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August 25, 2000

Francis X. Lyons
Regional Administrator
U.S. EPA - Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

To The Regional Administrator:

On June 19, 2000, a Petition was formally submitted to you pursuant to Section 9605(d) of Title 42 of the United States Code. The Petitioners were individuals and organizations active in Southeast Chicago. The Petition requested U.S. EPA to fulfill its duties under Section 9605(d) for two sets of boat slips on the Calumet River, located at the former USX and Wisconsin Steel sites.

At the time the Petition was submitted, I indicated the Petition would be supported by technical assistance from Northwestern University's School of Engineering. Today, I am sending you a copy of a report prepared at the School of Engineering. This document is designed to contribute to your evaluation of the Petition.

As stated in the initial cover letter, the Petitioners would welcome the opportunity to meet with you and any of your staff to discuss the Petition.

Thank you for your attention to this matter. Please contact me if you have any questions or comments.

Sincerely,

Keith Harley

Keith Harley
Attorney at Law

Enc

Cc w/o Enc
William Abolt, City of Chicago Department of the Environment
Thomas Skinner, Illinois Environmental Protection Agency
Sanford Solomon, U.S. Army Corps of Engineers
Petitioners

PUBLIC PETITION

Submitted to:

Regional Administrator
U.S. Environmental Protection Agency
77 W. Jackson Street
Chicago, IL 60604

Under the authority of CERCLA Section 105 (d), as amended, the following petitioners:

1. Southeast Environmental Task Force
2. Calumet Ecological Park Association
3. Center for Neighborhood Technology
4. South Deering Empowerment Association
5. Saint Kevin Church
6. Father Tom Franzman, South Chicago resident
7. Robert Granger, South Chicago resident
8. Karen Soberaj, South Chicago resident
9. South Chicago Chamber of Commerce
10. Southeast Chicago Development Commission

(herein after "the Petitioners") hereby request that Region V of the United States Environmental Protection Agency conduct a preliminary assessment of the suspected release of a hazardous substance, pollutant, or contaminant of the following locations in Southeast Chicago, Illinois:

1. Sediments in the North and South Vessel Slips which served the former United States Steel South Works site (hereinafter "USX site") and are located at the mouth of the Calumet River.

2. Sediments in the Wisconsin (North) and Semet-Solvay (South) Vessel Slips which served the former Wisconsin Steel Works site (hereinafter "WSW site") and are located along the Calumet River.

The Petitioners request that they be kept fully informed throughout the Preliminary Assessment (PA) process. The Petitioners further request to participate in the PA process and will utilize the resources available at the Northwestern University School of Engineering to actively participate in the preparation of the assessment to determine the ecological and human health risks posed by these contaminated sediments.

I. SUMMARY

The quality of the Calumet River has been damaged by the history of intense industrial activities along the river in Southeast Chicago, Illinois. Located at the mouth of the Calumet River, adjacent to Lake Michigan, are two Vessel Slips which once served the United States Steel South Works site (USX site). These slips, the North and South Vessel Slips, contain contaminated sediments. The USX North Vessel Slip actually leads directly into Lake Michigan. In addition to the USX vessel slips, there are two vessel slips which once served Navistar's Wisconsin Steel Works site (WSW site) located along the Calumet River. These WSW site slips, the North (Wisconsin) Vessel Slip and the South (Semet-Solvay) Vessel Slip, also contain contaminated sediments.

The WSW site was an integrated steel manufacturing facility which included: a coke battery to convert coal to coke, blast furnaces to process iron ore into iron, basic oxygen and open hearth furnaces to refine iron into steel, and steel casting and milling processes for shaping steel products. The USX site was a steel manufacturing plant, but did not include an onsite coking operation. The USX and WSW sites are no longer in operation and both sites are being remediated under the Illinois Environmental Protection Agency's (IEPA) Brownfields redevelopment program. The USX North and South Vessel Slips were intentionally excluded from the voluntary remediation efforts at the USX site. USX has already received a "No Further Remediation" (NFR) letter from IEPA for the South Works site. Both the application for the NFR letter and the NFR letter itself explicitly exclude the sediments in the USX North and South Vessel Slips. Similarly, the WSW North and South Vessel slips have been intentionally excluded from the scope of the WSW site voluntary remediation. If the United States Environmental Protection Agency (U.S. EPA) does not intervene, contaminated sediments could remain in the USX and WSW vessel slips indefinitely.

In general, the known and potential sources of contamination at the USX site included areas which came in contact with the Electric Furnace K061 wastewater or dust and contained above ground storage tanks, underground storage tanks, drum storage, railroad tie stockpiles, PCB transformers and capacitors, and blast furnace and other slag fill. The site groundwater generally tends to flow toward the vessel slips. Beryllium and manganese have been detected in sediment from the USX vessel slips in levels that exceed Risk Based Concentration values established by U.S. EPA Region III. However, as stated previously, the USX site vessel slips were deliberately excluded from the Illinois Brownfield remediation project for the site.

In general, known and potential sources of contamination at the WSW site exist wherever steel making processes were in operation. The two WSW site vessel slips are located in the most contaminated section of the site. These slips are contaminated with a mixture of pollutants typically associated with steel production and coke plants. After conducting an Ecological Study and Impact Assessment of the WSW site vessel slips, the U.S. Fish and Wildlife Service (U.S. FWS) recommended that the sediments in the WSW barge slips be remediated to help protect the "important fish and wildlife resources that nest and migrate through this industrial region."[1] In

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[1] Mike Coffey, U.S. Fish and Wildlife Service: Rock Island, Illinois, Ecological Study and Impact Assessment at the Wisconsin Steel Works Site, Final Report, Prepared for the U.S. Army Corps of Engineers, Buffalo District, (1994), p. x.

its report, the U.S. Fish and Wildlife Service concluded that the contaminated sediments have a potential to cause adverse ecological effects.[2] However, like the USX site, the WSW site vessel slips are not included in the Illinois Brownfield remediation project for the site.

Addressing the contaminated sediments in the USX and WSW vessel slips is important in efforts to restore the quality of the Calumet River. Furthermore, the Calumet River exists in a complex watershed system with Lake Michigan, a major source of drinking water for the City of Chicago. Both Navistar and USX have concluded that remediation of the contaminated sediments in the vessel slips of their former sites does not appear to be warranted at this time.[3] Therefore, under the authority of CERCLA Section 105(d), the Petitioners request that U.S. EPA Region V perform a Preliminary Assessment of the contaminated sediments in the USX and WSW vessel slips to characterize the ecological and human health risks posed by these sediments.

The United States Army Corps of Engineers (U.S. ACE) Chicago District currently plans to dredge the Calumet River navigable channel during the Summer of 2000. The U.S. ACE has indicated a willingness to work with individual owners to incorporate dredging of the WSW and USX vessel slips into this dredging project. This would save mobilization and demobilization costs and allow the dredging of the vessel slips to be done at cost. In February, 1999 a multi-neighborhood coalition formally requested that the City of Chicago Department of Environment provide the leadership necessary to incorporate the WSW and USX boat slips in U.S. ACE's current dredging project. To date, Chicago's Department of Environment, Navistar, and USX have failed to take steps to take advantage of the unique opportunity offered by U.S. ACE. As the dredging project progresses it becomes less likely that the vessel slips will be able to be incorporated into the current dredging project.

A vast amount of information regarding the USX and WSW sites is available to the public. USX, Navistar, and IEPA have placed relevant documents in the following three repositories:

1. WSW Official Location
   Vodak/East Side Library
   10542 South Ewing Avenue
   (312) 747-5500

2. WSW Courtesy Location and USX Location
   Calumet Environmental Resource Center
   Douglas Library, Room 303
   Chicago State University
   9501 South Martin Luther King Drive
   (773) 995-2964

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[2] Id. at 33.

[3] Geraghty & Miller, Inc., Ecological Risk Assessment, Former Wisconsin Steel Works, Prepared for Navistar International Transportation Corp., Chicago, Illinois (Dec. 1999), p. 19; ChemRisk Division of McLaren/Hart Environmental Engineering Corporation, Final Preliminary Human Health and Ecological Risk Assessment for the South Works Site, Chicago, Illinois, Prepared for USX, (Mar. 1995).

3. USX Official Location
   South Chicago Branch of the Chicago Public Library
   9055 S. Houston Avenue
   Contact Person: Gregory Carr
   (312) 747-8065

II. AUTHORITY

A. CERCLA §105(d) Preliminary Assessment Petition

Section 9605(d) of Title 42 of the United States Code (hereinafter CERCLA § 105(d)) empowers any person to petition the President to conduct a preliminary assessment (PA) of the hazards to public health and the environment which are associated with a release or threatened release of a hazardous substance or pollutant or contaminant.[4] Petitioners must be persons who are, or may be, affected by such a release or threatened release.[5] The term "release" includes any means by which a hazardous substance, pollutant, or contaminant could be exposed to the environment, such as by spilling, leaking, leaching, discharging, dumping, injecting, or escaping.[6]

Executive Order Number 12580 delegates the functions vested in the President in CERCLA §105(d), with respect to non-Federal facilities, to the Administrator of the United States Environmental Protection Agency (U.S. EPA).[7] The PA petitioning process allows the public to notify U.S. EPA of suspected environmental problems that may affect them, thus identifying sites that might otherwise have remained unknown.[8] U.S. EPA has codified the CERCLA § 105(d) PA petition provision in Section 300.420(b)(5) of Title 40 of the Code of Federal Regulations. Section 300.420(b)(5) requires PA petitions to be addressed to the EPA Regional Administrator for the region in which the release is located.[9]

Under CERCLA § 105(d) and 40 C.F.R. § 300.420(b)(5), if U.S. EPA has not previously conducted a preliminary assessment of such a release, it must, within 12 months after the receipt of a PA petition, complete a PA unless it determines a PA is not appropriate. When determining if performance of a PA is appropriate, the U.S. EPA shall take into consideration:

(A) Whether there is information indicating that a release has occurred or there is a threat of a release of a hazardous substance, pollutant, or contaminant; and

(B) Whether the release is eligible for response under CERCLA.[10]

If U.S. EPA determines a PA is not warranted, it must notify the petitioners and provide an explanation of why the assessment is not appropriate.[11] If the PA indicates that the release or threatened release may threaten human health or the environment, the U.S. EPA must promptly evaluate the release or threatened release in accordance with the hazard ranking system referred to in CERCLA § 105(a)(8)(A) to determine the national priority of the release or threatened

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[4] 42 U.S.C.A. § 9605(d) (1994) (Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act or "CERCLA").

[5] Id.

[6] 42 U.S.C.A. § 9601(22); See OSWER Directive 9320.3-08, Feb. 5, 1990, 1990 WL 608660 (OSWER).

[7] Ex. Ord. No. 12580, 52 FR 2923, Jan. 23, 1987, 1987 WL 181273 (Pres.).

[8] OSWER Directive 9320.3-08, Feb. 5, 1990, 1990 WL 608660 (OSWER).

[9] 40 C.F.R. § 300.420(b)(5).

[10] 40 C.F.R. § 300.420(b)(5)(iv).

[11] 42 U.S.C.A § 9605(d); 40 C.F.R. § 300.420(b)(5)(iii).

release.[12]

Accordingly, the undersigned (the Petitioners) invoke CERCLA § 105(d) to petition the U.S. EPA Region V Administrator, as a delegate of the President and the US EPA Administrator, to perform a PA of the hazards to public health and the environment resulting from the contaminated sediments located in the USX site North and South Vessel Slips and the WSW site Wisconsin Slip (North) and Semet-Solway Slip (South). In petitioning U.S. EPA Region V to conduct a PA, the Petitioners are acting within the purpose of CERCLA §105(d) to protect human health and the environment by identifying sites of suspected environmental problems. The Petitioners are or represent members of the communities in which the contaminated USX and WSW vessel slips are located. The sediments in the USX and WSW vessel slips are contaminated by hazardous substances typically found near steel mills and/or coke operations. Because of the interaction between these contaminated vessel slips and the Calumet River and Lake Michigan, the contaminated sediments in the slips pose a potential threat to human health and the environment.

B. Illinois Brownfields Voluntary Cleanup Program[13]

Through its Site Remediation Program (SRP), the Illinois EPA promotes the cleanup and redevelopment of brownfield sites by municipal governments and private land owners. The SRP is administered under the authority of Title XVII of the Environmental Protection Act (the Act). The regulations implementing the Act are found at 35 Illinois Administrative Code Part 740 (Site Remediation Program) and Part 742 (Tiered Approach to Corrective Action Objectives). Under IEPA's SRP, participants voluntarily clean up contaminated sites under IEPA oversight and receive IEPA approval and release of liability for approved remedial activities at the site. This release from liability is provided in the form of a No Further Remediation (NFR) Letter, which signifies a release from further responsibilities under the Act for conducting the approved remedial actions. U.S. EPA and IEPA have entered into a Superfund Memorandum of Understanding (SMOU). The SMOU states that U.S. EPA will not require further response actions at sites which have received a NFR letter. In addition, except in emergency situations, U.S. EPA will not plan or anticipate Federal action under CERCLA at sites participating in the voluntary cleanup program.

The SRP is designed to be flexible and responsive to the requirements of participants, to project constraints, and to varying remediation site conditions. Typically the scope of actions at SRP sites is defined by the person or entity seeking to participate in the voluntary cleanup program. Both Navistar and USX have elected to exclude the vessel slips from the scope of the voluntary clean up programs for their respective sites. Furthermore, the NFR letter received by USX for its Southworks site specifically excluded USX's North and South Vessel Slips. Similarly, if a NFR letter is issued to Navistar for its former Wisconsin Steel Works site, it is expected that the site's North and South Vessel Slips will be explicitly excluded. Therefore, the vessel slips at the USX and WSW sites are not subject to the SMOU that exist between IEPA and U.S. EPA.

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[12] id.

[13] 415 Ill. Comp. Stat. 5/58-58.15 (West 1999); Ill. Admin. Code tit. 35, § 740 (1999); Ill. Admin. Code tit. 35, § 742 (1999); See also IEPA website: <http://www.epa.state.il.us/land/brownfields>

III. PETITIONERS AND SUPPORTERS

A. *Southeast Environmental Task Force and Calumet Ecological Park Association*

Contact: Marian Byrnes
Non-responsive [redacted]

The Southeast Environmental Task Force (SETF) is comprised of members who live in Southeast Chicago. The SETF includes organizations whose members fish along the Calumet River. The SETF strives to prevent additional sources of pollution from entering the Southeast Side of Chicago, Illinois. SETF also seeks to facilitate both the clean up of contaminated land in the area and the reduction, as far as possible, of toxic emissions from industries in Southeast Chicago.

The goal of the Calumet Ecological Park Association is to preserve natural lands and habitats in the Lake Calumet region.

B. *Center for Neighborhood Technology*

Contact: Ignacio Correa-Ortiz
2125 W. North Avenue
Chicago, IL 60647
(773) 278-4800

The Center for Neighborhood Technology ("CNT") builds prosperous, sustainable and inclusive urban communities by linking economic, ecological and community development. CNT's work in public policy, market development and community planning is grounded in the Chicago region and national in scope.

The Center's Sustainable Calumet Project focuses on the watershed of the Calumet, Grand Calumet and Little Calumet Rivers in Southeast Chicago and Northwest Indiana. The project builds on nearly a decade of involvement the Center has had in the region, including work with local groups on brownfield restoration. CNT has been working for approximately three years on the redevelopment of the Wisconsin Steel Works site and has been monitoring the site's conditions, remediation, and future development.

C. *South Deering Empowerment Association*

Contact: Tirso Villafuerte
Non-responsive [redacted]

The South Deering Empowerment Association is a community organization for the residents of the South Deering neighborhood in Southeast Chicago. The residents of South Deering live in the immediate vicinity of the Wisconsin Steel Works site. The organization works on a variety of projects for the betterment of the community.

D. Saint Kevin Church

Contact: Father Alfredo Gundrum
10509 South Torrence Avenue
Chicago, IL 60617
(773) 721-2563

Saint Kevin Church is located in the immediate vicinity of the Wisconsin Steel Works site. Parishioners of the church are residents of the neighborhood surrounding the site.

E. Father Tom Franzman, a resident of Southeast Chicago

St. Michael the Archangel Church
8237 S. Shore Drive
Chicago, IL 60617
(773) 734-4921

Father Franzman joins this petition as an individual residing in Southeast Chicago.

F. Robert Granger and Karen Soberaj, residents of Southeast Chicago

Non-responsive [redacted]

These Southeast Chicago residents live near the United States Steel South Works and Wisconsin Steel Works sites.

G. South Chicago Chamber of Commerce

Contact: Neil Bosanko
2938 East 91st Street
Chicago, Illinois 60617
(773) 768-1221

H. Southeast Chicago Development Commission (SCDCom)

Contact: Lynn Cunningham
Southeast Chicago Development Commission
9204 South Commercial Avenue, Suite 212
Chicago, IL 60617
(773) 731-8755

SCDCom is a private not for profit community economic development organization working to revitalize the local economy.

IV. LOCATION OF RELEASE/THREATENED RELEASE

A. Wisconsin Steel Works Site (WSW site) and Vessel Slips

The WSW site is located in Southeast Chicago, Illinois in the Hyde Park Township of Cook County, Illinois (see Appendix 1).[14] The address of the site is 2701 E. 106th Street, Chicago, IL 60617. The facility's US EPA identification number is ILD000849737. The site encompasses 176 acres. The former Wisconsin Steel Works site is bounded on the east by the Calumet River, on the west by Torrence Avenue, on the north by 100th Street, and on the south by 114th Street.

The site is divided by 106th Street. Thirty-seven acres of the site are north of 106th Street, and 139 acres are south of 106th Street. The site consists of former production and slag areas and is divided into eight main sections (see Appendix 1):

- slag area
- office area
- steel finishing area
- blast furnace area
- ore yard
- coke plant area
- coal storage
- steel production area

Two of the sections, the office area and the slag area, are located north of 106th Street. The remaining six production areas are located south of 106th Street.

There are two barge slips known as the North (Wisconsin) and South (Semet-Solvay) Vessel Slips which lead from the main steel plant area into the Calumet River. These vessel slips are located in the most contaminated areas of the site. The North Vessel Slip runs east to west and is bordered by the Ore Yard on the north, the Coke Plant Area on the south, and the Steel Production area on the west. The South Vessel Slip also runs east to west and is bordered on the north by the Coal Storage area and on the west by the Steel Production area. The North Vessel Slip is approximately 374 meters long and 55 meters wide.[15] The South Vessel Slip is approximately 294 meters long and 53 meters wide.[16] The surface area of the water at the two vessel slips is 32,000 square meters (8 acres). A concrete and steel seawall borders the vessel slips.

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[14] Geraghty & Miller, Inc., Final Draft Preliminary Risk Assessment Wisconsin Steel Works Chicago, Illinois, Prepared for Navistar International Transportation Corp., (Mar. 1998), p. 2-1.
[15] Mike Coffey, supra note 1, at 26.
[16] Id.

B. United States Steel South Works Site (USX site) and Vessel Slips[17]

The USX site encompasses approximately 567 acres and is located adjacent to Lake Michigan between East 79th and East 91st Street, 13 miles south of Downtown Chicago in Cook County, Illinois (see Appendix 2). The address of the site is 3426 E. 89th Street , Chicago, IL 60617. The facility's U.S. EPA identification number is ILD010279222. The USX site is located in the southeast side of the City of Chicago and is bordered on the north and east by Lake Michigan, and on the west by a residential area. The South Vessel Slip and the Calumet River form the southern boundary of the USX site.

The USX site was an iron and steel production facility (see Appendix 2). When the site was active, the North and South Vessel Slips were used for shipping and receiving of raw materials and finished steel products. The North Slip divides the USX site into northern and southern segments. This slip is located adjacent to the North Ore Yard and leads directly into Lake Michigan. The North Vessel Slip is approximately 829 meters long and 60 meters wide. It encompasses approximately 12.5 acres. The South Vessel Slip is located adjacent to the South Ore Yard and leads into the Calumet River. The South Slip is approximately 373 meters long and 102 meters wide at its mouth. It encompasses approximately 5.6 acres.

[17] USS Former South Works Steelmaking Facility, Illinois Pre-Notice Site Cleanup Program, Fact Sheet 1 (Sept. 20, 1995); ChemRisk Division of McLaren/Hart Environmental Engineering Corporation, Human Health Risk Assessment For The South Works Site, Prepared for U.S. Steel Group (Aug. 25, 1995), p. 2-1.

V. NATURE AND HISTORY OF ACTIVITIES REGARDING RELEASE/THREATENED RELEASE

A. History of Wisconsin Steel Works Site

1857 Steel operations begin.

1899 Owned by South Chicago Furnace Company, which became the Deering Harvester Company and, ultimately, International Harvester (IH).

1917 The mill was officially named Wisconsin Steel Works of International Harvester.

1930's The facility developed into an integrated steel manufacturing operation encompassing a coke battery (converting coal to coke), blast furnaces (processing iron ore into iron), basic oxygen and open hearth furnaces (refining iron into steel) and steel casting and milling (shaping steel products).

1977 Sold by IH to EDC Holding Co., a subsidiary of Envirodyne Industries.

1979 Loans made to Navistar by U.S. Economic Development Agency (EDA).

1980 Envirodyne declared bankruptcy. EDA acquires 90% and Navistar 10% ownership of the Wisconsin Steel Trust, into which the site was placed.

1982 Furnaces were shut down and the process of selling assets began.

1984 Cuyohoga Wrecking Co. began demolition. Within a year, most of the above-ground structures at the site were demolished. The site still contained piles of recyclable material, building debris, dirt fill, and all underground tanks, tunnels, ducts, foundations and slips. Cuyohoga then entered bankruptcy.

1989 National Wrecking Company resumes demolition.

1991 U.S. EDA entered into a memorandum of agreement with the US Army Corps of Engineers to undertake the environmental remediation at the site. From May 1991 to July 1992, the Corps performed the following:

1. fenced and bermed hazardous waste areas,
2. removed and disposed hazardous liquids and sludges,
3. stabilized soils to reduce leaching,
4. covered underground areas to prevent water collection, and
5. cut and removed mooring posts to discourage docking by the site.

However, the site still contained several areas of contaminated soil, underground storage tanks and former basements and sumps containing contaminated liquids.

1992 The Corps initiated remedial investigation (Phase I), in order to identify the nature and extent of contamination, pathways for migration and impacts on human health and the environment.

