1886 Sanborn Map, three primary buildings were located on the site and included a coal storage building, a furnace room, and the largest building, the refining room. Over the years of operation additional buildings were added to house newer furnaces and kilns as well as copper sulfate production line. The Chicago Copper and Chemical Company was incorporated in Illinois in 1912 (Illinois Secretary of State, 1990).

Marvin Moore, a former employee, director and shareholder at Chicago Chemical and Copper stated that during the years of operation, ores and petroleum coke were the primary raw materials used on-site (Warzyn, 1994). Moore stated that residual materials consisting of barium sulfate, excess coke, ore impurities, silica, and barium and iron compounds were disposed of on-site or stored on the southern portion of the site in a pile (Warzyn, 1994). The facility ceased operations in 1970 and the buildings were dismantled thereafter (IEPA, 1990). The southeastern portion of the property was sold

in 1969 and leased out to Airline Towing which continues to operate on-site today (IEPA, 1990). Mr. J.R. Bramlett purchased the remaining eastern portion of the 16-acre parcel in 1988 (Warzyn, 1994).

A citizen complaint, filed in 1986 alleged that a pile of hazardous waste was present on the site which resulted in the first Illinois EPA inspection of the facility (IEPA, 1990). The resulting inspection did not identify any waste piles. However, a second complaint in April of 1986 and the May 1986 inspection identified a waste pile of multi-colored pebbled layers. Three samples taken form the pile identified several metals at concentrations significantly above background. Barium and lead (to a lesser degree) were the metals of primary concern in the sample results.

An inspection performed by Illinois EPA in May of 1989 indicated that the waste pile and debris identified in earlier inspections were removed to an unknown location (IEPA, 1990). In June 1989, the site was placed on CERCLIS.

In October 1989, Illinois EPA returned to the site along with ICEP, Inc. to test the soil beneath the waste pile that had been removed (Warzyn, 1994). A backhoe was used to dig eight holes between one and two feet deep in the southeast portion of the site (Bruni, 1989). Illinois EPA collected one soil sample from each location for laboratory analysis (Bruni, 1989). (The area encompassed by the eight samples is estimated to be about 0.2 acres based on a rough sketch included with the sample results.) Samples were analyzed for total and EP Toxicity metals (Warzyn, 1994). Concentrations of total barium ranged between 507 – 24,329 mg/kg and total lead concentrations ranged from 133 – 1,596 mg/kg (Warzyn, 1994). Samples were also analyzed for Extraction Procedure (EP) Toxicity and only barium exceeded its characteristic for toxicity using the procedure (Warzyn, 1994).

2.3 CERCLA Investigative History

In June 1989, the site was placed on CERCLIS based on Sanborn Fire Insurance Maps indicating that heavy metals may be present on-site from previous operations. In January of 1990, Illinois EPA completed a Preliminary Assessment on the property. As a part of the Preliminary Assessment process, Illinois EPA reviewed the existing data on the site and conducted a site visit. At the time of the site visit the facility was not completely fenced and waste material was simply "graded". Due to concerns regarding potential contact with waste materials at the surface of the site and existence of private drinking water wells in the area, the recommendation of the Preliminary Assessment was for the site to move to the next stage in the CERCLA process and remain on CERCLIS. The site remained on CERCLIS but was never investigated further under the program.

In October of 2007, Illinois EPA conducted an inspection at the site and adjacent residential areas. As a part of the October 18, 2007 inspection, residential soil samples were characterized in the field using the Agency's X-Ray Fluorescence analyzer (XRF). The XRF uses high-energy primary X-Ray photons emitted from an X-Ray tube to excite metals in soils. The XRF then detects the "finger print" of the metals fluoresced. This "finger print" is then compared to a known "finger print" to identify and quantify metals. The XRF was used to generate inorganic data for soils in parts per million in real-time. Following field characterization, soils were placed back into their original location.

Illinois EPA conducted XRF readings at eight (8) residential properties located to the north, south, and east of the facility. All of the soil samples were collected within one

foot of the ground surface. Table 1 (attached to this report) describes pertinent information regarding each sample location such as location, depth, and results. Figure 4 of this report displays the XRF locations and concentrations of barium, copper, chromium, and arsenic where they are greater than Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO) protective of residential soils. The results for barium and copper are of primary interest because they were known to be processed at the facility.