1994 In February, the Corps issued its site characterization interim report[18], in which it described the nature and extent of soil and underground water contamination. The interim report also characterized site soil and groundwater to provide a basis for risk assessment, environmental impact analysis and choices of cleanup alternatives.
In October, Navistar and U.S. EDA announced an agreement through which Navistar would pay U.S. EDA $11 million to satisfy outstanding claims, take title to the site and conduct all phases of the environmental cleanup through the Illinois voluntary cleanup program.

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[18] U.S. Army Corps of Engineers, Buffalo District, Wisconsin Steel Works Site Characterization Interim Report, Prepared for U.S. Department of Commerce Economic Development Administration (1994).

1996 In December, a consent order[19] between the Illinois EPA and Navistar was entered. This consent order combines state and federal voluntary and mandatory action.

1997 In May, U.S. EDA conveyed its ownership interest to Navistar.
In August, Navistar hosted an open house to inform the community about the environmental investigation (Phase II) and remediation project.

1998 In March, Navistar submitted to the Illinois EPA, and in turn to the community for comments, the Final Draft Preliminary Risk Assessment and Final Draft Phase II Remedial Investigation Work Plan.[20] Together these documents provide detailed guidance for the site activities and related procedures which will be followed during the Phase II site investigation. In August, Navistar issued the Preliminary Risk Assessment. In August, Illinois EPA approved the Final Draft Work Plan. In November, Navistar issued a Technical Memorandum – Arsenic Background Sampling Results and Analysis

1999 In March, Illinois EPA accepted (approved) Navistar's revised Amendment to Phase II Remedial Investigation report. In December, Geraghty & Miller published an Ecological Risk Assessment report prepared for Navistar in which they concluded that remediation of the WSW North and South Vessel Slips did not appear to be warranted.[21]

On July 2, 1998 Navistar issued a response to comments received on its Final Draft Preliminary Risk Assessment and Final Draft Phase II Remedial Investigation Work Plan. **In response to a suggestion to characterize contaminant hot spots in the sediments of the North and South Vessel Slips, Navistar indicated that the sediments would not be addressed in the remediation of the WSW site.** Navistar indicated that the quality of the sediments in the North and South Vessel Slips do not affect the future industrial/commercial redevelopment of the WSW and therefore these sediments would not be included in the scope of the WSW site remediation. More recently, Navistar reaffirmed its refusal to consider remediating the North and South slips in its December, 1999 Ecological Risk Assessment prepared by Arcadis, Geraghty & Miller, stating "...no recommendations for remedial actions are provided as they do not appear warranted at this time." Navistar acknowledges that U.S. Fish & Wildlife Service (U.S. FWS) and IEPA studies of the vessel slips have revealed sediments in the slips are contaminated. However, Navistar has consistently interpreted the data as justifying its decision not to act.

In its March, 1998 Final Draft Preliminary Risk Assessment (PRA), Navistar uses and summarizes data gathered or cited a 1994 Ecological Study and Impact Assessment prepared by U.S. FWS for the WSW site.[22] Navistar's draft PRA evaluates site data as compared to remediation objectives for soils, sediment, surface water, and groundwater.

In its Preliminary Risk Assessment, Navistar claims that various contaminants found on the WSW site are within the range of other areas found either nationally, throughout the Great Lakes region, or locally. The assessment uses concentrations of other highly polluted areas as reference

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[19] Illinois v. Navistar International Transportation Corp., 96CH 0014146 (Dec. 30, 1996).
[20] Navistar international Transportation Corp., Former Wisconsin Steel Works Newsletter No. 4. Project Update: Site Environmental Management Project, Winter 1998/1999.
[21] Geraghty & Miller, Inc., Ecological Risk Assessment, Former Wisconsin Steel Works, supra note 3, at 19.
[22] Geraghty & Miller, Inc., Final Draft Preliminary Risk Assessment, Wisconsin Steel Works Site: Chicago, Illinois, supra note 14.

for typical background concentrations of contaminants without stating these are polluted areas. As an example, in its PRA Navistar maintains that the U.S. FWS determined that "the concentrations of PCBs detected in the barge slips were within the range of samples from the Calumet River and other adjacent river systems."[23] However, the U.S. FWS report indicated that the "concentrations of PCBs detected in the barge slip sediments are within the range of other polluted aquatic sediments."[24]

Second, Navistar's PRA report also concludes that the activities at the WSW site did not contribute adversely to the condition of the sediments in the WSW barge slips or the Calumet River.[25] For example, in its PRA Navistar states "[t]he runoff of constituents in the surface soil is an incomplete pathway and was not considered in this Preliminary RA."[26] However, the U.S. FWS report states that the reason sediments in the South Vessel Slip are more polluted than those in the North Vessel Slip "may be due in part to the deposition of pollutants from historic discharges by WSW and current run-off from WSW."[27] Navistar's report further asserts, in many cases, that the U.S. FWS concluded that contaminants found in fish tissue were due to other sources along the Calumet River and not WSW. However, the U.S. FWS's conclusion that the contaminants in fish tissue are due to many sources along the Calumet River did not exclude WSW as one of those sources.

Navistar's December, 1999 Ecological Risk Assessment acknowledges that the sediments in the North and South Barge slips are impacted by PAHs, PCBs, metals and some VOCs (see page 3/20). Moreover, the Assessment notes that in U.S. FWS sediment toxicity tests using larval fathead minnows, some samples in the South Slip exhibit "significant toxicity" (p. 4/20). Indeed, fish tissue data collected by U.S. FWS reveals PCBs, metals and PAHs. Id. Despite these conclusions, Navistar maintains no action is presently needed to address the contaminants in the slips. Regardless of Navistar's potential liability or the liability of any other responsible party, the Petitioners assert there is more than adequate data demonstrating that the need for U.S. EPA to independently assess the ecological and human health risks posed by the contaminants in the sediments in the North and South Slips.

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[23] Id.; Geraghty & Miller, Inc., Final Draft Preliminary Risk Assessment, Wisconsin Steel Works Site: Chicago, Illinois, supra note 14, at 4-9.

[24] Coffey supra note 1, at 37; Emily Fahsl and Matthew Lamb, supra note 23, at Section 5.3.

[25] Id.

[26] Id.; Geraghty & Miller, Inc., Final Draft Preliminary Risk Assessment, Wisconsin Steel Works Site: Chicago, Illinois, supra note 14 at 4-3.

[27] Coffey supra note 1, at 32; Emily Fahsl and Matthew Lamb, supra note 23, at Section 5.3.

B. History of USX South Works Site[28]

1880 In March, North Chicago Railway Mill Company began construction of a 73 acre primary steel plant at South Works in South Chicago, which included the South Vessel Slip.

1882 Steel production begins. The site was owned and operated by Illinois Steel Company and then Carnegie-Illinois Steel Company.

1901 South Works becomes part of U.S. Steel Corporation, a business unit of USX Corporation. U.S. Steel produced alloy bars, billets, structural beams, rods, and plates at South Works. Coke production was not part of facility operations. All raw materials such as coke and ore were imported from other steel facilities. During the site's years of operation, it was expanded to 567 acres by landfilling low lying areas of Lake Michigan and the Calumet River. Molten slag, a byproduct of operations, was the primary fill material used for the expansion. Other material landfilled onsite included demolition and maintenance debris such as brick, concrete, and refractory materials.

1944 The site reached its peak employment of 20,000.

1951 South Works reached its peak production of 3,746,000 tons of steel. Steel shipments then began to decline.

1982 Decreasing trade shipments resulted in progressive shutdown until all but two major site operations, an electric furnace and a beam mill, were shut down. Between 1982 and 1991, approximately two-thirds of the site facilities were demolished.

1992 In April the South Works plant was completely shut down. Between July 1992 and January 1993, Waste Technologies, Inc. (WTI) conducted a Phase I environmental investigation for the USX's South Works site to identify the nature and extent of contamination, pathways for migration and impacts on human health and the environment. During the investigation an inventory of underground storage tanks, above-ground storage tanks, drums, small containers, and railroad ties was conducted. The former locations of PCB containing transformers and capacitors were also verified.

1993 In February, WTI issued the Phase I "Environmental Assessment of the Former South Works Plant" report. During March and April, WTI conducted a Phase II environmental Investigation. This investigation was designed to confirm groundwater results from the Phase I investigation and to take additional soil samples. In September, WTI issued a "Phase II Environmental Assessment of the Former South Works Plant" report. In December, USX entered the South Works facility into the IEPA's voluntary Pre-Notice Site Cleanup Program.

1994 During June and July WTI conducted a Phase III environmental investigation in which they sampled the vessel slip sediments for the first time. The purpose of the Phase III investigation was to determine site conditions as a whole by sampling and analyzing typical surface and subsurface soils on a grid system. This included three deep monitoring wells to obtain groundwater samples just above the first layer of bedrock

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[28] USS Former South Works Steelmaking Facility, Illinois Pre-notice Site Cleanup Program, Fact Sheet 1 (Sept. 20, 1995); Former South Works Steelmaking Facility, Illinois Pre-notice Site Cleanup Program, Fact Sheet 2 – Site Environmental Investigations (Dec. 4, 1995); Former South Works Steelmaking Facility, Illinois Pre-notice Site Cleanup Program, Fact Sheet 3 – Human Health Risk Assessment (Jan. 4, 1996); Former South Works Steelmaking Facility, Illinois Pre-notice Site Cleanup Program, Expanded Fact Sheet 3 – Human Health Risk Assessment (Jan. 24, 1996).

under the site. A "Phase III Environmental Assessment of the Former South Works Plant" report was issued in September. In December, the ChemRisk Division of McLaren/Hart Environmental Engineering Corporation, issued a "Preliminary Human Health and Ecological Risk Assessment for the South Works Site, Chicago, Illinois" report prepared for USX. This Preliminary Risk Assessment presented the methodologies that were going to be used in the final health risk assessment to evaluate potential health risks associated with environmental exposure.

1995 In March, ChemRisk issued a final "Preliminary Human Health and Ecological Risk Assessment for the South Works Site, Chicago, Illinois" report prepared for USX. IEPA approved this preliminary assessment on March 29, 1995. In August, ChemRisk issued a "Human Health Risk Assessment for the South Works Site, Chicago, Illinois" report. On September 18, 1995, IEPA approved the remediation goals presented in this risk assessment for each potential land use. IEPA determined that the calculated remedial goals were protective of human health and the environment. The USX site groundwater exceeded Illinois' Class II standards for several constituents. In November, USX requested that IEPA establish a groundwater management zone (GMZ) for the site which would permit alternative groundwater standards for the groundwater beneath the site.[29] A GMZ was requested for: beryllium, cadmium, manganese, chloride, phenolics, sulfate, pH, iron, antimony, and lead.

1996 In September USX submitted to IEPA a report entitled "Remediation Activities at the Former South Works Site, Chicago, Illinois." The report summarized the remedial activities which occurred at the site. The report was submitted with a request that IEPA issue USX a "No Further Remediation" for the South Works site so that potential sale of the site could begin. The report details the soil, vessel slip sediment, and groundwater investigations conducted at the South Works site and the necessary remediation conducted.[30] The remediation activities conducted are detailed in this report and are summarized in the various public information Fact Sheets provided by USX (see Appendix 3).

1997 In July, IEPA issued a No Further Remediation letter to USX for the South Works site.[31] The letter signified that USX had completed its responsibilities in remediating the South Works site for residential or Industrial use. **The following areas were not included in the South Works site remediation project and were excluded from this No Further Remediation letter: the North Vessel Slip, the South Vessel Slip**, the Calumet River, the near shore areas of Lake Michigan, the U.S. Government Properties, and the Elgin, Joliet and Eastern Railroad Company Property.

1999 Planning activities by the City of Chicago including the "From Steeltown to Hometown" plan for the USX site and the creation of a Tax Increment Finance District. USX agrees to sell 100 acres of land to the Solo Cup Corporation.

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[29] Letter from US Steel to IEPA Environmental Project Specialist Vickie Moy, "Groundwater Management Zone Request, South Works Site," Nov. 13, 1995.

[30] Waste Technology, Inc., Remediation Activities at the Former South Works Site: Chicago, Illinois, Prepared for USX Realty Development, (Sept. 4, 1996).

[31] Letter from IEPA to J. David Moniot of US Steel, July 31, 1997.

VI. SUBSTANCE(S) INVOLVED

A. WSW Site and Vessel Slips

The types and concentrations of contaminants in the sediments of the WSW vessel slips match those typically found near steel mill and coke operations.[32] The vessel slips are located in the most contaminated area of the WSW site. The coke plant area of the site is located between the North and South Vessel Slips, directly west of the Calumet River. The soil and groundwater in the coke plant area are contaminated with: benzene, toluene, phenol, naphthalene, benzo(a)pyrene, ammonia, and cyanide.[33] The former steel production area is located in the southwest section of the site. Contamination in this area included lead and chromium in the soil and PCBs in below-grade areas. Groundwater flow at the site is generally towards the Calumet River and the North and South Vessel Slips.[34]

The contaminated sediments in the WSW vessel slips have the potential to cause adverse ecological effects.[35] The South Vessel Slip sediments are generally more contaminated than those in the North Vessel Slip.[36] This is particularly true at the confluence of the South Slip and the Calumet River and the west end of this vessel slip. Microtox® tests conducted by the U.S. Fish and Wildlife Service suggest toxic conditions in both WSW vessel slips.[37]

Metals

The average concentration of three metals in the WSW vessel slips sediments is substantially greater than background concentrations in aquatic sediments from Great Lakes harbors and Illinois streams.[38] Zinc is about 20 times greater than background levels, lead is about 16 times greater, and cadmium is approximately 5 times greater.[39] The concentrations of arsenic and the heavy metals in the vessel slip sediments were also elevated.[40]

"Sediment metals concentrations from the confluence of the south slip and the Calumet River were among the highest values compared to other areas in both barge slips. Cadmium, copper, lead, nickel and zinc concentrations at the mouth of the south barge slip are the maximum detected in the barge slips."[41] The average concentrations of lead and zinc in the vessel slip sediments are above biological effect values for those contaminants.[42] The following chart shows the level of metals observed in samples taken from the sediment vessel slips.

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[32] Coffey, supra note 1, at 32.
[33] Geraghty & Miller, Inc., Final Draft Preliminary Risk Assessment, Wisconsin Steel Works Site: Chicago, Illinois, supra note 14.
[34] Id. at 2-9.
[35] Coffey, supra note 1, at 33.
[36] Id. at 32.
[37] Id. at 33.
[38] Id. at 34.
[39] Id.
[40] Id.
[41] Id. at 15.
[42] Id. at 34.

Barge Slips Metals Average Concentrations (mg/Kg, dry weight)[43]

ELEMENT	MAXIMUM	MEAN
Arsenic	19.90	16.06
Cadmium	22.80	4.95
Chromium	123.00	88.60
Copper	143.00	118.52
Lead	765.00	317.83
Mercury	0.79	0.42
Nickel	66.50	53.08
Zinc	1990.00	1052.00

Metal contaminants are commonly sorbed to clay grains and organic matter. Areas with clay content may have higher recorded metals concentrations. Heavy metals such as lead and cadmium are neurotoxins. Lead can cause reproductive and neurological damage.[44] Infants and pregnant mothers are especially susceptible to the adverse health effects caused by low levels of lead. Exposure to high levels of lead can cause severe brain and kidney damage. Cadmium can cause both lung and kidney damage. "The mobility of the metal pollutants in the WSW North and South Vessel Slips may change spatially and within the sediment column depending on depositional patterns and post depositional changes and seasonally with poor overlying water quality."[45]

Ammonia[46]

Fish toxicity test data provided by the U.S. Fish and Wildlife Service indicate that the vessel slip sediments contain toxic concentrations of ammonia. The concentration of ammonia in sediment throughout much of the Illinois River waterways is at toxic levels. Ammonia is more easily released from sediments than inorganic compounds.

Polychlorinated biphenyls (PCBs)[47]

Two PCB Aroclors have been detected in the WSW vessel slip sediments. The levels of PCBs detected in these sediments are within the range of other polluted aquatic sediments. PCB Aroclor 1242 (maximum concentration 7.6 mg/Kg) was detected throughout the South Vessel Slip and at the confluence of the North Vessel Slip with the Calumet River. PCB Aroclor 1242 is one of the PCB Aroclors detected in the soil in the main steel plant area. The average Aroclor 1242 level in the slip sediments is above the median biological effect value for total PCBs.

PCB Aroclor 1254 (maximum concentration 0.46 mg/Kg) was detected in the middle and west end of the North Slip. PCB Aroclor 1254 was also detected at concentrations above the moderate biological effect level.

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[43] Coffey. supra note 1, at 16 Table 4, 36 Table 15.
[44] U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Publication #EPA 540/R-94/044 PB 94-963272. Common Chemicals Found at Superfund Sites. (Aug. 1994).
[45] Coffey. supra note 1, at 35.
[46] Id. at 36.
[47] Id. at 16, 37.

Animal studies suggest that PCBs are probable carcinogens in humans.[48] Studies further indicate that some PCB mixtures cause liver damage, skin irritations, and reproductive and developmental effects. PCBs bioaccumulate and easily accumulate in sediments, especially sediments with high organic content. PCBs are hydrophobic and therefore the PCB concentration in sediment can be significantly higher than in water.

Aromatic Hydrocarbons[49]

Aromatic hydrocarbons are common contaminants of steel plant coking operations. BETX compounds (benzene, ethylene, toluene, and xylene) were detected in the South Vessel Slip sediments. Polycyclic aromatic hydrocarbons (PAHs) were detected at various concentrations and in varying combinations. The maximum total PAH concentration was 569.1 mg/kg. PAHs are much greater in the South Vessel Slip than in the North Vessel Slip. The observed concentration of two PAHs in sediment in the South Vessel Slip was above the sediment quality criteria for phenanthrene and fluoranthene published in 1991.

Animal studies indicate that PAHs cause tumors and birth defects in animals in high doses.[50] Long term exposure to mixtures containing PAHs have been associated with cancer in humans.[51] Volatile aromatics and low molecular weight PAHs are acutely toxic chemicals. While higher molecular weight PAHs are not as acutely toxic, they are known carcinogens.

Total Recoverable Petroleum Hydrocarbons (TRPHs)

TRPH's concentrations are somewhat higher in the South Vessel Slip than in the North Vessel Slip. The maximum TRPH concentration was 7000 mg/Kg.

Fish and Aquatic Macroinvertebrates[52]

Fish bioassay results indicate that sediments at the west end of the WSW's South Vessel Slip are acutely toxic. The greatest fish mortality toxicity test results correspond to the vessel slip location with the highest sediment contamination level. Several organic and inorganic priority pollutants were detected in fish samples from the vessel slips at WSW. PCB Aroclor 1248 was detected between 0.57 to 1.00 mg/Kg wet weight in all of the fish composites. Six heavy metals were also detected in fish samples from the slips. Two PAH compounds were detected only in fish samples from the South Vessel Slip.

The heavy metals detected in fish tissue from the WSW vessel slips is near the maximum concentration reported in whole fish data used in the national contaminant biomonitoring program. The chromium concentrations of white perch in the North Vessel Slip were higher than a non-contaminated site. The source of fish tissue contamination is believed to be from many areas along the Calumet because of the migratory nature of the fish. Fish using the South Vessel Slip are exposed to carcinogenic PAHs. Chronic health effects occur at low concentrations when PAHs are ingested by consuming contaminated fish.

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[48] U.S. Environmental Protection Agency, supra note 46.
[49] Coffey, supra note 1, at 38.
[50] U.S. Environmental Protection Agency, supra note 46.
[51] Id.
[52] Coffey, supra note 1, at 24, 42, 45, 47.

The relative level of aquatic worms in the South Vessel Slip is half that of the North Vessel Slip. Since the level of chemical contamination is greater in the South Slip, this indicates that the diminished benthos community is due to that higher chemical contamination.

B. USX Site & Vessel Slips

Included as Appendix 4 are nine maps indicating the levels of contamination in the soil, groundwater, and sediment at the USX site which were known at the time of the Phase I Environmental Assessment.[53]

The results of Phase I soil samples indicated the presence of low levels of total cyanide, Total Petroleum Hydrocarbons (TPHs), low levels of heavy metals, Volatile Organic Compounds (VOCs) and Semivolatile Organic Compounds (SVOC), and PCBs in soil located around PCB containing equipment.[54] The contaminants of concern at the USX site included: arsenic, antimony, beryllium, cadmium, lead, manganese, vanadium, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.[55] Groundwater at the USX site is mounded and flows radially toward the USX vessel slips, the Calumet River, and Lake Michigan.[56] Below is a list of some of the sources of potential contamination identified during the Phase I investigation:

- 118 above ground storage tanks (most of which had no secondary containment) which contained substances such as sulfuric acid, fire suppression materials, and boiler water treatment liquids; 10 tanks may have contained hazardous substances
- 2 petroleum product underground storage tank areas
- 70 areas where 55 gallon drums and small containers were located
- 13 areas where railroad ties were stockpiled
- 44 PCB transformers and 493 capacitors (some transformers may also have been buried in demolition rubble in two locations)
- layers of blast furnace and other slag fill

During the Phase II Environmental Assessment, sediments from the North Vessel Slip overflow and intake basins and the South Vessel Slip oil skimming chamber were sampled.[57] The North Vessel Slip overflow and intake basins are located in the west (inland) end of the North Slip. The sediment in the overflow and intake basins contained elevated levels of TPH, tetrachloroethane, and trichloroethane. The sediment sampled from the intake basin exceeded the U.S. EPA Toxicity Characteristic Leaching Procedure (TCLP) limit for lead and was

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[53] Waste Technology, Inc., Supplementary Report for South Works Environmental Report, Chicago, Illinois, Prepared for USX Realty Development, (Jan. 9, 1993).
[54] Waste Technology, Inc., Phase I Environmental Assessment of the Former South Works Plant, Chicago, Illinois, Prepared for USX Realty Development, (Feb. 1993).
[55] Id.
[56] Waste Technology, Inc., Phase III Environmental Assessment of the Former South Works Plant, Chicago, Illinois, Prepared for USX Realty Development, (Sept. 13, 1994), p. 24.
[57] Waste Technology, Inc., Phase II Environmental Assessment of the Former South Works Plant, Chicago, Illinois, Prepared for USX Realty Development, (Sept. 20, 1993).

therefore a RCRA characteristic hazardous waste.[58] When the sediment from the intake basin was removed, stockpiled, and retested, it was found to be an Illinois special waste and not a RCRA hazardous waste.[59] Sediment from the North Vessel Slip overflow basin was also removed and disposed of.[60]

The South Vessel Slip oil skimming chamber is located in the north (inland) end of the slip. The oil skimming chamber was part of the 006 Outfall system which discharged into the inland end of the South Slip. Sediment in the oil skimming chamber contained elevated levels of TPH, toluene, tetrachloroethane, and phenolics. The sediments in this chamber were removed and properly disposed of.