3.0 OTHER REGULATORY & CLEAN-UP AUTHORITY ACTIVITIES

On August 2, 1991 Illinois EPA received a "Review and Evaluation Services Agreement" from First Interstate Bank of Arizona establishing the framework for voluntary remedial actions at the site (if necessary) (Illinois EPA, June 1998).

In 1992, Harding Lawson and Associates conducted an investigation at the site on behalf of the property owner (Harding, 1992). The purpose of the investigation was to determine if site activities had impacted native soils. Native soils were found to be dark gray to brown silty lean clay. Native soil samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOC), and Resource Conservation and Recovery Act (RCRA) Metals by Toxicity Characteristic Leaching Procedure (TCLP). A total of 47 samples were collected from 47 separate boring locations from depths representing native surface soils. Four of the 47 locations exceeded regulatory limits for TCLP for barium. The remaining 43 samples had TCLP metals concentrations below regulatory limits. Twelve samples were analyzed for VOCs

and SVOCs. No volatile organic compounds were detected in soil samples and semi-volatiles compounds were only detected in one location.

In the process of characterizing impacts to native soils at the facility, the 1992 Harding Lawson investigation also delineated the lateral extent and thickness of fill materials at the site (Harding, 1992). The native soils were encountered at depths of approximately 2 feet in the northern portion of the site to 12 feet in the southwest portions of the site. The report stated:

> "Native soils consisted of dark gray to brown silty lean clay encountered at depths of approximately 2 feet in the northern portion of the site to 12 feet in the southwest portions of the site. In all the borings, a layer of 0.5 to 2 feet of gravely sand/silt was encountered with 1 to 2 feet of black to dark gray gravelly/silty material mixed with pieces of red tile, metals, plastic, wood, etc. Below two feet in depth, a wide variety of fill types were encountered including, multi-colored materials in sandy/silty gravel matrix, building debris, some viscous material, and light blue to blue granular/crystalline slag-like material." (Harding, 1992)

Groundwater was encountered in fourteen of the soil borings at depths ranging from 3.5 to 5 feet below ground surface (Harding, 1992).

In 1993 the site owner began to consider remediation of the property by risk-based approach and hired Warzyn Inc. consultants to further evaluate site conditions (Perellis, 1993). Warzyn proposed the risk-based approach using an industrial land use exposure scenario. In the spring of 1994, approximately 33,000 yd^3 to 40,000 yd^3 of crushed and ground asphalt pavement was trucked into the site and spread across the site, north of the site buildings (Warzyn, 1994). The asphalt material came from the Interstate 294 Reconstruction project that was occurring at the time. The crushed and ground pavement material spread on the site ranges in thickness from approximately nine

inches at the northern end to about three to four feet in the southeast corner. Warzyn produced a report for the Illinois EPA's consideration entitled "Corrective Action Plan" in August of 1994. In the report, Warzyn proposed that the crushed asphalt provided a suitable barrier protective of potential health risks from for direct contact with waste materials at the site. Warzyn made the case that the Wadsworth Till beneath the site, consisting of 70 – 100 feet of gray clayey and silty clay till, provided a relatively impermeable layer protective of groundwater beneath the site. However, no groundwater data has been collected to confirm Warzyn's assertion.

In November of 1994, Illinois EPA responded to Warzyn's Corrective Action Plan where Warzyn proposed to perform no further remediation at the site in consideration of surficial cover and geologic conditions that are "protective of groundwater". Illinois EPA agreed that the current site use and site surface of thick, crushed asphalt provided a suitable barrier for direct contact exposures. However, Illinois EPA requested that the owner monitor groundwater for a number of years to ensure that no contaminants leach into the groundwater from the waste on-site. Illinois EPA also requested that the owner periodically seal the asphalt cover of the site and place deed restrictions on the property to ensure that the site use access control measures remain protective. (Murphy, 1994)

Following the Illinois EPA's 1994 letter requesting that the site owner perform additional actions at the site in order to ensure that conditions are protective of human health and the environment, Bramlett's interest in pursuing voluntary remediation apparently waned and communication between the owner and Illinois EPA has essentially ceased. Illinois EPA records indicate that groundwater data has not been collected beneath the site and restrictions have not been added to deed. Additionally, Bramlett indicated in recent

months that he did not intend to pursue a "No Further Remediation Letter" from Illinois EPA's Voluntary Program (Bramlett, 2009).