USX's Phase II Environmental Assessment did not include sampling of the sediment within the North or South Vessel Slips. In a June 14, 1994 letter to Larry Eastep of USX, IEPA required USX to sample sediment from the these two vessel slips. IEPA noted that the USX's risk assessment must address the potential risk to anglers who may fish these slips in the future. This sampling and analysis was important because the fact that portions of the site might be developed as residential property made it more probable that some residents would fish these slips.

USX therefore collected samples of sediment from the North and South Vessel Slips as part of its Phase III Environmental Assessment. Three sediment samples were collected from the North Slip (which encompasses approximately 12.5 acres). Two sediment samples were taken from the South Slip (which encompasses approximately 5.6 acres). Based on the size of the slips and the potential for contaminant hot spots to exist, Petitioners believe that the number of sediment samples taken from these slips is insufficient to properly characterize the potential hazard posed by the contaminated sediments to public health and the environment.

USX's analytical results of the sediment samples indicated that two metals, beryllium (maximum 2.1 mg/kg) and manganese (maximum 1,200 mg/kg), were present above residential risk-based concentrations (RBC) for soil established by U.S. EPA Region III. The commercial/industrial RBC level for beryllium is 0.67 mg/kg and the residential RCB level for manganese is 390 mg/kg. In its March, 1995 Preliminary Human Health Risk Assessment (HRA), USX indicated that these levels were consistent with recent regional background sediment and soil data. Because of this, the sediments in the North and South Vessel Slips were not evaluated in the final HRA. However, Table 2-1 of USX's Preliminary HRA indicates that the maximum level of beryllium in the vessel slip sediment does exceed the sediment quality concentration range for that contaminant in Lake Calumet and the Grand Calumet River (as determined by U.S. EPA Region V).

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[58] Resource Conservation and Recovery Act ("RCRA") TCLP limit for lead is 5 ppm. The sample of sediment from the intake basin contained a TCLP level of 17 ppm.
[59] Splitstone & Associates. Technical Support for Site-Specific Groundwater Remediation Objectives. Prepared for USX Realty Development South Works Site, Chicago, Illinois. (Mar. 8, 1996). Appendix A.
[60] Id.

Beryllium can be a harmful substance depending on the level and length of exposure.[61] The primary organs affected by beryllium are the lungs. Short-term exposure to high levels of soluble beryllium can lead to inflammation or reddening and swelling of the lungs (Acute Beryllium Disease). Long-term exposure to beryllium at much lower levels can cause Acute Beryllium Disease in sensitive individuals. Animal studies suggest that only small amounts of beryllium pass into the blood and other tissue after ingestion. The most efficient way for beryllium to enter the body is through inhalation.

[61] U.S. Environmental Protection Agency, supra note 46.

VII. IMPACT/POTENTIAL IMPACT ON PETITIONER(S)

A. Residential communities near boat slips

The USX and WSW sites are located in the midst of heavily populated residential communities. The western border of the USX site is a residential community traditionally called the Bush. The southwestern corner of the USX site is adjacent to South Chicago, one of fifty "community areas" that comprise the City of Chicago. The WSW site is directly across Torrence Avenue from the South Deering neighborhood and directly across the Calumet River from a residential community called the East Side.

B. Showing racial and economic make up of area around boat slips; statistical comparison

An analysis of 1990 census data reveals the large number of Chicago residents who live in proximity to the USX and WSW sites. Using LANDVIEW software developed by the U.S. Census Bureau, it is possible to tabulate the total number of people who live within two miles of one of these two sites. Using coordinates of 41.739718, -87.536471 (roughly centered between the two USX slips), LANDVIEW calculates that a total of 71,139 people live within a two mile radius of the USX site. Using coordinates of 41.699539, -87.555250 (roughly centered between the two WSW slips), LANDVIEW calculates 41,529 people live within a two mile radius of the WSW site.

By comparison to their counterparts in Cook County and Illinois as a whole, the communities surrounding the USX and WSW sites are poorer and are comprised of a much higher percentage of minority residents. LANDVIEW indicates that the median income in Cook County is $32,673, and that the median income in Illinois as a whole is $32,252.. By contrast, the median income for residents living within a two mile radius from the USX site is $25,432; for residents living within two miles of the WSW site, the median income figure is $28,529.. LANDVIEW also indicates that in Illinois as a whole, African Americans comprise 14.8% of the population. In the two mile radius from the USX site, LANDVIEW reveals that 65.4% of the population is African-American. The second largest category is Hispanic, at 27.2% of the total population. Similarly, in the two mile radius from the WSW site, 34.4% of the population is Hispanic and 29.3% of the population is African-American. Using LANDVIEW as a tool, it is possible to see that roughly 111,000 people, many of them minority and lower income, live within two miles of one of these two sites. Perhaps most importantly, LANDVIEW also reveals that over 24,000 of the people living within two miles of the USX site, and over 13,000 of the people living within two miles of the WSW site, are age 19 or younger.

C. Local residents and the Calumet River

The history of industrial development and waste discharges along the Calumet River have resulted in polluted surface waters, sediments, and negative impacts on local fish and wildlife communities.[62] Allowing contaminated sediments to remain in the USX and WSW site vessel slips is counterproductive to attempts to remediate the Calumet River. After conducting an

[62] Coffey, supra note 1, at 52.

Ecological Study and Impact Assessment of the WSW site, the U.S. Fish and Wildlife Service recommended remediation of the sediments in both WSW vessel slips to help protect the "important fish and wildlife resources that nest and migrate through this industrial region."[63] As IEPA noted in its June 14, 1994 letter to USX, "it is likely that a portion of the South Works site is to be developed as residential property, and it is therefore probable that some residents will fish these slips." These contaminated sediments contribute to contamination of fish found in the slips, which provides a pathway for contaminants to reach human receptors.

D. Impact/potential impact on Lake Michigan and significance (maps)

Lake Michigan is the major source of drinking water for the Chicago region. The 68th Street Raw Water Intake Crib used to supply this drinking water is located approximately 2 ½ miles east-northeast of the USX site.[64] The USX North Vessel Slip leads directly into Lake Michigan. The WSW site is about 4.76 kilometers downstream of the convergence of the Calumet River and Lake Michigan.[65]

There are three major rivers in the greater Lake Calumet region which exist in a complex watershed system with the Calumet Harbor and Lake Michigan: the Calumet, Little Calumet, and Grand Calumet rivers (see Appendix 7). The Calumet River joins Lake Michigan at the Calumet Harbor, which is near 91st Street.[66] The O'Brien Lock and Dam at 134th Street generally controls the direction of the Calumet River's flow. The flow direction is also influenced by the river and lake water levels and wind conditions.[67]

During periods of low flow and winds, with the O'Brien Lock and Dam on the Calumet River closed, it is possible for the Calumet River to flow toward Lake Michigan.[68] During periods of moderate or high flow after a rainstorm, with the locks closed, it is also possible for the Calumet River to flow into Lake Michigan.[69] When the locks are closed during rare flood flow conditions resulting from heavy rains, it is possible for the Calumet River to flow toward Lake Michigan.[70] The interaction between the Calumet River and its tributary lakes and streams during low flows cause them to function like a tidal basin of Lake Michigan.[71] As lake water pumps in and out of the Calumet River watershed system, it is possible for sediments from the river's bed to be transported to Lake Michigan during low flows.[72] Therefore, although in a

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[63] Coffey, supra note 1, at x.
[64] Splitstone & Associates, supra note 61, at 7.
[65] Coffey, supra note 1, at 49.
[66] Chicago Legal Clinic, Inc., Environmental Law Program, Just Beneath the Surface: Groundwater And The Future of Southeast Chicago's Neighborhoods, A Status Report. (Nov. 1995).
[67] Id.
[68] Nani G. Bhowmik and William P. Fitzpatrick, A Monitoring and Evaluation Plan for Surface Water Contaminants and Sediment Within the Greater Lake Calumet Area and Southwestern Shores of Lake Michigan. Illinois State Water Survey. Champaign, Illinois. Printed June 1988. Reprinted June 1992. p.14.
[69] Id.
[70] Id. at 17.
[71] Chicago Legal Clinic, Inc., Environmental Law Program, supra note 68.
[72] Id.

response to comments regarding its Phase II EA WSW indicated that the predominant flow of the Calumet River is south from Lake Michigan, there is evidence that the interaction between the Calumet River and Lake Michigan is not quite that simple.[73]

[73] Wisconsin Steel Works. Response to Comments on the Final Draft Phase II Remedial Investigation Work Plan and Final Draft Preliminary Risk Assessment for the Former Wisconsin Steel Works Site. (July 2, 1998), p. 8.

VIII. STATE & LOCAL AUTHORITIES CONTACTED

A. City of Chicago Department of Environment

On February 11, 1999 a multi-neighborhood coalition sent a memorandum to the City of Chicago Department of Environment regarding the Wisconsin Steel Works and USX Boat Slips Cleanup (see Appendix 8). This multi-neighborhood coalition had been meeting to monitor the condition, remediation, and future development of the Wisconsin Steel Works Site. The purpose of this memorandum was to formally request that the City of Chicago provide leadership regarding the cleanup of the WSW and USX vessel slips. The coalition informed the City of Chicago that the United States Army Corps of Engineers (US ACE) Chicago District is willing to include the WSW and USX slips in its project to dredge the Calumet River navigable channel during the summer of 2000.

The City of Chicago Department of Environment did not see the economic benefit of dredging the boat slips. To date, no action has been taken by the City of Chicago in response to this request. The Petitioners intend to forward a copy of this petition to the City of Chicago.

B. United States Army Corps of Engineers Chicago District

The US ACE Chicago District's current project to dredge the Calumet River navigable channel is scheduled to begin in April 2000 and conclude in October 2000. Any carry-over work will be done in 2001. According to the US ACE, based on research back to 1960, they have never dredged the boat slips at either the USX or WSW sites. The US ACE has indicated a willingness to work with individual owners to incorporate dredging of the vessel slips into their current dredging project. This would save mobilization and demobilization costs and allow the dredging of the vessel slips to be done at cost.

The Petitioners intend to forward a copy of this petition to the US ACE.

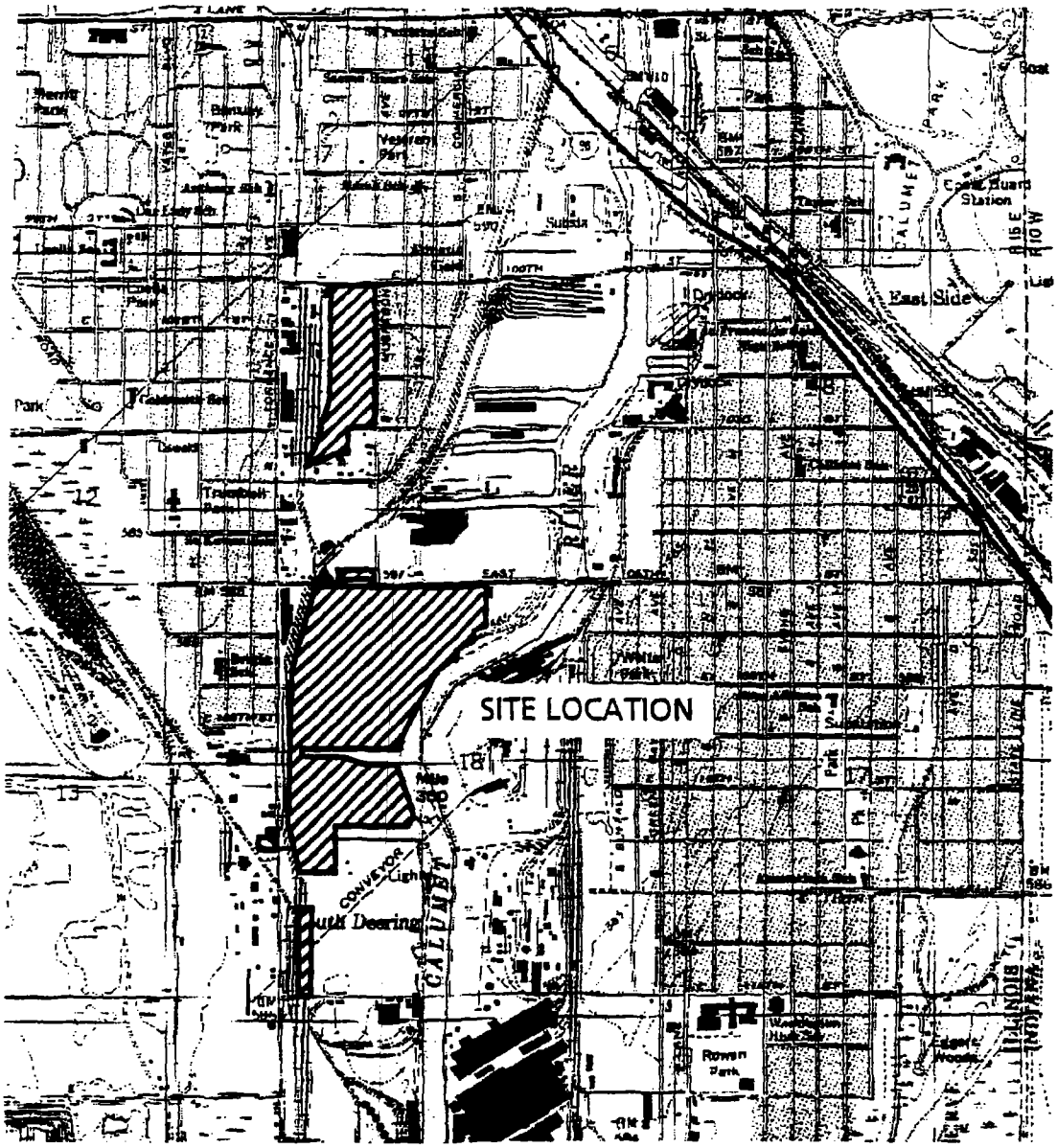
C. Illinois Environmental Protection Agency (IEPA)

Both the USX and WSW sites are being remediated pursuant to the Illinois Brownfield Voluntary Cleanup Program (or Illinois Pre-Notice Site Cleanup Program). Through this program IEPA provides facility owners/operators with guidance and oversight while environmental site assessments and remediation are performed. The focus of these efforts is to make the USX and WSW sites available for resale or redevelopment. However, the vessel slips were intentionally excluded from the remediation proposals for both sites. IEPA has not required Navistar (WSW site) or USX (South Works site) to remediate the contaminated sediments in these vessel slips.

IEPA was sent a copy of the February 11, 1999 memorandum sent by the multi-neighborhood coalition to the City of Chicago. To date, IEPA has not responded to this memorandum. A copy of this petition will be forwarded to IEPA.

APPENDIX 1:

MAPS OF THE FORMER WISCONSIN STEEL WORKS SITE



SOURCE: USGS 7.5 MIN. TOPOGRAPHIC MAP, LAKE CALUMET, ILLINOIS QUADRANGLE, 1991

NOTE: SITE BOUNDARIES ARE APPROXIMATE

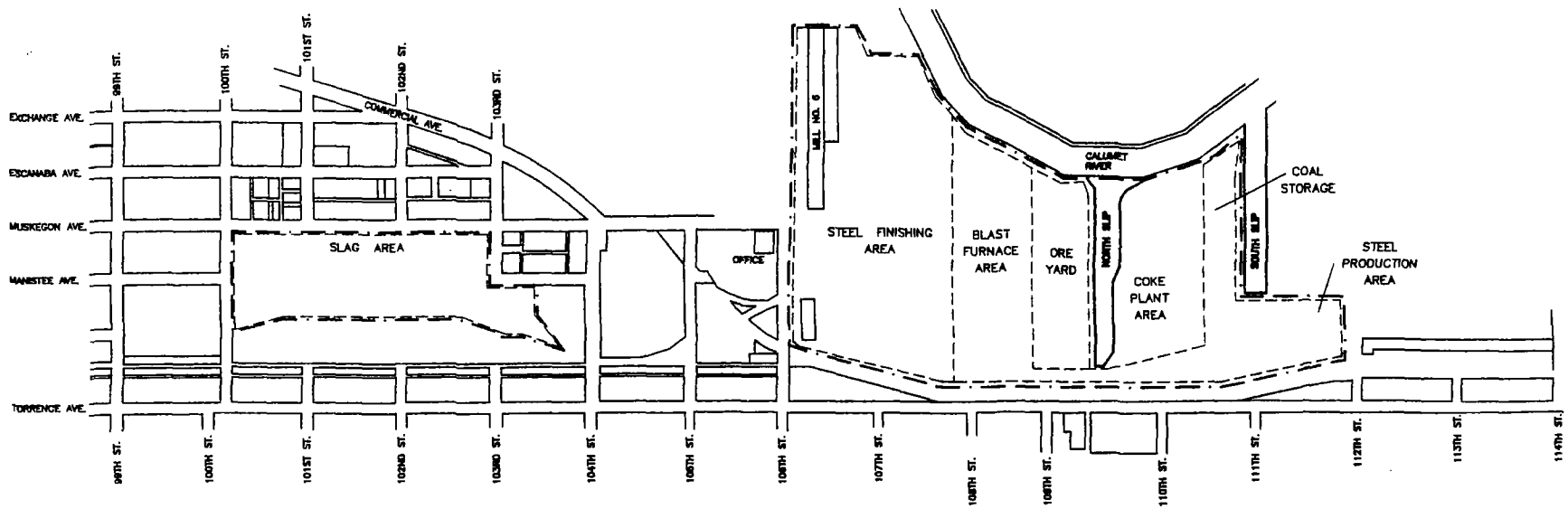
ARCADIS GERAGHTY & MILLER

35 East Wacker Drive
Suite 1000, Chicago, Illinois 60601
Tel: 312/263-6703 Fax: 312/263-7897

SITE LOCATION MAP
WISCONSIN STEEL WORKS SITE
CHICAGO, ILLINOIS

PROJECT NUMBER
CI0664.003

FIGURE NUMBER
1



NO.	DATE	REVISION DESCRIPTION	BY	CKD

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS GERAGHTY&MILLER

FORMER WISCONSIN STEEL WORKS SITE
CHICAGO, ILLINOIS

DRAWN: Shaner
DATE: October 6, 1999

SITE PLAN

PROJECT MANAGER: B WANDERLAAN
LEAD DESIGN PROF.: Shaner
PROJECT NUMBER: CI000664.0003

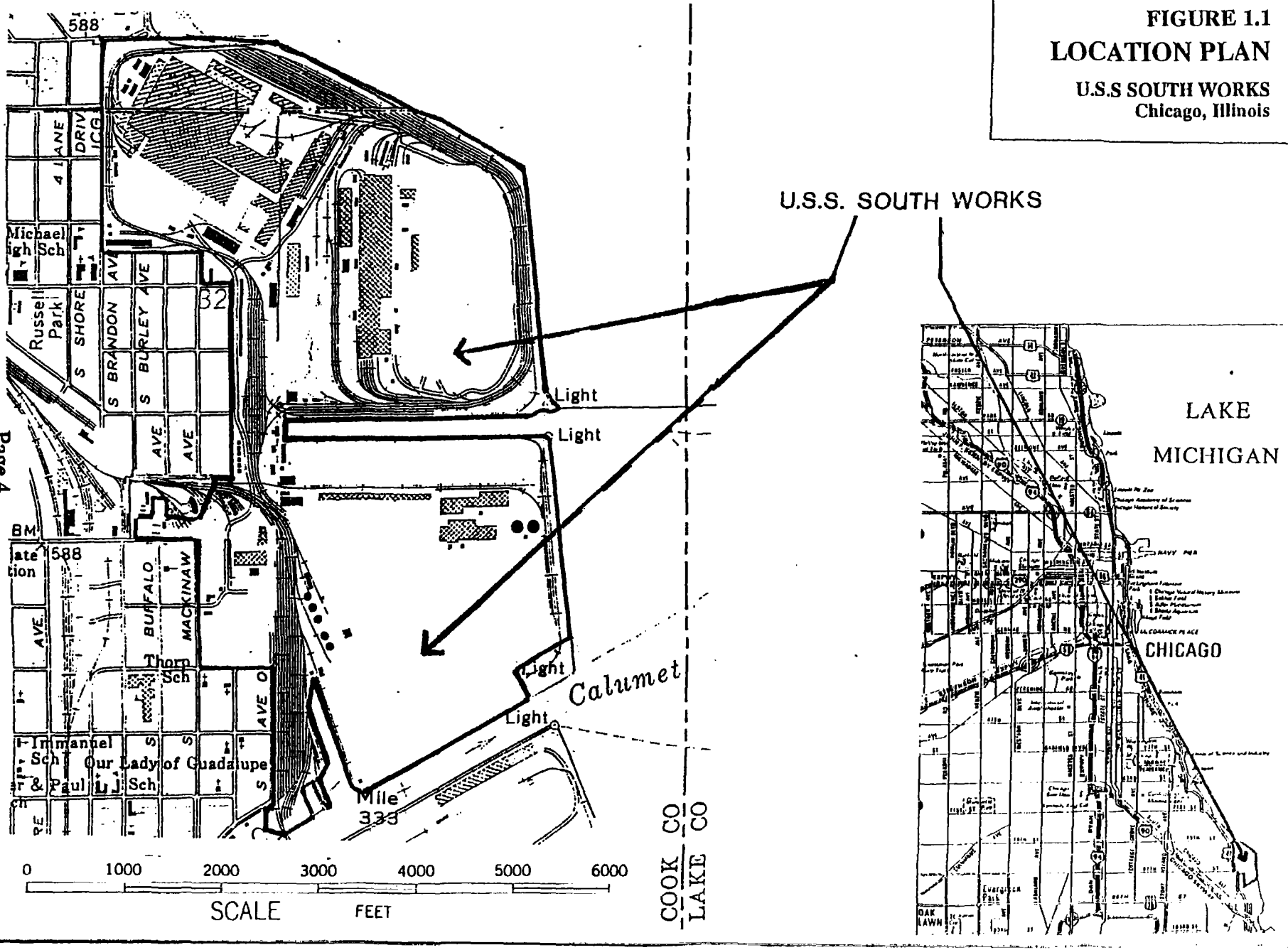
DEPARTMENT MANAGER: B WANDERLAAN
CHECKED: B CONN
FIGURE NUMBER: 2

Date: 10/8/99 Project No.: CI000664.0003/00014 Filename: 99CI0455.DWG Drwn By/Plot Scale: SGosner/1=500