4.0 SUMMARY AND CONCLUSIONS

The Chicago Copper and Chemical Company is the former location of a copper smelting and refining company. The company was in operation from before 1886 until 1970. The company manufactured barium hydrate and other barium compounds along with the smelting and refining of other metals, ores, and alloys. Bi-products, impurities, and residual materials consisting of barium sulfate, excess coke, ore impurities, silica, and barium and iron compounds were disposed of on-site or stored on the southern portion of the site in a pile. The triangle-shaped property is approximately 16 acres in size and is located in Calumet Park, in an area with both residential and commercial properties. The current property owner uses the southern portion of the site for his business, Airline Towing Company and rents the northern portion out to various transportation, shipping, or storage businesses.

The site is flat, completely covered with crushed asphalt materials and limestone gravel. Residential properties are located across the street to the east of the site. Access to the property is limited by a cyclone fence and motorized entrance gate. According to a water well database maintained by the Illinois State Water Survey, five water wells are located within a one-mile radius of the site. However, residents in the area receive their drinking water from Lake Michigan operated by the City of Chicago, therefore the Groundwater migration pathway is not of concern.

There are no surface water bodies near the site and run-off from the facility is minimal and largely controlled by ditches, curbs, and gutters. Therefore the Surface Water migration pathway is not of concern. The Air Pathway is not of concern because the site is covered with crushed asphalt, limiting the possibility of air migration of contaminants in the soil.

Soil investigations conducted by private parties identified four out of 47 locations on-site where concentrations of barium exceeded regulatory limits for TCLP for barium. The site is fenced and the thickness of fill placed on top of the native soils at the site ranges from depths of approximately two feet in the northern portion of the site to 12 feet. Eight samples collected in October of 1989 are believed to be representative of some of the fill material on the southeastern portion of the site. The results identified elevated lead and barium, with barium in excess of the toxicity characteristic using the EP Toxicity procedure.

In 1993 the site owner began to consider remediation of the property by risk-based approach. Crushed and ground asphalt pavement was trucked into the site and spread across the site, north of the site buildings. Illinois EPA approved the use of thick, crushed asphalt as a suitable barrier for direct contact exposures but requested that the owner periodically seal the asphalt cover; monitor groundwater; and place deed restrictions on the property. Ultimately, the site owner's interest in pursuing voluntary remediation apparently waned and groundwater data has not been collected and restrictions have not been added to deed. Communication between the owner and Illinois EPA has essentially ceased. In January 2009, Bramlett indicated in that he did not intend to pursue a "No Further Remediation Letter" from Illinois EPA's Voluntary Program.

Illinois EPA's XRF analysis conducted in residential areas adjacent to the facility identified concentrations of barium, copper, chromium, and arsenic where they are greater than Illinois EPA's TACO numbers protective of residential soils. The results indicate that activities at the site may have impacted concentrations in soils at nearby properties.