APPENDIX 2:

MAPS OF THE FORMER U. S. STEEL SOUTH WORKS SITE

FIGURE 1.1
LOCATION PLAN
U.S.S SOUTH WORKS
Chicago, Illinois



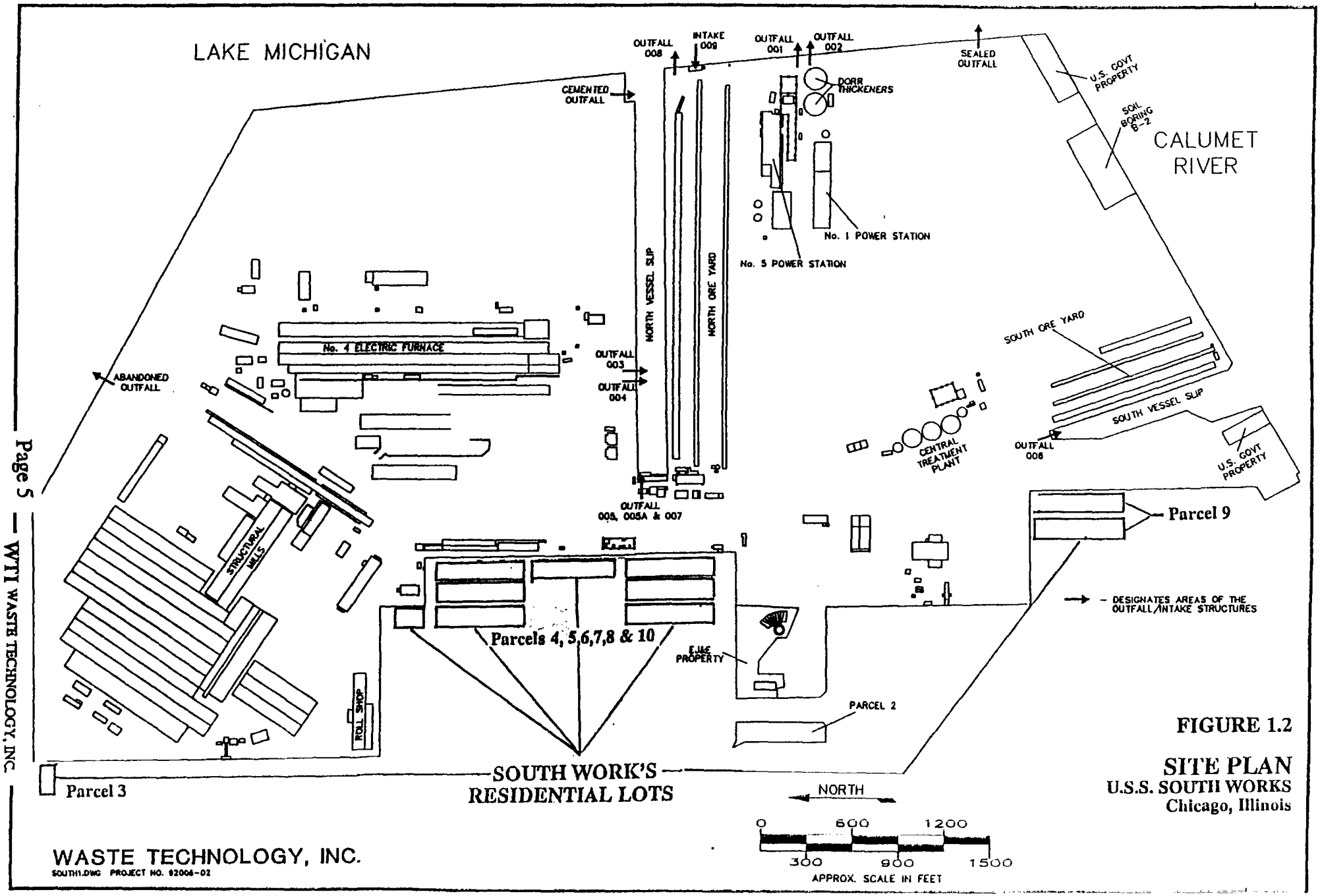


FIGURE 1.2

SITE PLAN
U.S.S. SOUTH WORKS
Chicago, Illinois

APPENDIX 3:

USX SOUTH WORKS SITE FACT SHEETS

USS FORMER SOUTH WORKS STEELMAKING FACILITY
ILLINOIS PRE-NOTICE SITE CLEANUP PROGRAM
FACT SHEET 1
SEPTEMBER 20, 1995

SITE HISTORY AND INTRODUCTION

In March 1880, the North Chicago Railway Mill Company began construction of a primary steel plant on 73 acres south of Chicago, Illinois, which included the South Vessel Slip. Steel production began on the site in June 1882. Since that time, the site has been owned and operated by the Illinois Steel Company, the Carnegie -Illinois Steel Company, and finally U.S. Steel Corporation, in 1901. U.S. Steel is a business unit of USX Corporation. United States Steel (U.S. Steel) produced alloy bars, billets, structural beams, rods, and plates at the South Works facility. Coke production was not a part of processes at the facility. Starting in 1982, decreased annual trade shipments resulted in the progressive shutdown of all but two major operations at the site. Final plant shutdown occurred in April 1992.

Anytime a property has been used for heavy industrial production, soil and groundwater at the site may contain chemical residuals from previous operations. It is now common practice to carry out an environmental investigation on such a site before selling it or using it for some other purpose. In the case of South Works, USX decided to perform an investigation under the oversight of the Illinois Environmental Protection Agency (IEPA).

The proximity of the site to Lake Michigan and the size of the property, nearly 600 acres, makes South Works an ideal property for redevelopment. USX has been working with the IEPA to evaluate environmental conditions at the site so that the sale and redevelopment of the property can proceed.

SITE DESCRIPTION

The South Works site (the Site), adjacent to Lake Michigan between East 79th and East 91st Street, occupies approximately 567 acres located 13 miles south of Downtown Chicago in Cook County, Illinois (see attached figure). The South Vessel Slip and the Calumet River form the southern boundary of the site; Lake Michigan forms the eastern and northern boundaries of the site; and a primarily residential area forms the western boundary of the site. A prominent feature at the site is the North Vessel Slip, a body of water previously used to transport raw materials to the former steel making facility, which segments the property into northern and southern portions.

CURRENT AND UPCOMING ACTIVITIES AT THE SITE

In December 1993, USX Corporation (USX) voluntarily entered the former U.S. Steel South Works facility into the Illinois Pre-Notice Site Cleanup Program (the Program). The Program provides the guidance, assistance, and oversight of the IEPA (the Agency) to owners and operators of industrial/commercial property in Illinois performing environmental site assessments and/or site remediation for the purpose of selling/redeveloping the property.

Successful participation in the Program requires the site owner or operator to: 1) submit a work plan for environmental investigation at the site, 2) allow for or otherwise arrange a site visit or other site evaluation by the Agency, 3) perform the environmental investigation as approved by the Agency, and 4) pay all laboratory fees incurred by the Agency for analytical testing performed at the site as well as any reasonable costs for Agency oversight.

To date, USX has voluntarily completed two initial environmental investigations and a third, more detailed investigation. In addition, USX has demolished most of the buildings housing former plant operations, removed sediments from various sewer lines, and removed underground storage tanks formerly used to store fuels at the site.

The environmental investigations performed on the site included sampling and laboratory analysis of soil and groundwater from plant property, and sediments from the North and South Vessel Slips. Preliminary evaluation of these results has not indicated the presence of any threats to human health or the environment from soil, groundwater, or sediments. Analytical results from sediment samples collected from the Slips were consistent with sediment samples collected from other areas in the Calumet Harbor by the U.S. Army Corps of Engineers.

Analytical results from soil sampled during the three environmental investigations have undergone a detailed evaluation process called risk assessment. Studies so far have not shown any risk from the site to the residential areas around the former plant. The risk assessment is meant to determine how much of each of the chemicals possibly left on the site from former operations can acceptably remain in the soil. The acceptable amount of each chemical depends on what use is planned for the particular area of the site where the chemical was found.

The site environmental investigations and the risk assessment are discussed in more detail in Fact Sheets 2 and 3 to be released in the near future.

SITE CONTACT LIST

As part of the effort to keep interested groups and individuals informed about the progress of this project, USX and the IEPA have begun developing a Contact List. Fact Sheets and other environmental updates regarding the South Works site will be mailed to all persons on the Contact List. An attempt was made to include on this list as many persons and groups as possible that have shown interest in the South

Works site. If you have received this Fact Sheet by mail, your name is currently on the Contact List. If you did not receive this Fact Sheet by mail or we have the wrong address, or if you have any doubts about whether you are on the list, please contact any of the people listed below by mail or by telephone.

FOR MORE INFORMATION

For more information about the South Works site, you may contact the following IEPA representative:

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Mark Britton
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3426 E. 89th Street
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(312) 933-3300

INFORMATION REPOSITORY

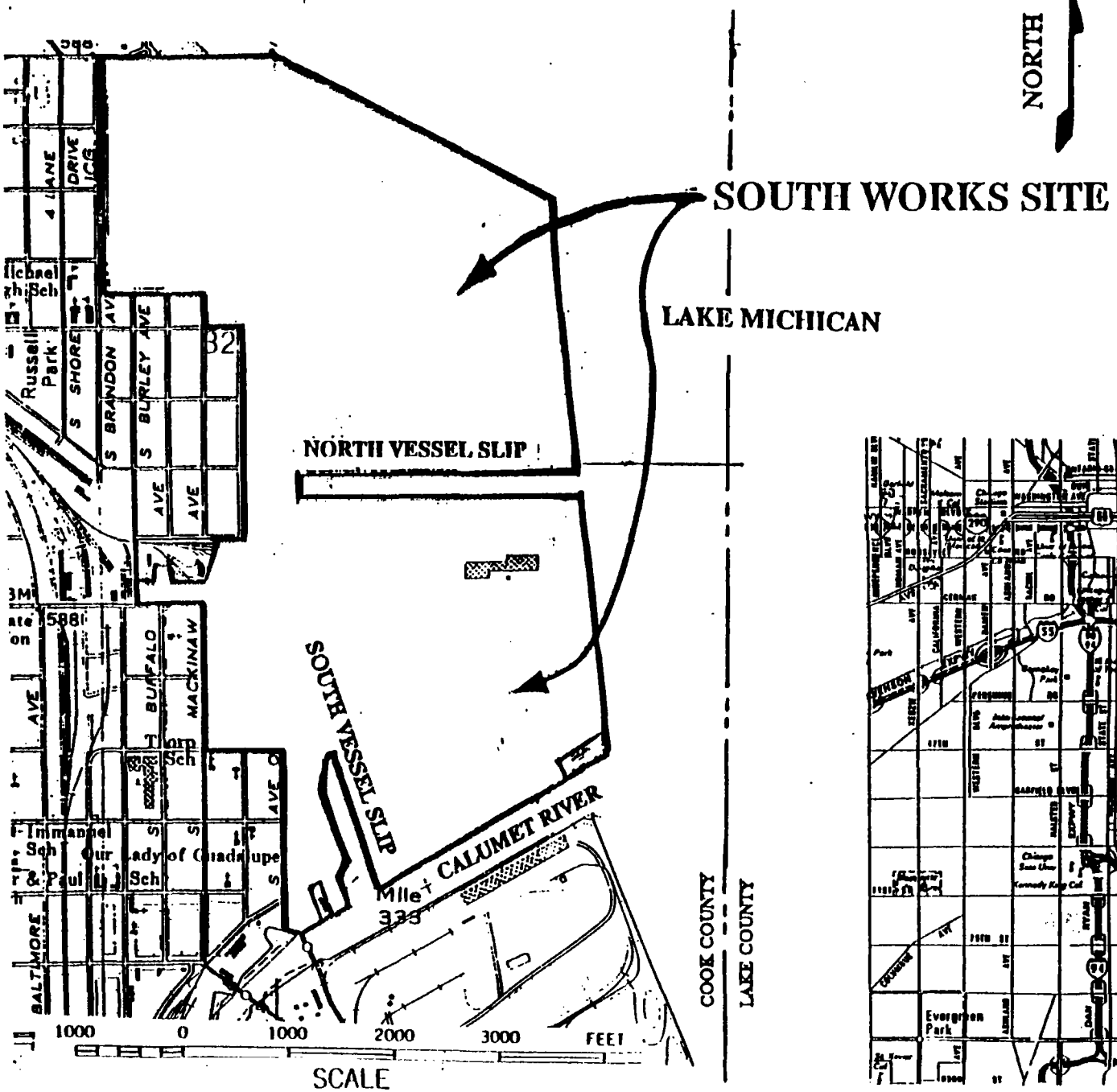
USX has set up an information repository in the Chicago Public Library, South Chicago Branch. The repository will contain site-related environmental documents, fact sheets, and other relevant technical documents. Detailed technical reports from the various studies that have been conducted at the site will be placed in the repository once the risk assessment, which interprets the results of these studies, has been completed and the IEPA has approved it.

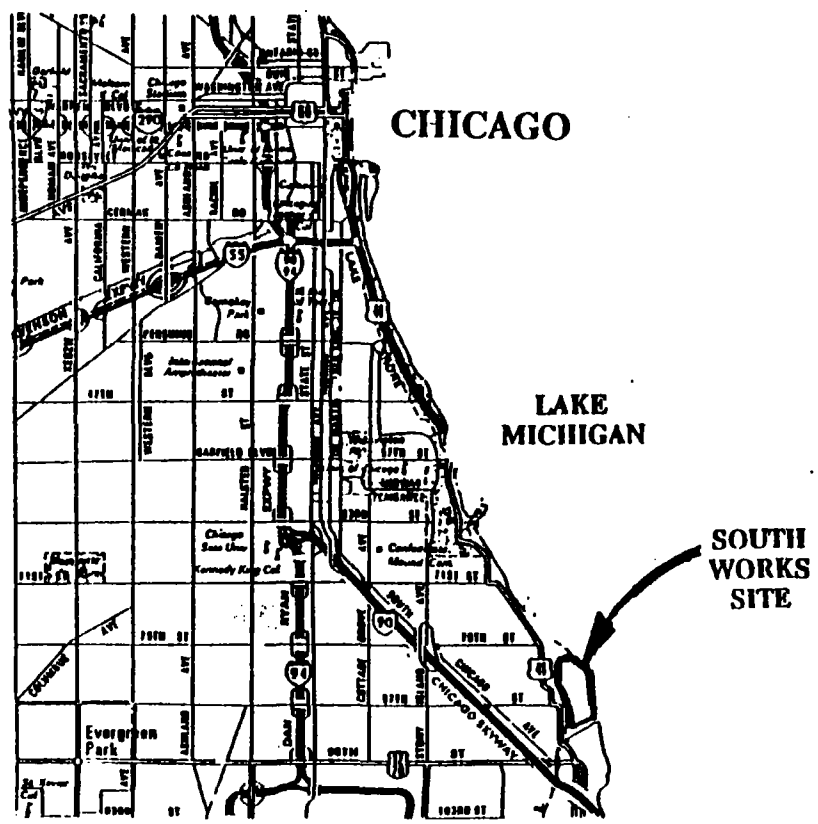
The repository will be located at:

Chicago Public Library
South Chicago Branch
9055 South Houston Avenue
Chicago, Illinois 60617
Contact Person: Gregory Carr
(312) 747-8065 or 747-0300

Library hours:
Monday through Friday - 9:00 AM to 8:00 PM
Saturday - 9:00 AM to 5:00 PM

FIGURE
LOCATION PLAN
SOUTH WORKS SITE
CHICAGO, ILLINOIS





WTI WASTE TECHNOLOGY, INC.

FORMER SOUTH WORKS STEELMAKING FACILITY
ILLINOIS PRE-NOTICE SITE CLEANUP PROGRAM
FACT SHEET 2 - SITE ENVIRONMENTAL INVESTIGATIONS
DECEMBER 4, 1995

INTRODUCTION

Fact Sheet 2 is the second in a series of fact sheets describing environmental activities that have been conducted at U.S. Steel Corporation's (U.S. Steel) former South Works steelmaking facility (South Works) in Chicago, Illinois. A brief history of steel production at the site and a general description of environmental activities conducted to date are described in Fact Sheet 1 of this series. Information is provided at the end of this document on how to obtain copies of all available fact sheets and how to get on the Contact List to receive information about the site.

SITE ENVIRONMENTAL INVESTIGATIONS

U.S. Steel began environmental investigations at South Works after it was closed in April 1992. Anytime a property has been used for heavy industrial production, soil and groundwater at the site may contain residual chemicals from past operations. The environmental investigations have been conducted to determine site conditions prior to redevelopment of the site for residential or industrial use. There have been three investigative phases which are listed below and described in more detail in the body of this Fact Sheet:

- **PHASE I INVESTIGATION:** Conducted between July 1992 and January 1993; presented in Waste Technology, Inc.'s (WTI's) February 1993 report: "Environmental Assessment of the Former South Works Plant".

- **PHASE II INVESTIGATION:** Conducted during March and April 1993; presented in WTI's September 1993 report: "Phase II Environmental Assessment of the Former South Works Plant".

- **PHASE III INVESTIGATION:** Conducted during June and July 1994; presented in WTI's September 1994 report: "Phase III Environmental Assessment of the Former South Works Plant".

The environmental investigations involved sampling of groundwater, surface and subsurface soils, and sediments from sewers, pits, storage tanks, and the vessel slips that were used to transport materials in and out of the South Works site. Groundwater was obtained from 20 monitoring wells strategically placed throughout the site. Most of these wells have been sampled more than once from the time that the Phase I investigation was begun (July 1992) to completion of the Phase III investigation (July 1994) to carefully document groundwater conditions at the site.

The Phase I and Phase II investigations were conducted in an attempt to identify areas of potential contamination normally expected to result from former steel plant operations. In the first two phases, sampling was limited to areas most likely to have been contaminated by past operations. In contrast, the third phase investigation used a "grid" system to sample soil throughout the site to determine a range of conditions, or "average" conditions found on the site as a whole.

Phase I Investigation - July 1992 to January 1993

The Phase I investigation included the following activities:

1. Completion of 26 soil borings, 17 of which were also used to install groundwater monitoring wells.

2. Collection and analysis of 17 groundwater samples from the monitoring wells, 60 soil samples, 13 sediment samples from sewers and manholes, and 20 samples tested for polychlorinated biphenyls (PCBs) (these included both soil samples and "wipe- samples" from concrete surfaces where transformers and capacitors that might have contained PCBs were previously located).

3. Inventory of underground storage tanks, above-ground storage tanks, drums, small containers, and railroad ties.

4. Verification of former locations and quantities of PCB-containing transformers and capacitors.

Samples were analyzed for a wide range of chemicals of concern in environmental investigations, including:

- **Heavy Metals:** for example, lead, arsenic, cadmium.
- **Volatile Organic Compounds (VOCs):** solvent-like chemicals that evaporate easily. Examples include: gasoline and dry-cleaning fluids, which consist primarily of VOCs.
- **Semi-Volatile Organic Compounds (SVOCs):** These heavier organic chemicals include components of fuel oil, diesel fuel, tars, asphalt, roofing materials, the products of incomplete burning, and many other items.

- **Total Petroleum Hydrocarbons (TPHs):** These include the chemicals expected to remain after leaks of petroleum fuels, such as gasoline, diesel fuel, and fuel oil.
- **pH:** This is a measure of how acidic (or its opposite, how alkaline) soil or water is, and pH levels can affect how readily chemicals can be released from soil to threaten the environment or public health.

In addition, some soil samples were analyzed for PCBs, total cyanide, or phenols, if those chemicals were suspected to have been present at those soil locations.

In Phase I, a total of 60 soil samples were collected and chemically analyzed. Low levels of total cyanide were found in 33 soil samples. TPHs were found in 42 soil samples; later resampling at these locations resulted in much lower TPH levels, presumably because of natural breakdown of these substances in soils near the ground surface. In addition, low levels of heavy metals, VOCs, and SVOCs were identified in various soil samples. Similar levels of chemicals were found in sediments, except the level of TPHs was considerably lower. PCBs were found in wipe-samples obtained from concrete surfaces and in soil samples obtained from beneath PCB-containing equipment. Where PCBs were found above the U.S. Environmental Protection Agency's (U.S. EPA) action levels, U.S. Steel has removed the concrete or soil at those locations for shipment to permitted off-site treatment or disposal facilities.

The State of Illinois has established groundwater standards for various chemicals determined to be safe for various uses of groundwater. For example, the "Class I" groundwater standards are protective of groundwater that can be used for drinking, bathing, or other domestic uses. Low levels of TPHs were found in the groundwater. Low levels of lead and toluene were detected in one monitoring well. No chemicals were detected above the Illinois Class I groundwater standard except lead, which was only found in one sample. However, seven samples were found with a pH greater than 9.0, which is the upper limit defined by the Illinois Class I groundwater standards. It is important to note that groundwater from beneath the South Works site is not used as a water source for residential or industrial use.

Phase II Investigation - March and April 1993

The Phase II investigation was designed to confirm groundwater results obtained during the Phase I investigation and to supplement Phase I information by taking soil samples at different locations on the site. The Phase II investigation consisted of the following activities:

1. Collection and analysis of 11 groundwater samples (from groundwater wells installed during Phase I), 12 soil samples from other locations on the site, and 19 sediment samples from various manholes and subsurface pits.

2. Excavation of three trenches in search of possible subsurface contamination and exploratory excavations for possible underground storage tanks. Also excavation of 33 test trenches near monitoring well MW-11 in search of reported SVOC contamination.

As with Phase I samples, Phase II samples were analyzed for heavy metals, VOCs, TPHs, and pH, but only selected soil samples were analyzed for SVOCs based on suspected contamination in these areas.

The only Phase II groundwater samples where TPHs were detected had TPH levels that were lower than had been detected in the Phase I sample from the well, suggesting that natural degradation of these substances has occurred. One groundwater monitoring well was sampled for lead and three groundwater monitoring wells were sampled for VOCs. However, during Phase II groundwater sampling, no chemicals were detected above their Illinois Class I groundwater standard.

As a general practice, environmental sampling results are first compared to U.S. EPA risk-based "screening criteria" to determine if they are of concern to human health and the environment. These criteria have been developed by U.S. EPA Region III, using especially protective contact assumptions, as a means for screening sites to determine which ones present minimal risk under residential or industrial uses. In addition, soil results are compared to "background" levels of chemicals found in soils throughout the United States as well as near the site.

Low levels of cyanide were found in several of the soil samples that were consistent with levels found during the Phase I investigation. Low levels of some of the heavy metals were also found. Comparison of the soil results to U.S. EPA soil "screening criteria" showed that the only chemicals found at levels above "screening criteria" in soil samples during Phase II were lead and cadmium.

Only one Phase II sediment sample had a chemical concentration exceeding the usual range of local and national background levels: that sample was high in cadmium. Five sediment samples from on-site sewers exceeded the U.S. EPA standard for dissolvable lead, so these sediments had to be collected and sent off-site to a permitted hazardous waste facility.

Phase III Investigation - June and July 1994

The Phase III investigation was designed to sample and analyze typical surface and subsurface soils on a grid system to determine site conditions as a whole. It also included installing three deep monitoring wells (MW-7D, MW-9D, and MW-14D) to obtain groundwater samples just above the first layer of bedrock under the site. All 20 groundwater monitoring wells were sampled and analyzed to begin establishing historical trends in groundwater conditions.

The Phase III investigation consisted of the following activities:

1. Installation of three deep groundwater monitoring wells (Depths: MW-7D at 45 feet, MW-9D at 65 feet, and MW-14D at 67 feet).

2. Collection and analysis of 20 groundwater samples (from both new and existing monitoring wells), 48 soil samples, and five sediment samples (from the North and South Vessel Slips).

Soil samples were analyzed for heavy metals, VOCs, SVOCs, pH, and PCBs. Phase III analyses also included soluble chloride and sulfate, nitrogen-ammonia, phenols, and sulfide. IEPA required analyses for a slightly different list of metals in Phase III ("Target Compound List" metals).

Six heavy metals and five SVOCs were found in some South Works soil sampling locations above the U.S. EPA risk-based "screening criteria" for residential use. All five vessel slip sediment samples were found to contain both beryllium and manganese above the risk-based "screening criteria" for residential use.

Groundwater was found to contain chloride above both the Class I and Class II standards in two monitoring wells. Phenolics and iron were detected in one monitoring well; sulfate was detected in four monitoring wells; and pH was detected in six monitoring wells above the Class I and Class II standards. Beryllium, cadmium, and lead exceeded Class I standards in only one montoring well each; manganese exceeded the Class I standard in six monitoring wells; and antimony exceeded the Class II standard in six monitoring wells.

Groundwater beneath the site is not used for drinking water now, nor will it be used in the future. Therefore, it is unlikely that the chemicals found in the groundwater will impact human health or the environment.

NEXT STEPS

Chemicals detected in site soil or sediments above the U.S. EPA risk-based "screening criteria" or typical background concentrations in soil and sediment throughout the United States were further evaluated using a more detailed process called human health risk assessment. The human health risk assessment (HRA) for the South Works site, which is described in Fact Sheet 3, has been completed and approved by the IEPA. The purpose of the HRA was to determine levels of chemicals in site soils that are safe for human health and the environment. Once these levels were established, actual levels of chemicals measured at the site were compared to these levels to determine if soils need to be removed.

U.S. Steel has applied to the IEPA for a groundwater management zone and alternative groundwater quality standards for groundwater beneath the South Works site in accordance with Illinois environmental regulations. Establishment of a groundwater management zone and alternative standards will be set in a framework that will continue to protect human health and the environment.

SITE CONTACT LIST

As part of the effort to keep interested groups and individuals informed about the progress of this project, U.S. Steel and IEPA have begun developing a Contact List. Fact Sheets and other updates regarding the South Works site will be mailed to all persons on the Contact List. An attempt was made to include on this list as many persons and groups as possible that have shown interest in the South Works site. If you did not receive this Fact Sheet by mail or we have the wrong address, or if you have any doubts about whether you are on the list, please contact any of the people listed below by mail or by telephone.

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FORMER SOUTH WORKS STEELMAKING FACILITY
ILLINOIS PRE-NOTICE SITE CLEANUP PROGRAM
FACT SHEET 3 - HUMAN HEALTH RISK ASSESSMENT
JANUARY 4, 1996

INTRODUCTION

Fact Sheet 3 is the third in a series of fact sheets describing environmental activities that have been conducted at U.S. Steel Corporation's (U.S. Steel) former South Works steelmaking facility (South Works) in Chicago, Illinois. A brief history of steel production at the site and a general description of environmental activities conducted to date are described in Fact Sheet 1. In Fact Sheet 2, the results of the soil, sediment and groundwater investigations performed at the site are described, and those results were used in the health risk assessment which is described briefly in this Fact Sheet. More information regarding the methodologies used in the risk assessment is provided in expanded Fact Sheet 3. Information is provided at the end of this document on how to obtain copies of all available fact sheets and how to get on the Contact List to receive information about this site.

HEALTH RISK ASSESSMENT

A **Health Risk Assessment (HRA)** (7/27/95) was prepared for the former U.S. Steel South Works site by ChemRisk, an environmental consulting firm specializing in risk assessment. The HRA was performed to assist in property redevelopment and determine any necessary remedial action or cleanup requirements. **Risk assessment** is a process used to evaluate the potential health risks associated with environmental exposure. It involves the calculation of **chemical exposure (or dose) levels** to future site users based on standardized U.S. Environmental Protection Agency (U.S. EPA) and Illinois EPA (IEPA) formulas and specific information about the site (chemical concentrations in soil, proposed future land use, etc.). The exposure levels that are calculated for the site are compared to levels that are considered protective of human health by regulatory (U.S. EPA and IEPA) criteria to determine whether, how much, and where site cleanup is necessary.

The objective of the South Works HRA was to determine site-specific remediation (cleanup) goals that will protect the health of people using the site in the future, based on the chemicals found at the site during the environmental investigations. **Remediation goals** are chemical concentrations which will not cause health problems among people who use the site in the future (*i.e.*, residents, workers, etc.). The concentrations of the chemicals measured in site soil during the environmental investigations were compared to the calculated remediation goals to determine if and where remediation would be necessary to protect future site users.

Certain uses of the site, such as residential use, require more protective cleanup standards for chemicals present in site soils. Other uses, such as commercial or industrial use, require less cleanup because workers would not be expected to contact the soil as frequently and at as high a rate as children living in homes on the site. These **exposure conditions** are considered in the HRA. Each potential future land use (i.e. residential) was evaluated as an **exposure scenario**.

Because no final plans had been made for the future development of the site, the HRA considered a wide range of possible future uses such as: residential, commercial/industrial, recreational, and construction during site redevelopment. For each potential use, based on the chemicals found in site soil, the HRA evaluated possible **exposure routes or "pathways"** by which people using the site in the future might be exposed to the soil. Examples of these pathways include breathing dust in the air, eating or smoking with dirty hands, accidentally or purposely eating the soil, or directly absorbing chemicals in the soil through the skin.

U.S. Steel submitted a Preliminary Human Health and Ecological Risk Assessment to the IEPA detailing the methods to be used to calculate remediation goals in the HRA (3/03/95). The IEPA reviewed and approved (3/29/95) the Preliminary Human Health and Ecological Risk Assessment, and it formed the basis for the HRA (submitted 7/27/95). The IEPA reviewed the HRA results and approved (9/18/95) the calculated remediation goals for each potential land use as being protective of human health and the environment. The IEPA-approved HRA is available to the interested public, along with other site-related documents, at the Information Repository located at the South Branch of the Chicago Library (See location at the end of this document).

METHODS

All of the chemicals that were detected in site soil were evaluated in the HRA. First, the highest measured concentrations of each chemical were compared with screening or "safe" levels developed by U.S. EPA Region 3. The **inorganic constituents** (minerals which occur naturally in soil from the erosion of rocks) were also compared to naturally occurring background concentrations. The **organic chemicals** are those containing carbon. Those chemicals which were measured at concentrations higher than the U.S. EPA screening levels and were present at concentrations greater than background are:

Organics	**Inorganics**
• Benzo(a)anthracene	• Antimony
• Benzo(a)pyrene	• Beryllium
• Benzo(b)fluoranthene	• Cadmium
• Dibenz(a,h)anthracene	• Lead
• Indeno(1,2,3-cd)pyrene	• Manganese

The HRA further studied the chemicals on this list using quantitative methods of assessing health risk that are approved by U.S. EPA and IEPA . First, the HRA estimated the potential exposure (dose) associated with living, working or playing at the site. Three possible future land uses

(residential, recreational, and industrial/commercial) were evaluated. In addition, worker exposure to chemicals during redevelopment construction activities was also evaluated. The residential scenario addresses the highest exposure possible, as it assumes that an individual spends almost all of his or her time at home on the site, and assumes the highest degree of exposure that is likely to occur.

Health-protective **remediation goals (cleanup levels)** were calculated for the residential, industrial/commercial, recreational, and construction worker scenarios for high (more protective) and average exposure levels. The U.S. EPA has provided guidance on estimating the amount of chemical an exposed person might contact. The methodology used in the HRA is based upon U.S. EPA and IEPA guidance, supporting scientific literature, and site-specific information (such as local weather patterns). For an example of how remediation goals are calculated, see Table 2 of expanded Fact Sheet 3.

Blood Lead Modeling

Lead is a unique chemical receiving much public attention because very low levels of lead in the blood can cause damage to the brains and nervous systems of young children. State-of-the-art mathematical models have been developed specifically for lead in an effort to understand how lead moves and acts in the body. The South Works HRA used three such mathematical models (two developed by the U.S. EPA and one by an independent University researcher) to evaluate the potential effects of lead from site soils. The HRA selected the results of the model that would allow the smallest amounts of lead (most-protective of health) to remain in site soils for each land use.

Regulatory Criteria

Following U.S. EPA guidance, for noncarcinogenic (not cancer-causing or promoting) chemicals, remediation goals were calculated for a **Hazard Index** of 1.0. A Hazard Index of 1.0 indicates that non-carcinogenic but potentially harmful chemicals are present at a level judged by U.S. EPA to be protective of human health, even for especially sensitive groups in the population, such as children. Also based on U.S. EPA guidance, for suspected carcinogens (possible cancer-causing or promoting chemicals), remediation goals were calculated for two levels of increased cancer risk: 1×10^{-5} (0.00001) (one increased case in a population of one hundred thousand) and 1×10^{-6} (0.000001) (one increased case in a population of one million). An increased cancer risk of 1×10^{-6} indicates that, on a strictly theoretical basis, one additional person in an exposed population containing one million people will develop cancer. For a 1×10^{-5} risk, one additional cancer would theoretically occur in a population of one hundred thousand people. For comparison, we can note that the actual lifetime cancer background rate in the U.S. is 250,000 cancer cases for a population containing one million people (one out of four, or 25%, or $250{,}000 \times 10^{-6}$). The U.S. EPA is required to use a risk range of 1×10^{-4} to 1×10^{-6} (0.0001 to 0.000001) when determining cleanup levels at Federal Superfund sites.

RESULTS

In the HRA, the remediation goals calculated for each chemical and exposure scenario were compared to the South Works soil sampling data. The HRA identified each sampling location where the measured level of a chemical exceeded its remediation goals. A summary of the number of locations where Remedial Goals were exceeded is provided below. A simplified example of how Remedial Goals are calculated is provided in Table 2 of expanded Fact Sheet 3.

Noncarcinogens:

With the exception of lead, all of the other noncarcinogenic chemicals detected at the site were already below the calculated remediation goals for all exposure scenarios. Therefore, all proposed uses of the site, including residential, could be carried out safely without cleanup of these chemicals. Three samples contained lead at levels that exceed the lead remedial goal protective of children living in homes on the site. In addition, the lead remediation goal for the construction worker scenario was exceeded in one location, where the maximum concentration of lead was measured. Site soil concentrations did not exceed the lead remediation goals for any other scenario.

Carcinogens:

The remediation goals calculated for beryllium at the 1×10^{-6} risk level are within the range of naturally occurring background concentrations of beryllium in United States soils (1 to 15 mg/kg). However, all measured levels of beryllium in soil at South Works are less than the remediation goals calculated for a 1×10^{-5} risk level, and, therefore, no cleanup of this element is necessary to bring site concentrations below cleanup goals. The concentrations of all other carcinogenic chemicals in South Works soil were already below their remediation goals for a 1×10^{-6} risk level. Therefore, all proposed uses of the site, including residential, could be carried out safely without cleanup of these chemicals.

CONCLUSIONS

The purpose of developing remediation goals for South Works was to help define "safe levels" of chemicals in soil for future site users after the site is redeveloped. A comparison of remediation goals to soil data from the environmental investigations indicates that lead should be addressed in three locations to protect future children, if these areas are to be developed for residential use. After remedial activities, the South Works site should not pose a health risk for any site uses, including industrial/commercial, recreational, and even residential.

NEXT STEPS

U.S. Steel is currently evaluating clean-up options to address the site soils where the RG for lead for the child residential scenario was exceeded. Soil excavation and off-site disposal is currently the preferred option. The Confirmatory Sampling Plan to assure that the soil has been cleaned-up to the health protective levels as determined in the HRA was submitted to IEPA for review and approval.

U.S. Steel has applied to the IEPA for a groundwater management zone and alternative groundwater quality standards for groundwater beneath the South Works site in accordance with Illinois environmental regulations. Establishment of a groundwater management zone and alternative standards will be set in a framework that will continue to protect human health and the environment.

SITE CONTACT LIST

As part of the effort to keep interested groups and individuals informed about the progress of this project, U.S. Steel and IEPA have begun developing a Contact List. Fact Sheets and other updates regarding the South Works site will be mailed to all persons on the Contact List. An attempt was made to include on this list as many persons and groups as possible that have shown interest in the South Works site. If you did not receive this Fact Sheet by mail or we have the wrong address, or if you have doubts about whether you are on the list, please contact any of the people listed below by mail or by telephone.

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COMMONLY ASKED QUESTIONS

What is the contamination at this property?

The risk assessment determined that lead was the only chemical in soil that could potentially pose a health risk at the site. The levels of lead in soil were above the "safe levels" calculated in the HRA in only three locations at the site. These three areas are being investigated further and measures (such as soil excavation and off-site disposal) will be taken to prevent possible exposure to the soil in those three areas before the site is redeveloped, eliminating the concern for people living, working, and playing on the site in the future.

How could I be exposed to contaminated soil?

People visiting the site or living, working, or playing on the site in the future may come into contact with chemicals whenever they contact the soil. People contacting the soil may be exposed to chemicals in soil by skin absorption, by eating soil, or by breathing dust. The chemicals in soil at South Works do not evaporate; therefore, inhaling chemical vapors is not a concern. Contact with chemicals in soil will be greatly limited in the future because clean top soil, landscaping, buildings and pavement will cover the site. The risk assessment determined that after exposure to lead in soil at the site is eliminated and the site is redeveloped, there will be no significant potential hazards associated with living, working, visiting, or playing on the site.

If I move to this property, could I develop cancer from contaminated soil?

The risk assessment determined that there should be no significantly increased cancer risk for site residents.

The likelihood of contracting cancer from environmental contaminants is described as a probability or chance. In the risk assessment performed on the site, the U.S. EPA and IEPA near zero risk range for contracting cancer of one-in-one-million to one-in-one-hundred thousand was used to determine the cleanup or safe levels. It is important to interpret this theoretical risk range correctly. U.S. Steel does not expect one person out of a population of one million to contract cancer due to living, working or visiting at the site. Rather, this estimated risk level is insignificant because of the conservative nature of the risk assessment process and the mathematical modeling used to derive the estimated risk. The background risk (probability) of an individual in the general U.S. population contracting cancer is one in four (25%) or 250,000 cases among a population of one million people.

If I live or work at this property, will my drinking water be affected by chemicals?

No, after redevelopment of the site, the City of Chicago will supply the water necessary for all industrial, commercial, or residential needs. Chicago's Public Water Supply is drawn from Lake Michigan, 2.3 miles from the South Works shoreline. Therefore, any residual chemicals present in soil at the South Works site will not impact the drinking water.

Can I eat the fish I catch from along the shore line of the property?

Yes, although one should consider that general historical pollution in Lake Michigan, which is not related to South Works, may have affected some fish and the Illinois Department of Public Health has issues consumption limitation advisories for several species of fish in Lake Michigan. The risk assessment determined that there is no additional risk caused from chemicals from South Works associated with eating fish caught from the South Works shore line.

What does the blood-lead modeling in the HRA mean?

Blood-lead modeling was used to determine the safe concentration of lead in soil that would not result in harmful levels of lead in blood among people who live, work, and visit the site in the future. These "safe" concentrations were used as the cleanup levels for lead.

For the South Works risk assessment, a physiologically-based pharmacokinetic model was used to evaluate lead exposures. This model has been reviewed and approved by other scientists and is widely used to evaluate lead exposures. The modeling efforts are a means to predict the concentration of lead in blood for people who may contact the site soil in the future. Remediation goals (or safe levels) for lead for the South Works site were determined using the O'Flaherty model. Dr. O'Flaherty, the author of the model, is a recognized expert in the field of lead kinetics (how lead behaves once inside the human body) and in blood lead modeling. The remediation goals were established using the U.S. EPA and Center for Disease Control (CDC) blood-lead criteria for protecting young children. Cleaning those areas of the site that exceed the remediation goals will assure that children will not be adversely impacted by lead at the site. In addition, two other modeling approaches used by the U.S. EPA were used and found to be consistent with the results of the O'Flaherty analysis.

FORMER SOUTH WORKS STEEL MAKING FACILITY
ILLINOIS PRE-NOTICE SITE CLEANUP PROGRAM
EXPANDED FACT SHEET 3 - HUMAN HEALTH RISK ASSESSMENT
JANUARY 24, 1996

INTRODUCTION

Fact Sheet 4 is the fourth in a series of fact sheets describing environmental activities that have been conducted at U.S. Steel Corporation's (U.S. Steel) former South Works steelmaking facility (South Works) in Chicago, Illinois. A brief history of steel production at the site and a general description of environmental activities conducted to date are described in Fact Sheet 1. Fact Sheet 2 describes the environmental investigations conducted at the site, and Fact Sheet 3 briefly describes, in basic terms, the health risk assessment performed to determine if clean-up is necessary at the South Works site. Expanded Fact Sheet 3 presents more detail on the methods used for conducting the South Works HRA. Information is provided at the end of this document on how to obtain copies of all available fact sheets and how to get on the Contact List to receive information about this site.

HEALTH RISK ASSESSMENT

A **Health Risk Assessment (HRA)** was prepared by ChemRisk, an environmental consulting firm, on behalf of USX Corporation for the former U.S. Steel South Works steel making site (South Works) located in Chicago, Illinois. The HRA was performed to facilitate property redevelopment and determine the possible need for remedial action or cleanup. Health risk assessment is a process developed by the **National Academy of Sciences (NAS)** in 1983 and used by environmental regulatory agencies, including the **Illinois and U.S. Environmental Protection Agencies (IEPA and U.S. EPA)**, to evaluate the potential health risks associated with environmental exposure. The HRA was based upon a Preliminary Human Health and Ecological Risk Assessment, submitted to IEPA on March 3, 1995 and approved on March 29, 1995 that described the approach and methodology to be used in the HRA. The South Works HRA, submitted to IEPA on July 27, 1995 and approved on September 18, 1995, evaluated the potential adverse human health effects associated with future land use conditions at South Works.

The objective of the South Works HRA was to determine **site-specific remediation goals (RGs)** that will protect the health of people using the site in the future, based on chemical residuals in soil at the site resulting from historical plant operations. RGs are chemical concentrations that will not

result in adverse health effects among people who frequent the site in the future (*i.e.*, residents, workers, etc.). The concentrations of the chemicals measured in site soil during the environmental investigations were compared to the calculated RGs to determine if and where remediation would be necessary to protect future site users.

The South Works HRA followed the format recommended by NAS, the U.S. EPA and the IEPA, and contains four sections: 1) Hazard Identification, 2) Dose-Response Assessment, 3) Exposure Assessment, and 4) Risk Characterization. The analysis presented in each of these sections of the HRA is described below.

HAZARD IDENTIFICATION

The Hazard Identification process identified the **environmental media (*i.e.*, soil, groundwater, etc.)** that have been impacted, and determined the chemicals of interest. As described in Fact Sheet 2, soil from the South Works site, sediments from the North and South Vessel Slips, and groundwater beneath the site were sampled in three phases of a site investigation, to characterize the extent of potential chemical impacts that might have occurred at the site.

The HRA did not evaluate the groundwater medium because groundwater beneath the South Works site is not currently used for drinking water or any other use. It is highly unlikely that a domestic use well would be installed in the City of Chicago, as municipal water is available.

CHEMICALS OF INTEREST IN SOIL

The HRA identified **Chemicals of Interest (COIs)** in soil to focus the assessment on only those chemicals that may pose a human health risk at the site. If the highest measured concentration of a chemical in site soil was greater than U.S. EPA Region 3's "risk-based concentrations" or safe levels for that chemical, it was identified as a preliminary COI for the site soil. The screening levels are concentrations of chemicals in soil, calculated by U.S. EPA Region 3, that should not cause a human health effect even among people living at the site in the future.

Organic Chemicals:

Organic chemicals are chemicals containing carbon. **Polynuclear aromatic hydrocarbon (PAH) compounds** were the organic chemicals detected in site soils at concentrations exceeding the screening levels. It is important to recognize that PAHs are also found naturally in the environment due to incomplete burning of organic material (*e.g.*, burning of wood, coal, gasoline, or oil) and are present in chargrilled meat, burnt toast, etc. Therefore, the general public is expected to contact PAHs at low levels on a regular basis during everyday activities.

Inorganic Chemicals:

Inorganic chemicals are minerals which typically occur naturally in soil as part of the earth's crust. Those inorganic chemicals that exceeded their screening levels were further evaluated using a statistical test to determine if the level of each chemical found in site soils was greater than regional background (naturally occurring) concentrations. The results of the tests indicated that at some locations, concentrations of antimony, beryllium, cadmium, lead, and manganese exceeded naturally occurring background concentrations. Therefore, these metals were retained as COIs in the HRA.