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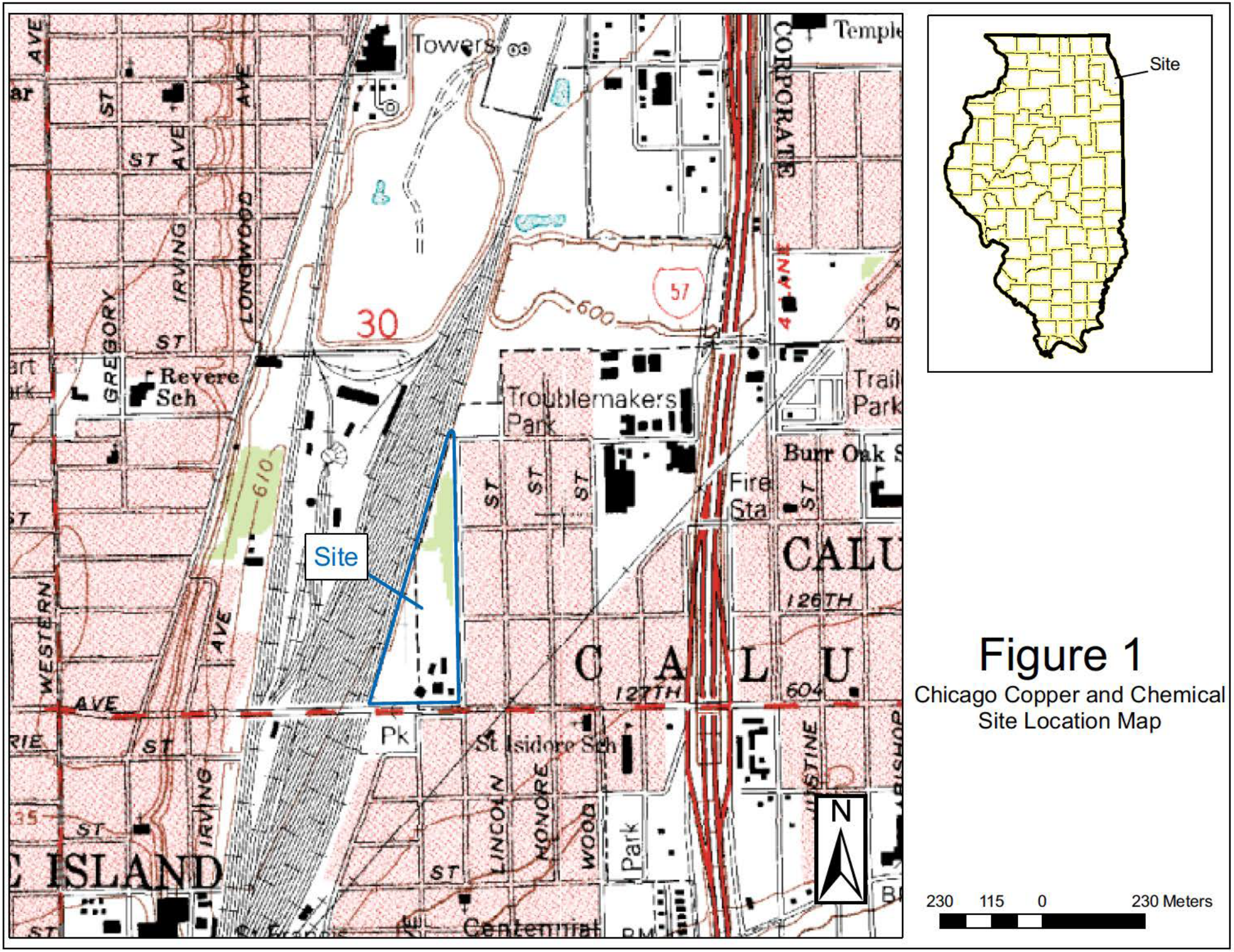