In summary, based upon the comparison with the U.S. EPA screening levels and the results of the statistical tests, the COIs for site soils are the following:

Organic COIs	Inorganic COIs
• Benzo(a)anthracene	• Antimony
• Benzo(a)pyrene	• Beryllium
• Benzo(b)fluoranthene	• Cadmium
• Dibenzo(a,h)anthracene	• Lead
• Indeno(1,2,3-cd)pyrene	• Manganese

Sediments

A total of five sediment samples were collected from the shipping vessel slips during the sampling investigations conducted at South Works. Only two chemicals, beryllium and manganese, exceeded U.S. EPA Region 3 soil screening levels. However, the concentrations of chemicals detected in the sediments are consistent with background sediment and soil data. Therefore, it was concluded that operations at South Works have not affected sediments, and no further evaluation of sediments was conducted.

DOSE RESPONSE ASSESSMENT

Dose-response assessments, determine the relationship between the amount of a chemical a person is exposed to (**dose**) and the potential for an adverse health effect (**response**). The dose is the quantity of the chemical that enters the body through all **exposure pathways**. All chemicals (sugar, salt, even water) are poisonous if a high enough dose is given. For some chemicals, the difference between a remedy and a poison is the dose administered (*e.g.*, aspirin). For all COIs at South Works, the relationship between dose and response had previously been quantitatively evaluated by the U.S. EPA. These U.S. EPA analyses (called chemical-specific toxicity criteria) were used in the HRA to establish health-protective levels of chemicals in soil.

HRAs are conducted to evaluate both **noncarcinogenic health effects** (*e.g.*, liver and kidney damage, nasal irritation, etc.) and **carcinogenic health effects (cancer)**. It is widely accepted that most noncarcinogenic effects of chemicals occur only after a specific **threshold dose** is exceeded. It should be noted that U.S. EPA toxicity criteria are generally derived from animal studies and are very conservative (*i.e.*, health-protective) because they are calculated by dividing the threshold dose by uncertainty or safety factors to ensure that even especially sensitive humans are protected.

The U.S. EPA does not have a toxicity criterion for lead. As a consequence, blood lead concentration modeling was performed in the HRA to evaluate the potential hazard resulting from exposure to lead in site soil and to derive RGs. The HRA used the physiological-based pharmacokinetic model developed by Dr. Ellen O'Flaherty of the University of Cincinnati, and compared the results to those from two other U.S. EPA modeling approaches. The results of the blood-lead modeling are discussed in the Exposure Assessment Section.

Only a few chemicals are known with certainty to cause cancer in humans, others are only believed to potentially cause cancer in humans based on studies of laboratory animals that receive large doses of chemicals under controlled conditions. The accepted regulatory approach assumes that potentially carcinogenic chemicals should be evaluated as if any dose (no matter how small) may potentially cause cancer. By making this very health-protective assumption, it is not technically feasible to determine the dose of a carcinogenic chemical that is associated with zero risk, except zero dose. Depending on the circumstances of exposure, when interpreting the theoretical risk of cancer, regulatory agencies typically consider a risk "insignificant" in the range from "one predicted cancer case in an exposed population of ten thousand" ($1x10^{-4}$), to "one predicted cancer case in an exposed population of a million" ($1x10^{-6}$). This risk range is considered to be insignificant because of the very health-protective methods used to estimate risk. To estimate theoretically plausible responses at low doses, such as that which would be plausible from environmental exposure, mathematical models that describe the expected quantitative relationship between dose and risk are used.

The U.S. EPA has issued toxicity criteria upon which an HRA can be conducted for carcinogens and noncarcinogens. Based on U.S. EPA toxicity criteria, the following COIs at the South Works site were evaluated for noncarcinogenic effects:

- antimony
- lead
- manganese

Cadmium was also evaluated for noncarcinogenic effects via the oral and dermal routes of exposure because it is considered carcinogenic via inhalation only.

COIs at the South Works site that were evaluated for potential carcinogenic effects, based on U.S. EPA classifications are:

- benzo(a)pyrene
- dibenzo(a,h)anthracene
- indeno(1,2,3-c,d)pyrene
- cadmium (inhalation only)
- benzo(a)anthracene
- benzo(b)fluoranthene
- beryllium

EXPOSURE ASSESSMENT

The Exposure Assessment estimates the potential **exposure (dose)** associated with persons living, working or playing at the site. First, potentially exposed populations are identified. Future plans for the South Works site may include residential developments, recreational uses, and industrial and commercial uses. Therefore, these three possible future land uses or **scenarios** (residential, recreational, and industrial/commercial) were addressed in the HRA. In addition, construction activities (i.e., sewer and underground utility work, etc.) will be necessary for site redevelopment. Therefore, the HRA also evaluated worker exposure to chemicals during construction activities.

The industrial/commercial scenario accounts for common activities associated with individuals working at the site five days per week. The **recreational scenario** accounts for frequent visits to facilities such as parks on the site, and the **construction worker scenario** accounts for exposure for an eight month construction season. The **residential scenario** addresses the highest exposure possible as it assumes that an individual spends almost all of his or her time at the site. The residential land use scenario also incorporates very health-protective exposure assumptions.
An analysis of the quantity of each COI that an individual might be exposed to is conducted using U.S. EPA-derived equations. Specifically, the rate of exposure to soil through pathways such as eating, breathing, and touching, and estimates of the duration and frequency of exposure (or contact), are estimated based upon U.S. EPA guidance and local population characteristics. **Ingestion (eating)** of soil is primarily a concern for children whose mouthing tendencies may result in the ingestion of larger soil quantities than adults, especially as a percentage of body weight. Adults may ingest soil through incidental hand-to-mouth contact (*e.g.* eating or smoking with dirty hands) or ingesting dirty food. Soil ingestion was evaluated for all land uses using U.S. EPA established guidelines which are designed to be health-protective. In addition, lab tests evaluated the amount of lead, beryllium and manganese that would leach from South Works soil in stomach acid and be accessible for absorption into the blood. The reason for this evaluation is that human and animal data have shown that the total amount of a metal in the soil is not available for absorption once ingested. The remediation goals, therefore, accounted for the percentage of the metals which could be absorbed into the bloodstream.

Future populations at the site might also be exposed to the COI when soil adheres to the skin. Exposure via dermal contact was addressed for each future land use. The HRA also studied the amount of beryllium and manganese that could be released from South Works soil in sweat on the skin and therefore be accessible for **dermal absorption** (absorption of chemicals through the skin into the blood stream).

The HRA did not evaluate the inhalation of chemical vapors, as the COIs identified from the South Works site do not evaporate at natural ambient temperatures or pressures. However, construction activities may generate dust. Therefore, **inhalation of airborne particulates (dust)** was evaluated for construction workers.

Exposure scenarios are developed by combining exposure pathways (*e.g.* ingesting soil) with the anticipated future land uses. For example, the residential scenario evaluates potential exposure to residents living on the site who may be exposed to chemicals in soil through incidental soil ingestion and dermal contact. Three possible land uses were evaluated in the South Works HRA: residential, recreational, and industrial/commercial. These scenarios were developed in conjunction with the IEPA to represent the most plausible future land use conditions at the South Works site. It is important to note that these scenarios assume exposure to certain soil depths. That is, the residential, recreational, and industrial/commercial scenarios were evaluated for the upper two feet of the soil column. This is a standard practice in risk assessment, as the populations evaluated in these scenarios rarely contact soil below two feet. In contrast, the construction scenario was addressed for the entire soil column (as deep as the COIs have been detected), because construction activities may involve digging to depths below two feet.

The exposure scenarios, pathways and **media** (surface soil, subsurface soil, sediments, etc.) evaluated in this HRA are summarized below:

	RESIDENTIAL SCENARIO	RECREATIONAL SCENARIO	INDUSTRIAL/COMMERCIAL SCENARIO	CONSTRUCTION SCENARIO
Exposure Pathways	Incidental Ingestion (surface soil) Dermal Contact (surface soil)	Incidental Ingestion (surface soil) Dermal Contact (surface soil)	Incidental Ingestion (surface soil) Dermal Contact (surface soil)	Incidental Ingestion (surface/subsurface soil) Dermal Contact (surface/subsurface soil) Inhalation of Suspended Particulates (surface/subsurface soil)

RGs were calculated for the residential, industrial/commercial, recreational, and construction worker scenarios for high and average exposure levels as defined by the **maximally exposed individual (MEI)** and the **most likely exposed individual (MLEI)**. The MEI is the single individual with the highest potential exposure in a given population, and the MLEI is the individual with the average exposure in a given population. The advantage of using the MEI and MLEI

scenarios in the exposure assessment is that the resulting range of RGs provide some measure of the health-protectiveness associated with the high end (MEI) exposure estimates.

The U.S. EPA has provided guidance on quantifying or numerically estimating the amount of chemical an exposed person may contact by defining **"exposure parameters"** which are input into the equations calculating dose. Exposure parameters are assumptions required by this process to describe the magnitude and duration of exposure. All of the exposure parameters used in the HRA are based upon U.S. EPA and IEPA guidance, scientific literature, and site-specific information (such as local weather patterns). The exposure parameters used in the HRA are presented in Table 1.

Organic chemicals are naturally degraded in the environment by the sun, bacteria, and natural chemical reactions in the soil. The HRA incorporated chemical-specific degradation measurements (*i.e.*, environmental half-lives) to evaluate the environmental degradation of the organic chemicals in soil for the calculation of RGs. **Environmental half-lives** are chemical-specific measures of the amount of time necessary for the chemical concentration to decrease by one half, and are calculated from field and laboratory studies.

REMEDIATION GOALS FOR LEAD

Lead is a unique chemical receiving much public attention because of the potential adverse health effects (*i.e.*, neurological impairment) that lead may cause in young children. Lead may adversely affect adult health as well. However, impacts to adults are seen at much higher levels than in children. Consequently, state-of-the-art mathematical models have been developed specifically for lead in an effort to understand how lead moves and acts in the body. The South Works HRA used the latest and most accurate scientific method to evaluate lead exposures, a physiological-based pharmacokinetic (PBPK) model developed by Dr. Ellen O'Flaherty of the University of Cincinnati. Dr. O'Flaherty is a recognized expert in the field of lead kinetics (how it behaves inside the human body) and in blood lead concentration modeling. This PBPK model for lead was deemed the most appropriate method to evaluate potential future exposures at South Works because the model is: 1) capable of evaluating both children and adults, 2) capable of evaluating both short- and long-term exposure durations, 3) proven to be accurate for a variety of exposure settings, and 4) published in the peer-reviewed scientific literature. Publication in the peer-reviewed scientific literature means that Dr. O'Flaherty's work has been critically reviewed and accepted by other (outside) scientists who are experts in the field. At the request of IEPA, two U.S. EPA modeling approaches were also presented in the HRA for comparison and to ensure that all modeling approaches were adequately investigated.

Each of the modeling approaches is discussed in detail in the HRA, and the RGs calculated for lead are presented below. The lowest RG (lowest soil concentration, thus most health-protective) for each scenario was used in the HRA.

CALCULATED RG'S FOR LEAD		
Scenario	**Remediation Goals for Soil (mg/kg or ppm)**	
	MEI Evaluation	**MLEI Evaluation**
Residential Scenario	932[a]	932[a]
Recreational Scenario	3,790[a]	3,790[a]
Industrial/Commercial Scenario	6,150[a]	40,900[b]
Long-term Construction Scenario	1,660[b]	6,640[b]
Short-term Construction Scenario	2,080[a]	18,650[a]

a Calculated using O'Flaherty model.
b Calculated using U.S. EPA model.

The resulting RG for protecting children in the residential scenario is consistent with the USEPA proposed soil cleanup guidance for lead, which states that cleanup levels of 500 to 1,000 mg/kg for residential settings should be health-protective. Additionally, the results of the USEPA modeling approaches were consistent with the results of the O'Flaherty analysis.

REGULATORY CRITERIA

Following U.S. EPA guidance, for **noncarcinogenic** (not cancer-causing or promoting) chemicals, RGs were calculated for a **Hazard Index** of 1.0. A Hazard Index of 1.0 indicates that non-carcinogenic but potentially harmful chemicals are present at a level judged by U.S. EPA to be protective of human health. Also based on U.S. EPA guidance, for suspected **carcinogens** (possible cancer-causing or promoting chemicals), RGs were calculated for two levels of increased cancer risk: 1×10^{-5} (0.00001) (theoretically, one additional case in a population of one hundred thousand) and 1×10^{-6} (0.000001) (theoretically, one additional case in a population of one million). An increased cancer risk of 1×10^{-6} indicates that, on a strictly theoretical basis, one additional person in an exposed population containing one million people will develop cancer. For a 1×10^{-5} risk, one additional excess cancer would theoretically occur in a population of one hundred thousand people. For comparison, we can note that the actual background rate of cancer in the U.S. is 250,000 cancer cases of a population containing one million people (one out of four, or 25%, or

250,000 x 10^{-6}). The U.S. EPA is required to use a risk range of $1x10^{-4}$ to $1x10^{-6}$ (0.0001 to 0.000001) when determining cleanup levels at Federal Superfund sites.

CALCULATING REMEDIATION GOALS

RGs are calculated by combining the information developed in the Dose-Response and Exposure Assessment sections using mathematical formulas. A simplified example of how RGs are calculated is provided in Table 2.

RISK CHARACTERIZATION

The Risk Characterization portion of the HRA compared the final RGs calculated for each COI and exposure scenario to the soil sampling data. For each exposure scenario, each sampling location where a COI concentration exceeded its RG was identified.

The RGs for residential, recreational and industrial/commercial land uses are presented on Tables 3 and 4 with the maximum concentration of chemicals in soil. The calculated RGs for the future residential, industrial/commercial, and recreational exposure scenarios are applicable to surface soils (0-2 feet) only because these populations are unlikely to come into contact with subsurface soils (more than 2 feet below the ground surface) on a regular basis. However, the RGs protective of potential exposures to construction workers (Tables 5 and 6) during redevelopment were applied to both surface and subsurface soils because these workers are more likely to contact subsurface soils during site redevelopment activities.

The results of a comparison between soil concentration data and the RGs are provided below. As this table shows, in evaluating noncancer effects, concentrations of lead in South Works soil exceeded calculated RGs in only 2 scenarios, the MEI for residential and the MEI for construction land uses. In evaluating the 10^{-5} cancer risk level, none of the concentrations of inorganics in South Works soil exceeded the RGs for any of the scenarios. At the 10^{-6} cancer risk level, the soil concentrations of beryllium and cadmiun exceed the calculated RGs for both the MEI and MLEI for the residential scenario and the MEI recreational and MEI construction scenarios.

The RGs calculated for beryllium at the 1 x 10^{-6} risk level (Table 4.0) for the residential MEI and MLEI scenarios and for the recreational and industrial/commercial MEI scenario are within the range of naturally occurring background concentrations of beryllium in United States Soils (1 to 15 mg/kg). All measured concentrations of beryllium in site soil are also within this range. All measured concentrations of beryllium in soil are less than the RG calculated at a 10^{-5} risk level.

Remediation Goals Protective of	Number of Sampling Locations Where Concentrations in Soil Exceed Calculated Remediation Goals, By Exposure Scenario							
	Residential		Recreational		Industrial/Commercial		Construction	
	MEI	MLEI	MEI	MLEI	MEI	MLEI	MEI	MLEI
10^{-6} Cancer Risk Level	23[a]	2[a]	8[a]	None	None	None	1[b]	None
10^{-5} Cancer Risk Level	None	None	None	None	None	None	None	None
Noncancer Effects	3[c]	None	None	None	None	None	1[d]	None

a Only the RG for beryllium at a 10^{-6} increased cancer risk was exceeded, at all but one sampling location (total number of sampling locations = 24.

b One sample exceeded the RG for cadmium at a 10^{-6} increased cancer risk level.

c The RG for lead calculated using the O'Flaherty model, which is protective of children in a residential setting, was exceeded at three sampling locations.

d The RG for lead, which is protective of a female construction worker of child-bearing age, was exceeded at one sampling location.

Except for lead, the RGs for all noncarcinogenic chemicals, for all exposure scenarios (MEI and MLEI) are higher than the concentrations of the noncarcinogenic chemicals in site soils, therefore, no cleanup of these chemicals is necessary. Three samples contained lead at levels that exceed the residential RG calculated for the MEI scenario (932 mg/kg). In addition, the lead RG for the MEI construction worker scenario was exceeded only where the maximum concentration of lead was measured. The sample location corresponding to the construction scenario was also one of the samples where soil concentrations exceeded the RG in the residential scenario. Site soil concentrations were lower than the lead RGs for any other scenario.

UNCERTAINTY ANALYSIS

There are many sources of uncertainty that may be identified for any risk characterization. These include, among others, uncertainty associated with the U.S. EPA toxicity criteria, uncertainty regarding the adequacy and representativeness of sampling, uncertainties associated with exposure parameters used in the exposure assessment and uncertainties associated with combining exposure parameters and toxicity criteria in the risk characterization. Some level of uncertainty is introduced into a risk assessment each time an assumption is relied upon to describe a variable parameter (*e.g.*, how much a person weighs). The selection of multiple health-protective assumptions in the exposure assessment generally results in an overestimation of potential health risks associated with exposure to specific chemical constituents. The primary areas of uncertainty for the South Works risk assessment are summarized below.

- The USEPA toxicity criteria incorporate several uncertainty or safety factors that result in health-protective risk estimates.

- Beryllium has never been shown to cause cancer in animals or humans by the oral route of exposure, yet using highly health-protective USEPA assumptions, beryllium was evaluated as a carcinogen in the HRA.

- Exposure parameters used in the risk calculations (Table 1) were designed to be health-protective and represent an individual who consistently and frequently contacts site soil.

- Health-protective exposure assumptions are compounded in this assessment such that the risk estimates, particularly for the MEI, are probably overstated.

CANCER RISK CRITERIA AND REGULATORY POLICY

Recent reviews of U.S. EPA decisions indicate that the theoretical cancer risks associated with currently enforced environmental regulations are in the vicinity of one cancer case in a population of one hundred thousand people (10^{-5}). The National Contingency Plan, which provides the legislative basis for the Superfund program, has set the acceptable risk range between 10^{-4} and 10^{-6}. Ultimately, the selection of an acceptable risk level is a policy decision in which both costs and benefits of anticipated courses of action should be thoroughly evaluated.

In the South Works HRA, the RGs for the carcinogenic COIs were calculated based upon a cancer risk range of 1×10^{-5} to 1×10^{-6}. The beryllium RGs for a 1×10^{-5} risk level were used to guide remedial efforts because: 1) RGs are within the range of naturally occurring background levels of beryllium in soil, 2) beryllium has never been shown to cause cancer in animals or humans following oral exposure, 3) the mobility and bioavailability of the metals in slag material on the site is very low, and 4) the RGs were calculated using very health-protective assumptions regarding the level, frequency and duration of exposure. For these reasons, the RGs calculated for beryllium, protective of a 1×10^{-5} increased cancer risk level, which were not exceeded by concentrations of beryllium in site soil, are considered protective of human health for South Works.

CONCLUSIONS

The purpose of developing RGs for South Works was to direct cleanup such that there would not be a significant health risk to future site users after the site is redeveloped. A comparison of RGs to soil data from the environmental assessments indicates that lead should be addressed in three locations to protect future children living in the homes on the site. The location of the maximum lead concentration should also be addressed to protect construction workers. In addition, the RGs will be compared to any new site data collected during plant demolition, sediment removal or sewer

remediation to ensure that site concentrations do not exceed the RGs. After remedial activities, the South Works site will not pose a hazard to people living, working or playing on the site in the future.

NEXT STEPS

U.S. Steel is currently evaluating clean-up options to address the site soils where the lead RG for children in the residential scenario was exceeded. Soil excavation and off-site disposal is currently the preferred option. The Confirmatory Sampling Plan, which was developed to assure that the soil has been cleaned-up to health-protective levels as determined in the HRA, was submitted to IEPA for review and was approved on .

U.S. Steel has applied to the IEPA for a groundwater management zone and alternative groundwater quality standards for groundwater beneath the South Works site, in accordance with Illinois environmental regulations. Establishment of a groundwater management zone and alternative standards will be set in a framework that will continue to protect human health and the environment.

SITE CONTACT LIST

As part of the effort to keep interested groups and individuals informed about the progress of this project, U.S. Steel and IEPA have begun developing a Contact List. Fact Sheets and other updates regarding the South Works site will be mailed to all persons on the Contact List. An attempt was made to include on this list as many persons and groups as possible that have shown interest in the South Works site. If you did not receive this Fact Sheet by mail or we have the wrong address, or if you have doubts about whether you are on the list, please contact any of the people listed below by mail or by telephone.

FOR MORE INFORMATION

For more information about the South Works site, you may contact the following IEPA representatives:

Stan Black
Illinois Environmental Protection Agency
Office of Community Relations
2200 Churchill Road, P.O. Box 19276
Springfield, IL 62794-9276
(217) 785-1427

Mark Britton
Illinois Environmental Protection Agency
Office of Community Relations
2200 Churchill Road, P.O. Box 19276
Springfield, IL 62794-9276
(217) 524-7342

or the following U.S. Steel representatives:

Thomas Ferrall
USX Corporation
Public Affairs
600 Grant Street
Pittsburgh, PA 15219-2749
(412) 433-6899

John Zaborske
USX Realty Development
3426 East 89th Street
Chicago, IL 60617-3499
(312) 933-3300

INFORMATION REPOSITORY

U.S. Steel has set up an information repository in the Chicago Public Library, South Chicago Branch. The repository will contain site-related environmental documents and other relevant technical documents including detailed technical reports from the various studies that have been conducted at the site (Phase I, II, and III Environmental Site Assessment reports as well as the IEPA-approved Human Health Risk Assessment for the South Works site). Interested citizens are invited to review these documents, although they must be viewed at the library and cannot be checked out for home use. However, additional copies of this fact sheet and all others regarding the site will be available at the Repository to be taken home for permanent reference.

The repository is located at:

Chicago Public Library
South Chicago Branch
9055 South Houston Avenue
Chicago, IL 60617
Contact Person: Gregory Carr
(312) 747-8065 or 747-0300

Library Hours:
Monday through Friday - 9:00 A.M. to 8:00 P.M.
Saturday - 9:00 A.M. to 5:00 P.M.

TABLE 1
EXPOSURE PARAMETERS AND DEFINITIONS

EXPOSURE PARAMETERS		DEFINITION
Exposure Duration		**Years Spent At The Site**
Residential	MEI MLEI	30 Years 9 Years
Industrial/Commercial	MEI MLEI	25 Years 4.5 Years
Recreational	MEI MLEI	30 Years (based on a nearby resident) 9 Years
Construction	MEI MLEI	1 Year 1 Year
Exposure Frequency [a]		**Days Per Year Spent at The Site**
Residential		350 days (7 days per week X 50 weeks per year)
Industrial/Commercial		250 days (5 days per week X 50 weeks per year)
Recreational		104 days (2 days per week X 52 weeks per year)
Construction		160 days (5 days per week X 8 months per year)
Meteorological Factor		**Fraction of Year When Exposure Can Occur Due to Good Whether Conditions (temperatures greater than 32°F and Less than 0.1 Inches of Rain for MEI or 0.01 inches for MLEI)**
Residential, Recreational & Industrial/Commercial Construction	MEI MLEI	62% 52% 100% (assumes construction worker work through bad weather)
Averaging Time		**Time Period Over Which Exposure is Average**
Carcinogens[b]		70 years (average lifetime)
Noncarcinogens		Is equal to exposure duration
Residential	MEI MLEI	30 Years 9 Years
Recreational	MEI MLEI	30 Years 9 Years
Industrial/Commercial	MEI MLEI	25 Years 4.5 Years
Construction	MEI MLEI	1 Year 1 Year

Daily Soil Ingestion Rate		Mass of Soil Incidentally Ingested Per Day
Residential and Recreational Children	MEI MLEI	200 mg/day 50 mg/day
Residential, Recreational & Industrial/Commercial Adults	MEI MLEI	50 mg/day 10 mg/day
Construction Workers Adults	MEI MLEI	200 mg/day 50 mg/day
Oral Bioavailability[b]		**Fraction of Chemical Released From Soil in Gastrointestinal Tract and Available for Absorption**
	PAHs	50%
	Manganese[c]	23.5%
	Beryllium[c]	25.6%
	Lead[c]	48.8%
	Cadmium	100%
	Antimony	100%
Inhalation Rate[d]		**Volume of Air Inhaled**
Construction[a]		20 m^3/8 hour work day
Soil to Air Suspension Factor[d]		**Amount of Soil as Dust in Air**
Construction	MEI MLEI	5 mg/m^3 50 mg/m^3
Skin Surface Area[e]		**Surface Area of Skin Exposed to Soil**
Residential & Recreational Children		2,195 cm^2 (area of arms, hands and head)
Residential, Recreational & Industrial/Commercial Adults[l]		2,836 cm^2 (hands and forearms)
Construction Adults[a]		4,300 cm^2 (head, hands & fore arms of males)
Soil to Skin Adherence Factor[e]		**Amount of Soil that Sticks to the Skin**
Residential, Recreational, Industrial/Commercial Children & Adults	MEI MLEI	1.0 mg/cm^2 0.2 mg/cm^2
Construction Adults[a]		1.5 mg/cm^3 (highest reported soil adherence rate)

TABLE 1 (Cont.)
EXPOSURE PARAMETERS AND DEFINITIONS

Dermal Bioavailability[b, e]	Amount of Inorganic Released From Soil Matrix in Sweat on the Skin and Systemically Absorbed
Antimony	1 % (Default Value)
Cadmium	1 % (Default Value)
Beryllium	0.0034 %
Manganese	0.049%

a Factors are the same for MEI and MLEI.
b Factors are the same for all scenarios.
c Based on a site-specific study of the leachability of these metals in stomach conditions or in simulated sweat.
d Only construction worker scenario was evaluated for inhalation of particulates.
e Only inorganics evaluated for dermal pathway per IEPA guidance. Dermal exposure to PAHs evaluated by doubling the soil ingestion dose.

TABLE 2
SIMPLE EXAMPLE OF HOW REMEDIAL GOALS ARE CALCULATED IN HRA'S

Questions To Be Answered	Risk Assessment Procedure	Simplified Example
	Step 1	
What is the **acceptable chemical** dose?	Identify acceptable dose from USEPA guidance (RfD, SF)	RfD[a] = 0.05 mg chemical/kg body weight (BW)-day $Chemical_x$
	Step 2	
How can future populations be exposed?	Identify all exposure pathways & scenarios	For residential land use, children playing in soil and incidentally ingesting soil
	Step 3	
How much exposure is likely to occur?	Quantify exposure to soil	Upper bound estimate of child soil ingestion rate = 200 mg soil/day, for 350 days/year, & child weighs 15 kg (33 lbs.)
	Step 4	
What is acceptable soil level?	Calculate RG 1) Calculate soil dose 2) Use **acceptable chemical** dose to calculate **acceptable soil** concentrations	<u>Rearrange Equation:</u> $C_{soil} = \frac{Chemical\ Dose}{Soil\ Dose}$ Solve for **acceptable soil** concentration (RG) $RG = \frac{Acceptable\ Chemical\ Dose}{Soil\ Dose}$ $RG = \frac{RfD}{Soil\ Dose}$ $RG = \frac{0.05\ mg\ chemical\ /\ kg\ BW\ -\ day}{4{,}700\ mg\ soil\ /\ kg\ BW\ -\ day}$ $RG = 0.000011\ mg\ chemical\ /\ mg\ soil$ $RG = 11\ mg\ chemical\ /\ kg^{c}\ of\ soil\ (ppm)$

a RfD = Reference Dose or Acceptable Dose.
b C_{soil} = Concentration of a $Chemical_x$ in soil.
c 100,000 mg = 1 kg.

TABLE 3
REMEDIATION GOALS BASED ON A 1 x 10^{-5} CANCER RISK AND HAZARD INDEX OF ONE FOR THE RESIDENTIAL, RECREATIONAL, AND INDUSTRIAL/COMMERCIAL SCENARIOS (mg/kg)

Chemical	Maximum Surface Soil Concentration (mg/kg)	Residential Scenario				Recreational Scenario				Industrial/Commercial Scenario	
		MEI		MLEI		MEI		MLEI		MEI	MLEI
		Adult	Child	Adult	Child	Adult	Child	Adult	Child		
Antimony	7.6	601	46	1,960	158	2,020	153	12,100	745	841	5,020
Beryllium	9.3	11[a]		62[a]		37[a]		210[a]		83.3[b]	2,760[b]
Cadmium	89.1	1,500	114	4,890	394	5,060	383	30,200	1,860	2,100	12,500
Lead	3,200	NC[c]	932	NC[c]	932	NC[c]	3,790	NC[c]	3,790	6,150	72,800
Manganese	29,900	$>10^6$	75,000	$>10^6$	355,000	$>10^6$	253,000	$>10^6$	$>10^6$	$>10^6$	$>10^6$
Benzo(a)anthracene	1.3	185[a]		1,050[a]		624[a]		3,530[a]		1,180[b]	39,000[b]
Benzo(a)pyrene	1.7	23.8[a]		135[a]		80[a]		453[a]		151[b]	5,000[b]
Benzo(b)fluoranthene	1.6	207[a]		1,170[a]		695[a]		3,930[a]		1,310[b]	43,400[b]
Dibenz(a,h)anthracene	0.57	13.4[a]		75.9[a]		45.1[a]		255[a]		85.2[b]	2,820[b]
Indeno(1,2,3-cd)pyrene	1.3	173[a]		977[a]		581[a]		3,290[a]		1,100[b]	36,300[b]

a Value is for adult and child exposure combined based on carcinogenic effects.
b Based on carcinogenic effects for adults only.
c RG for child exposure is also protective for adult exposures.
NC Not Calculated

TABLE 4
REMEDIATION GOALS BASED ON A 1 x 10^{-6} CANCER RISK AND HAZARD INDEX OF ONE FOR THE RESIDENTIAL, RECREATIONAL, AND INDUSTRIAL/COMMERCIAL SCENARIOS
(mg/kg)

Chemical	Maximum Surface Soil Concentration (mg/kg)	Residential Scenario				Recreational Scenario				Industrial/Commercial Scenario	
		MEI		MLEI		MEI		MLEI			
		Adult	Child	Adult	Child	Adult	Child	Adult	Child	MEI	MLEI
Antimony	7.6	601	46	1,960	158	2,020	153	12,100	745	841	5,020
Beryllium	9.3	1.1[a]		6.2[a]		3.7[a]		21[a]		8.3[b]	276[b]
Cadmium	89.1	1,500	114	4,890	394	5,060	383	30,200	1,860	2,100	12,500
Lead	3,200	NC[c]	932	NC[c]	932	NC[c]	3,790	NC[c]	3,790	6,150	72,800
Manganese	29,900	$>10^6$	75,000	$>10^6$	355,000	$>10^6$	253,000	$>10^6$	$>10^6$	$>10^6$	$>10^6$
Benzo(a)anthracene	1.3	18.5[a]		105[a]		62.4[a]		353[a]		118[b]	3900[b]
Benzo(a)pyrene	1.7	2.38[a]		13.5[a]		8.0[a]		45.3[a]		15.1[b]	500[b]
Benzo(b)fluoranthene	1.6	20.7[a]		117[a]		69.5[a]		393[a]		131[b]	4340[b]
Dibenz(a,h)anthracene	0.57	13.4[a]		7.59[a]		4.51[a]		25.5[a]		8.5[b]	282[b]
Indeno(1,2,3-cd)pyrene	1.3	17.3[a]		97.7[a]		58.1[a]		329[a]		110[b]	3630[b]

a Value is for adult and child exposure combined based on carcinogenic effects.
b Based on carcinogenic effects for adults only.
c RG for child exposure is also protective for adult exposures.
NC Not Calculated

TABLE 5
REMEDIATION GOALS BASED ON A 1 x 10^{-5} CANCER RISK
AND A HAZARD INDEX OF ONE
FOR THE CONSTRUCTION SCENARIO
(mg/kg)

Chemical	Maximum Soil Concentration[b] (mg/kg)	Construction Scenario		Short-Term Construction Scenario	
		MEI	MLEI	MEI	MLEI
Antimony	64.7	241	558	NC	NC
Beryllium	9.8	224[a]	1,900[a]	NC	NC
Cadmium	89.1	534	1,390	NC	NC
Lead	3,200	3,750	15,600	2,080	18,650
Manganese	35,900	443,000	$>10^6$	NC	NC
Benzo(a)anthracene	1.7	805[a]	3,650[a]	NC	NC
Benzo(a)pyrene	1.7	84.6[a]	383[a]	NC	NC
Benzo(b)fluoranthene	1.6	821[a]	3,720[a]	NC	NC
Dibenz(a,h)anthracene	0.57	76.7[a]	347[a]	NC	NC
Indeno(1,2,3-cd)pyrene	1.3	796[a]	360[a]	NC	NC

a Based on carcinogenic effects for adults only.
b Soil concentrations for both surface and subsurface soils.
NC Not Calculated

TABLE 6
REMEDIATION GOALS BASED ON A 1 x 10^{-6} CANCER RISK
AND A HAZARD INDEX OF ONE
FOR THE CONSTRUCTION SCENARIO
(mg/kg)

Chemical	Maximum Soil Concentration[b] (mg/kg)	Construction Scenario		Short-Term Construction Scenario	
		MEI	MLEI	MEI	MLEI
Antimony	64.7	241	558	NC	NC
Beryllium	9.8	22.4[a]	190[a]	NC	NC
Cadmium	89.1	53.4	1,390	NC	NC
Lead	3,200	3,750	15,600	2,080	18,650
Manganese	35,900	443,000	$>10^6$	NC	NC
Benzo(a)anthracene	1.7	8.05[a]	365[a]	NC	NC
Benzo(a)pyrene	1.7	8.46[a]	38.3[a]	NC	NC
Benzo(b)fluoranthene	1.6	82.1[a]	372[a]	NC	NC
Dibenz(a,h)anthracene	0.57	7.7[a]	34.7[a]	NC	NC
Indeno(1,2,3-cd)pyrene	1.3	80[a]	360[a]	NC	NC

a Based on carcinogenic effects for adults only.
b Soil concentrations for both surface and subsurface soils.
NC Not Calculated

APPENDIX 4:

USX SOUTH WORKS SITE CONTAMINATION LEVELS

SUPPLEMENTARY REPORT

TO

USX REALTY DEVELOPMENT

FOR

SOUTH WORKS ENVIRONMENTAL REPORT

CHICAGO, ILLINOIS

January 9, 1993

Prepared By

WASTE TECHNOLOGY, INC.
1813 N. Mill Street - Suite F
Naperville, Illinois 60563-1288

708/961-5000

INDEX

Figure Number	Description
S.1a	Known Subsurface Soil Contamination Cyanide, TPH and pH
S.1b	Known Subsurface Soil Contamination RCRA Metals
S.1c	Known Subsurface Soil Contamination Volatile and Semivolatile Organic Compounds
S.2	Known Ground Water Contamination
S.3a	Known Surface Soil Contamination - Non-Metals
S.3b	Known Surface Soil Contamination - RCRA Metals
S.3c	Known Surface Soil Contamination - PCB Soil and Concrete Pad Wipe Samples
S.4a	Known Sediment Soil Contamination - Non-Metals
S.4b	Known Sediment Soil Contamination - RCRA Metals

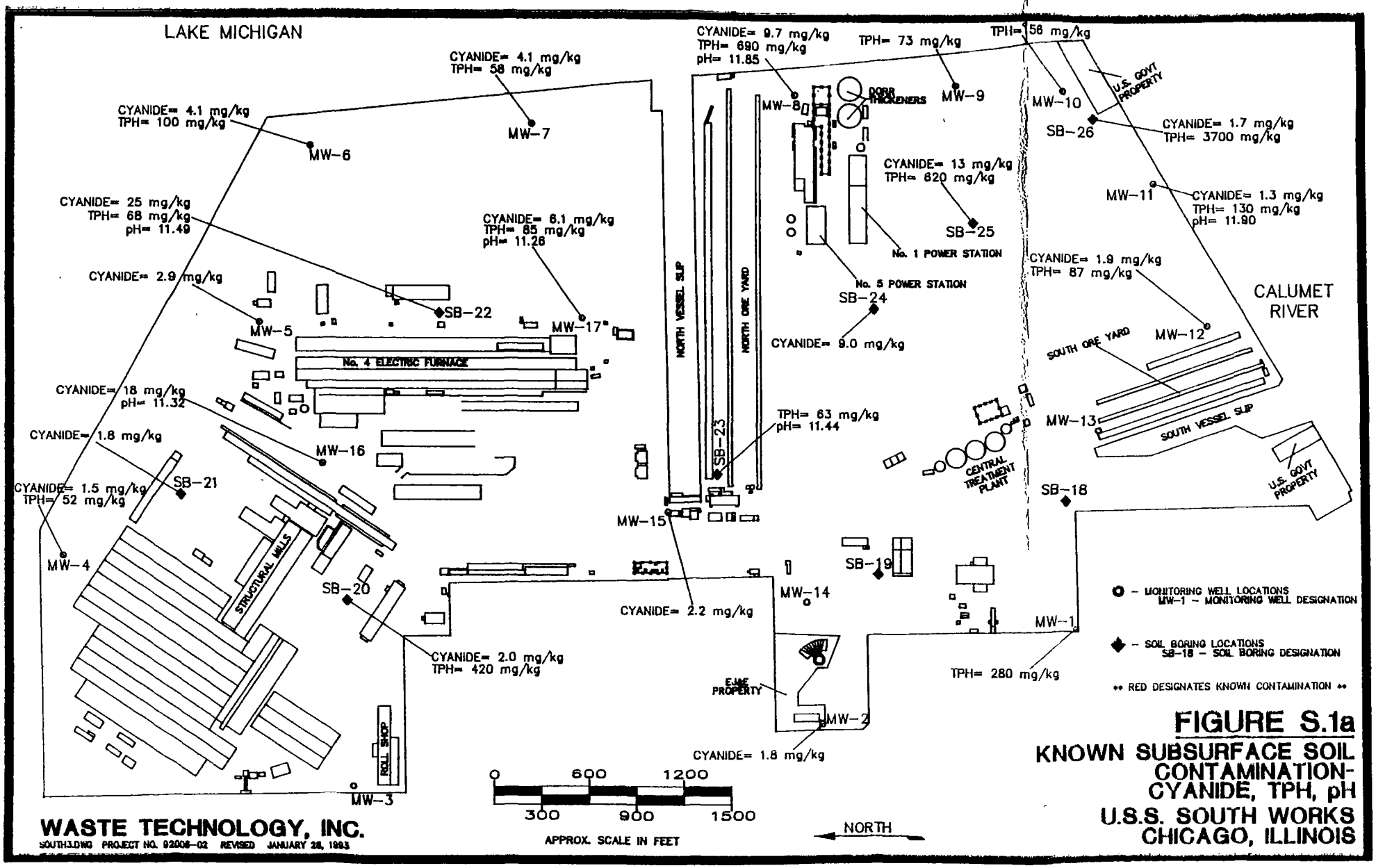


FIGURE S.1a

KNOWN SUBSURFACE SOIL CONTAMINATION-CYANIDE, TPH, pH

U.S.S. SOUTH WORKS CHICAGO, ILLINOIS

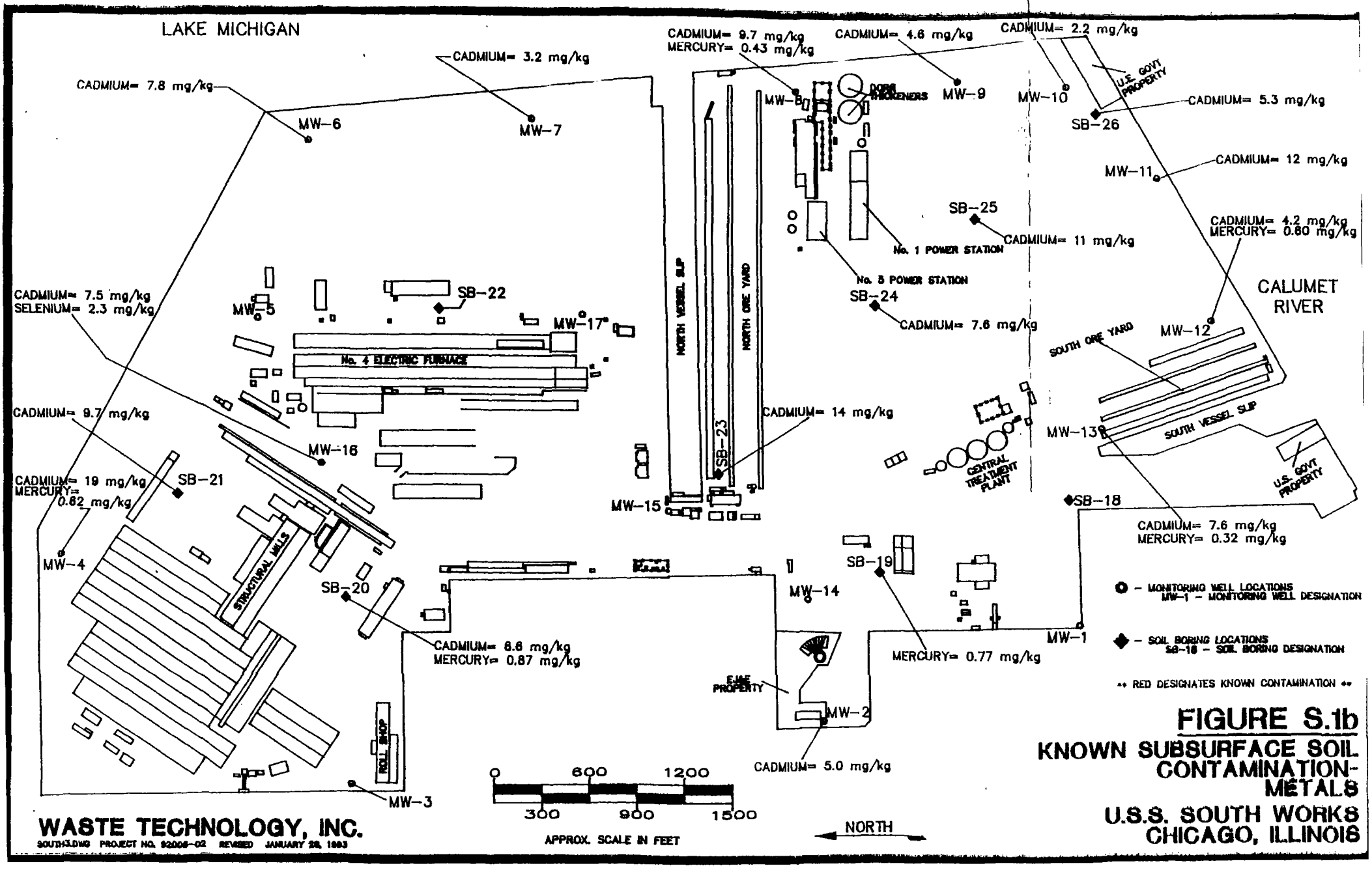


FIGURE S.1b

KNOWN SUBSURFACE SOIL CONTAMINATION-METALS

U.S.S. SOUTH WORKS
CHICAGO, ILLINOIS

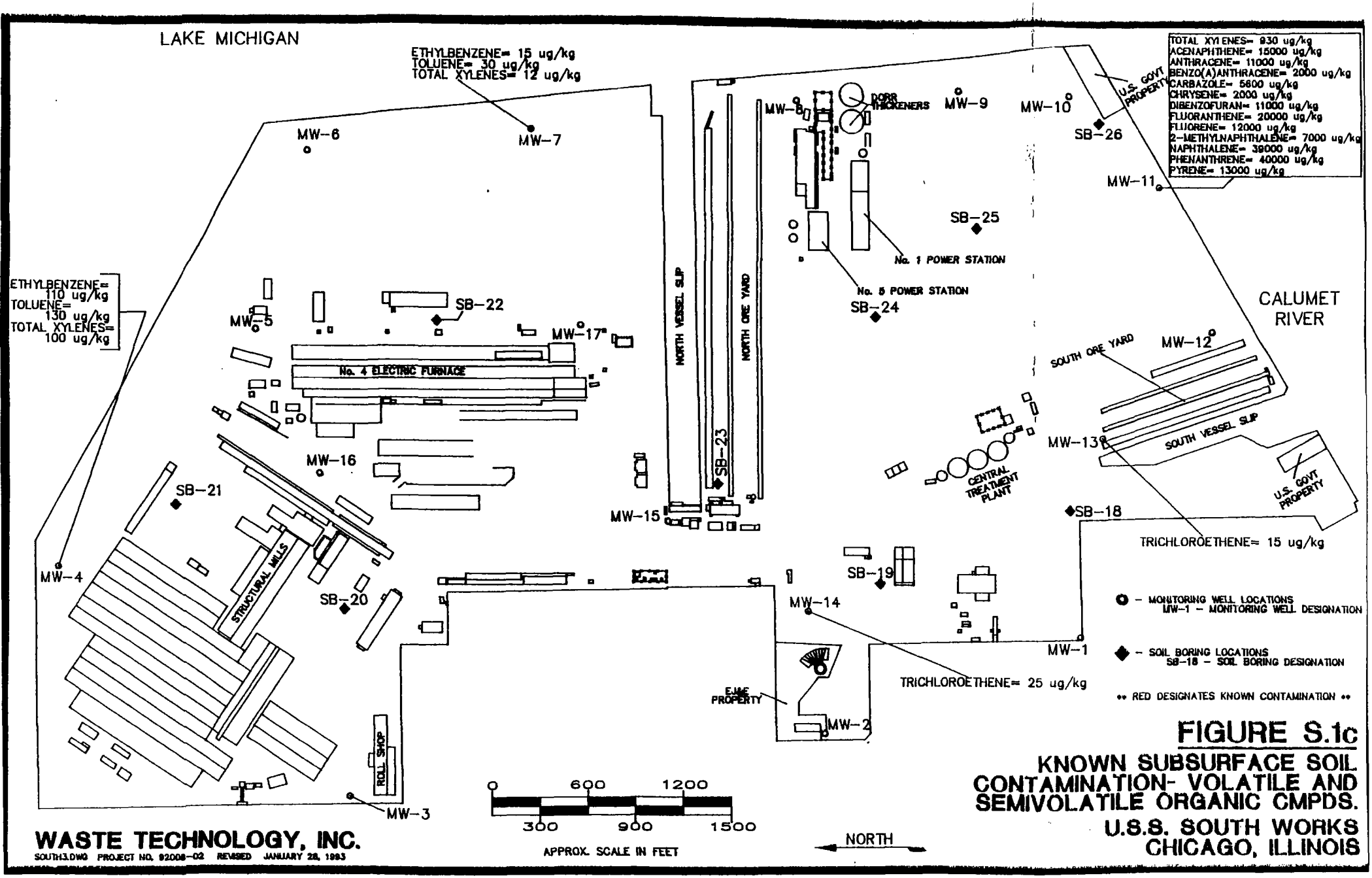


FIGURE S.1c

KNOWN SUBSURFACE SOIL CONTAMINATION- VOLATILE AND SEMIVOLATILE ORGANIC CMPDS.