Figure 1

Chicago Copper and Chemical Site Location Map

Figure 2
Chicago Copper and Chemical
Site Map

non responsive

non responsive

Figure 3

Chicago Copper and Chemical
4-Mile Radius Map

non responsive

non
respons
ive

Legend

- Site Location
- Distance Ring
- Private Well
- Non-Community Water Supply Well

non
resp
onsi
ve

non responsive

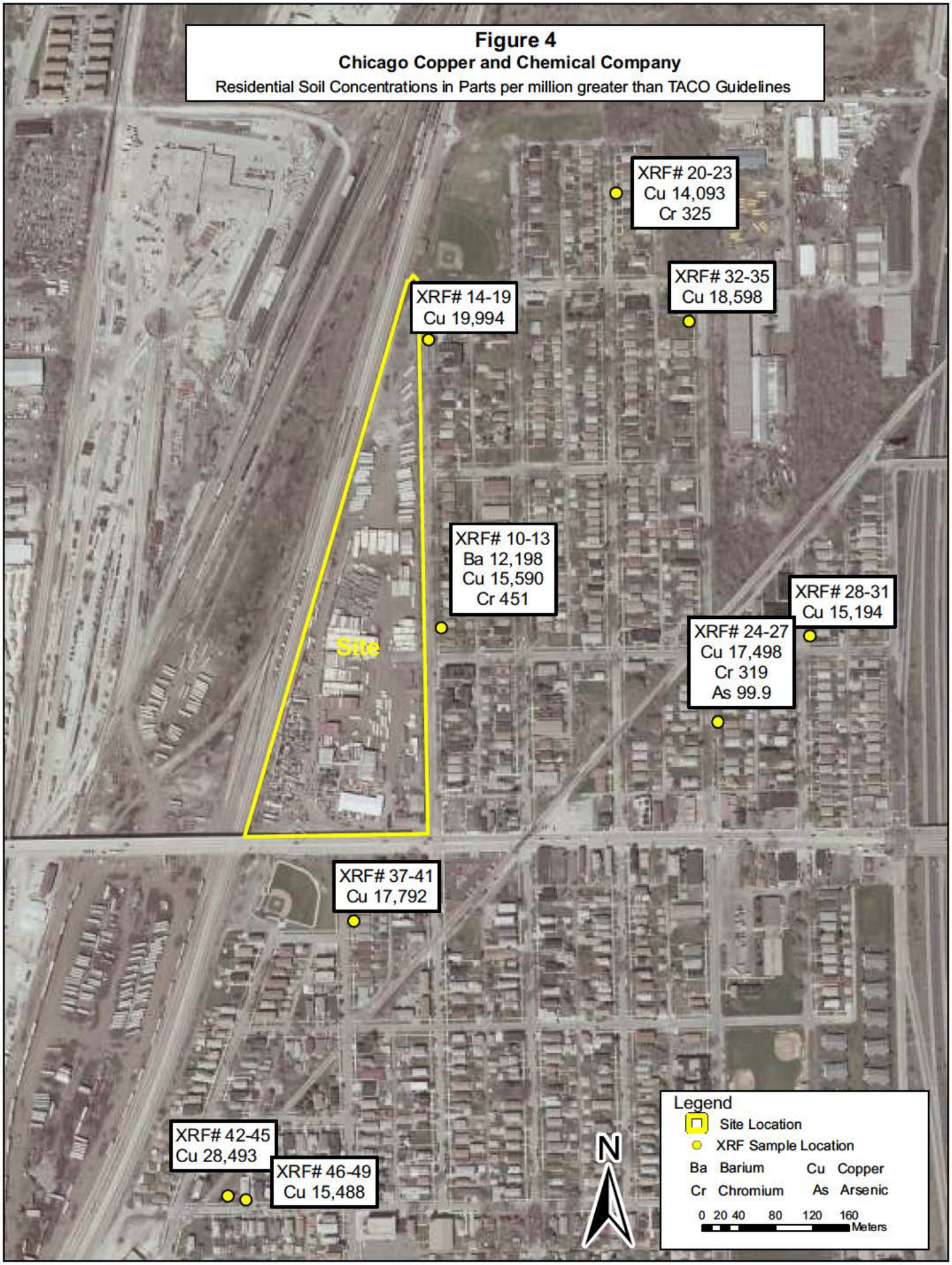
Figure 4
Chicago Copper and Chemical Company
Residential Soil Concentrations in Parts per million greater than TACO Guidelines
XRF# 20-23
Cu 14,093
Cr 325
XRF# 32-35
Cu 18,598
XRF# 14-19
Cu 19,994
XRF# 10-13
Ba 12,198
Cu 15,590
Cr 451
Site
XRF# 28-31
Cu 15,194
XRF# 24-27
Cu 17,498
Cr 319
As 99.9
XRF# 37-41
Cu 17,792
XRF# 42-45
Cu 28,493
XRF# 46-49
Cu 15,488
N
Legend
Site Location
XRF Sample Location
Ba Barium
Cu Copper
Cr Chromium
As Arsenic
0 20 40 80 120 160
Meters

Table 1
X-Ray Fluorescence Analysis of Residential Soils

					Metal Concentrations in Parts Per Million													
					Pb	**Se**	**As**	**Hg**	**Zn**	**Cu**	**Ni**	**Co**	**Mn**	**Cr**	**Ba**	**Sb**	**Cd**	**Ag**
			Residential Benchmarks [1]		400	390	11.3	10	23000	2900	1600	4700	3700	230	5500	31	78	390
XRF Reading Number	**Date**	**Address**	**Location**	**Depth in Inches**														
10,11	10/18/2007	non respon sive	Front yard, 25 feet west of southwest corner of house	1.5	155	< 15.6	< 50.1	< 19.8	< 76.2	14989	< 255	< 570	< 855	355	12198	< 134	< 81	< 360
10,13	10/18/2007			3.5	116	< 17.7	< 59.6	< 25.1	< 107	15590	< 315	< 675	< 1005	451	11296	< 150	< 80.6	< 330
14,15	10/18/2007	non respon sive	Southwest portion of front yard between sidewalk and curb	surface	55.5	< 11	< 30.3	< 15	75.2	5949	< 165	< 330	< 480	< 180	976	< 93.5	< 84.2	< 285
16,17	10/18/2007			1.5	128	< 14.3	< 51.3	< 20.3	138	15898	< 270	< 645	< 915	< 315	1520	< 95.1	< 58.8	< 225
14,19	10/18/2007			3.5	170	< 14	< 51.6	< 21.6	158	19994	< 270	< 660	< 975	< 315	2080	< 104	< 68.6	< 240
20,21	10/18/2007	non responsive	Front yard, 20 feet west of northwest corner of house	1	80.4	< 10.2	< 36.5	< 16.5	112	14093	< 210	< 480	< 705	325	1449.6	< 72.9	< 41.7	< 180
22,23	10/18/2007			3.5	84.3	< 11.1	< 34.5	< 15.6	120	13094	< 195	< 450	< 660	298	1380	< 71.1	< 52.8	< 195
24,25	10/18/2007	non responsive	Front yard, 10 feet west of northwest corner of house	1	100	< 12.2	46.3	< 17.4	112	13798	< 225	< 510	< 735	< 255	1529.6	< 61.1	< 46.5	< 195
26,27	10/18/2007			3	117	< 11	99.9	< 20.7	198	17498	< 255	< 570	< 855	319	2459.2	< 78.8	< 55.2	< 210
28,29	10/18/2007	non responsive	Front yard, 25 feet west of southwest corner of house, east of sidewalk	1	69.1	< 15.5	< 45	< 20.1	92.8	15898	< 270	< 600	< 900	< 300	1849.6	< 83.9	< 53.9	< 225
30,31	10/18/2007			3	73.5	< 11.6	< 35.1	< 17.7	105	15194	< 225	< 510	< 750	< 255	2028.8	< 89.1	< 56.1	244
32,33	10/18/2007	non responsive	Southeast corner of adjacent lot, in grassy area	1	109	< 14.7	< 48.3	< 20.1	225	16794	< 270	< 645	< 885	< 300	1320	< 73.8	< 59.1	229
34,35	10/18/2007			3.5	132	< 15	< 51.2	< 21.6	182	18598	< 285	< 645	< 1005	< 330	1249.6	< 96.9	< 56.9	< 225
37,38	10/18/2007	non non	Bare spot in front yard, immediately west of porch and south of sidewalk	surface	62	< 12.3	< 36.5	< 16.5	122	13299	< 210	< 465	< 660	< 225	3619.2	< 69.6	< 44.7	< 180
37,41	10/18/2007			3	118	< 14.3	< 46.1	< 18.2	143	17792	< 255	< 585	< 840	< 285	4409.6	< 83.6	< 54.3	< 210
42,43	10/18/2007	non responsiv	Side yard, 50 feet west of southwest corner of house	1	85.6	< 10.7	< 37.7	< 16.4	150	24499	< 240	< 600	< 930	< 300	806.8	< 59.7	< 39.3	< 165
42,45	10/18/2007			3.5	113	< 10.7	< 38	< 14.9	121	28493	< 225	< 630	< 945	< 300	742	< 77.9	< 44	< 195
46,47	10/18/2007		Front yard, 10 feet south of porch, 2 feet west of driveway	1	126	< 11.3	< 42.8	< 16.8	92.1	12998	< 195	< 465	< 720	< 255	756	< 86.9	< 30.2	< 195
46,49	10/18/2007			3	135	< 15.8	< 51.2	< 20	171	15488	< 240	< 585	< 870	< 285	1029.6	< 76.1	< 34.7	< 195