U.S.S. SOUTH WORKS CHICAGO, ILLINOIS

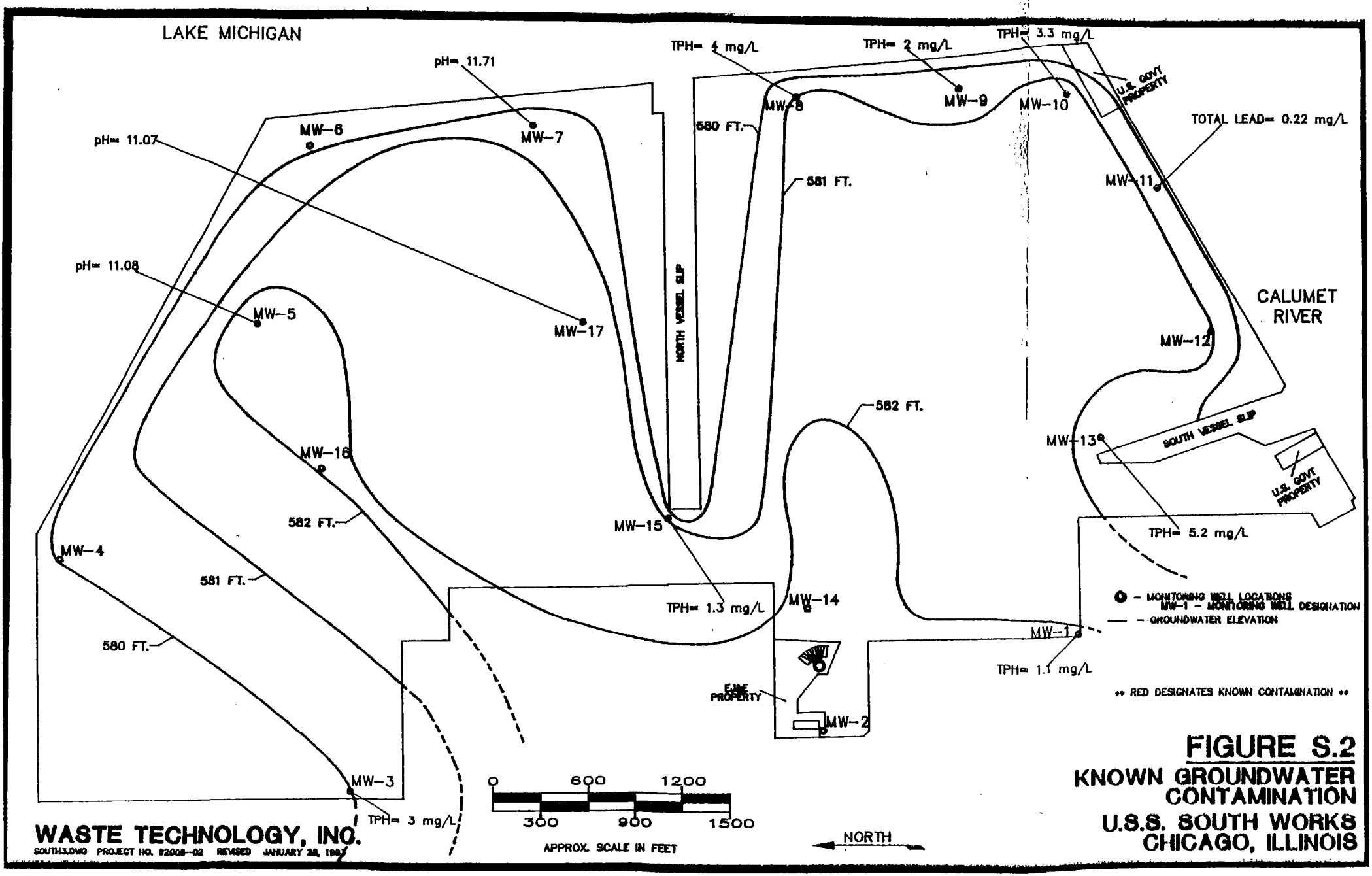
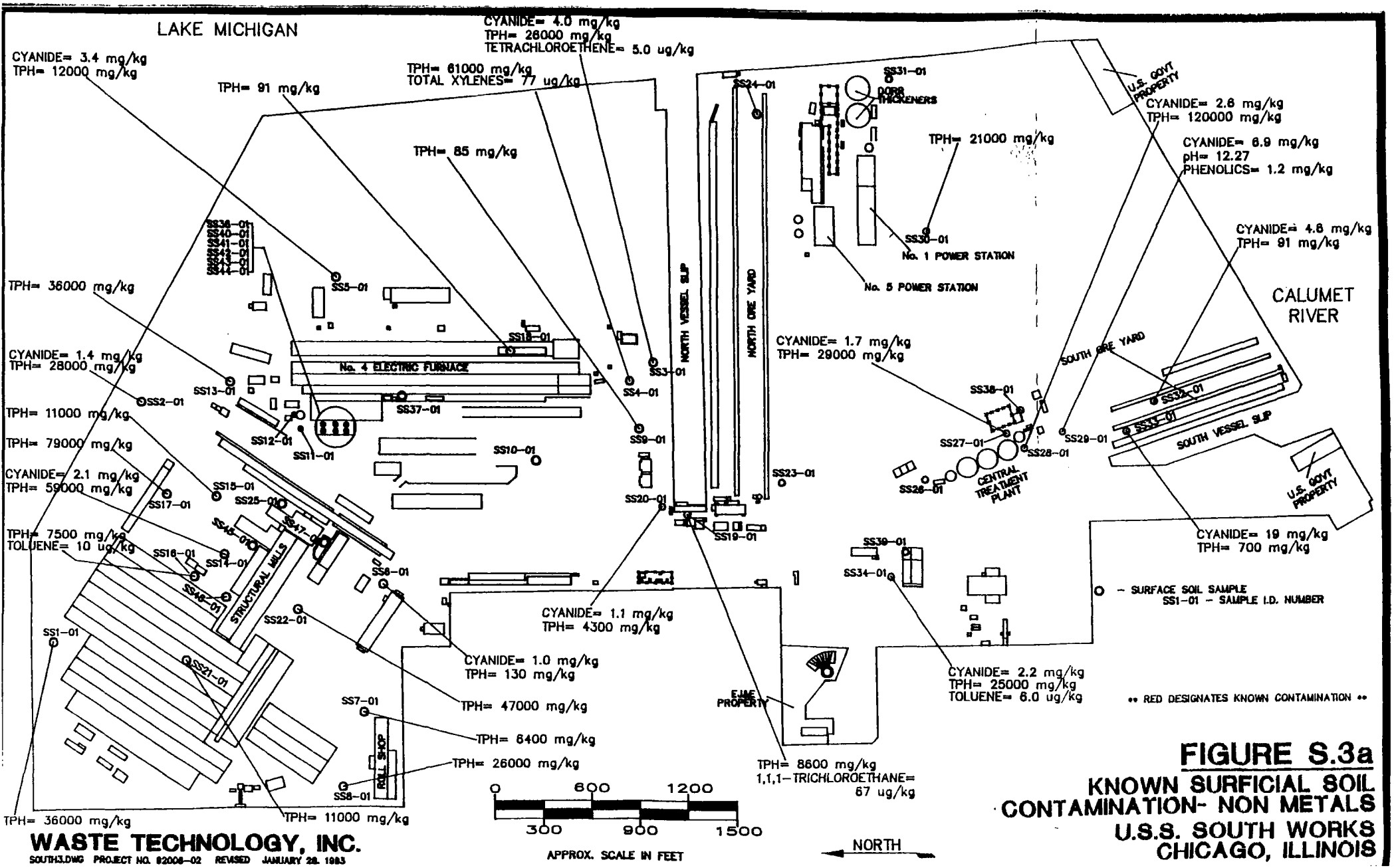


FIGURE S.2

KNOWN GROUNDWATER CONTAMINATION

U.S.S. SOUTH WORKS
CHICAGO, ILLINOIS



WASTE TECHNOLOGY, INC.

SOUTH3.DWG PROJECT NO. 92008-02 REVISED JANUARY 28, 1993

FIGURE S.3a

KNOWN SURFICIAL SOIL CONTAMINATION- NON METALS

U.S.S. SOUTH WORKS

CHICAGO, ILLINOIS

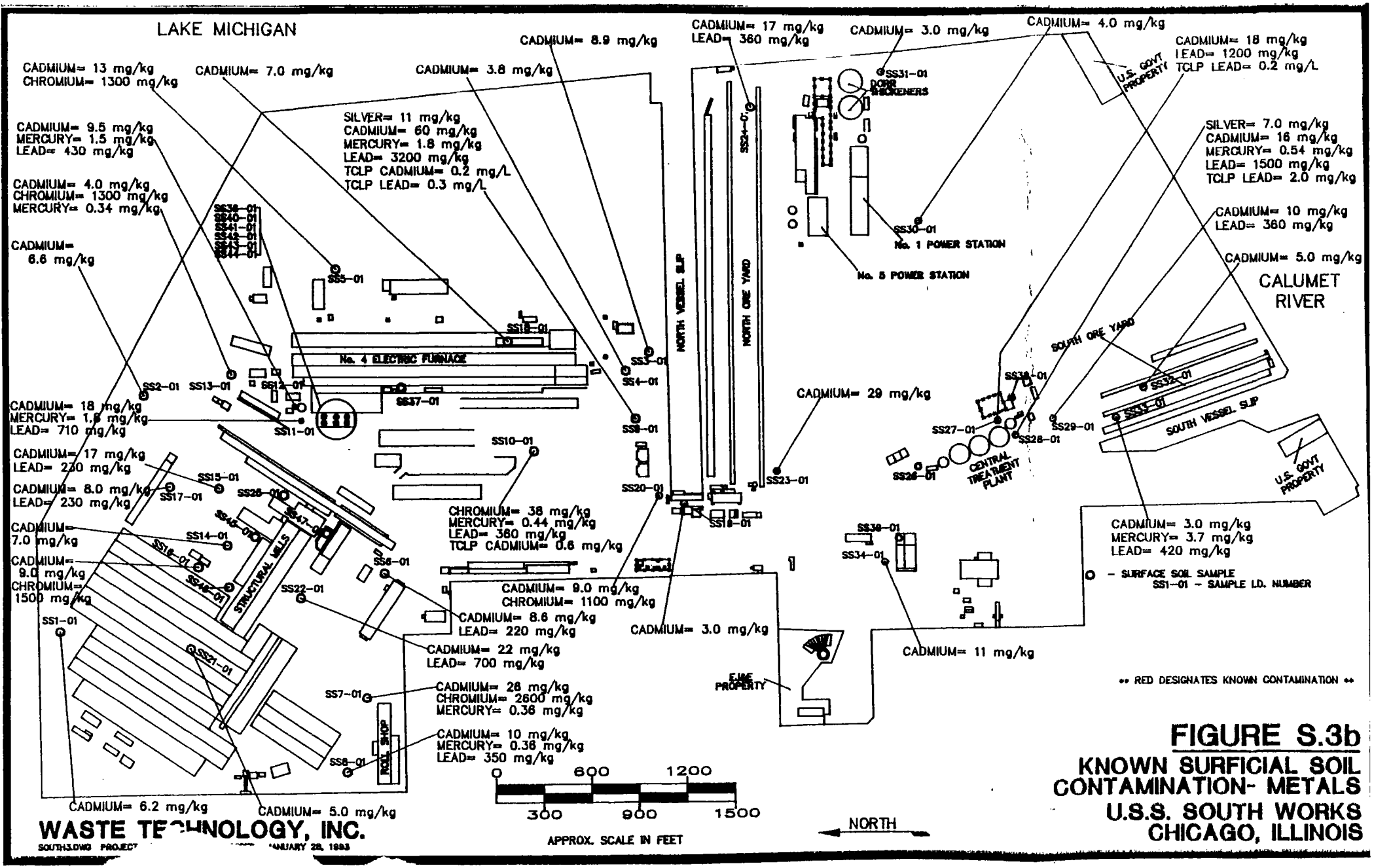


FIGURE S.3b

KNOWN SURFICIAL SOIL CONTAMINATION- METALS

U.S.S. SOUTH WORKS
CHICAGO, ILLINOIS

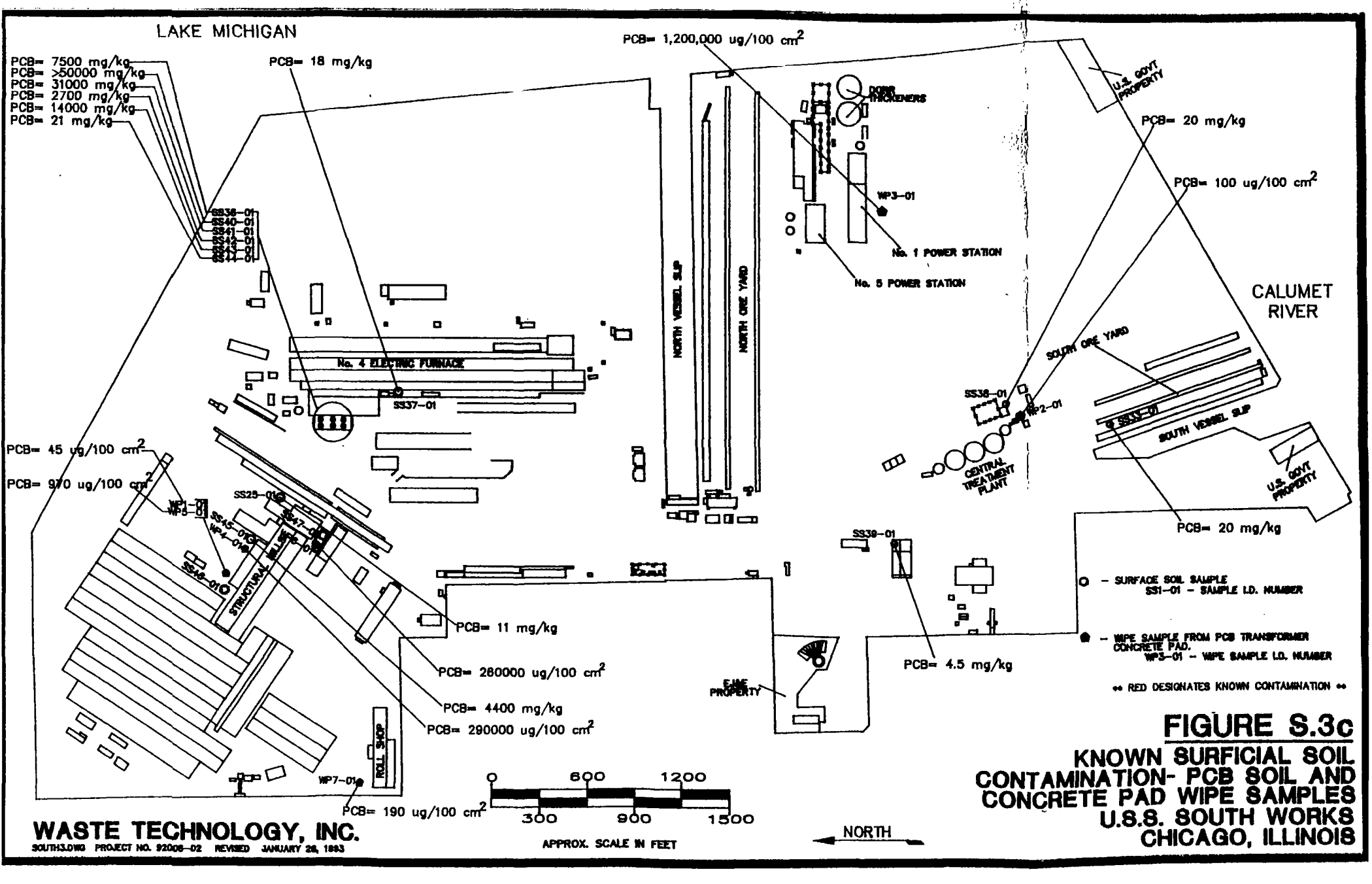


FIGURE S.3c

KNOWN SURFICIAL SOIL CONTAMINATION- PCB SOIL AND CONCRETE PAD WIPE SAMPLES
U.S.S. SOUTH WORKS
CHICAGO, ILLINOIS

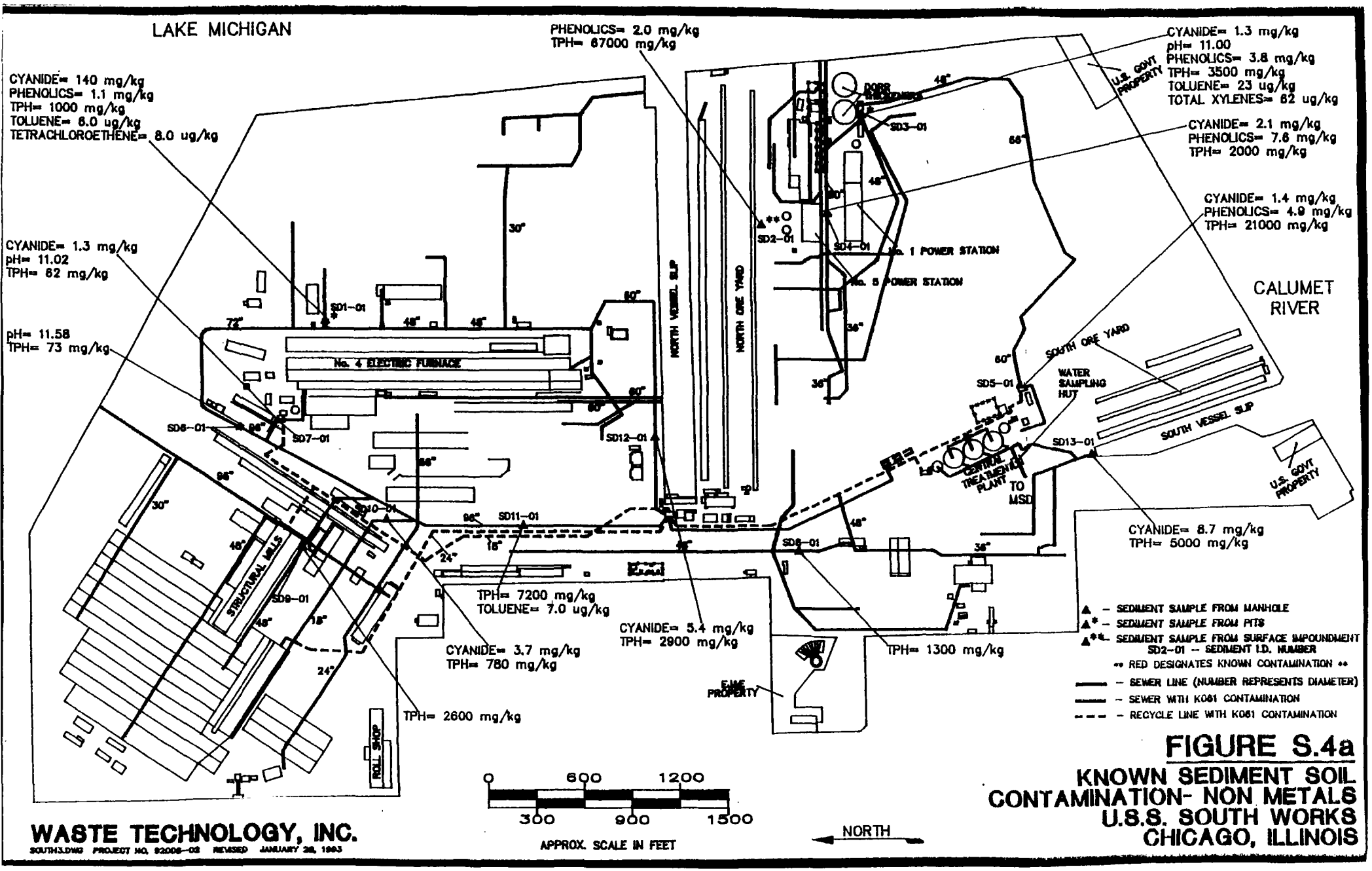


FIGURE S.4a

KNOWN SEDIMENT SOIL CONTAMINATION- NON METALS U.S.S. SOUTH WORKS CHICAGO, ILLINOIS

WASTE TECHNOLOGY, INC.

SOUTH3.DWG PROJECT NO. 92006-03 REVISED JANUARY 28, 1993

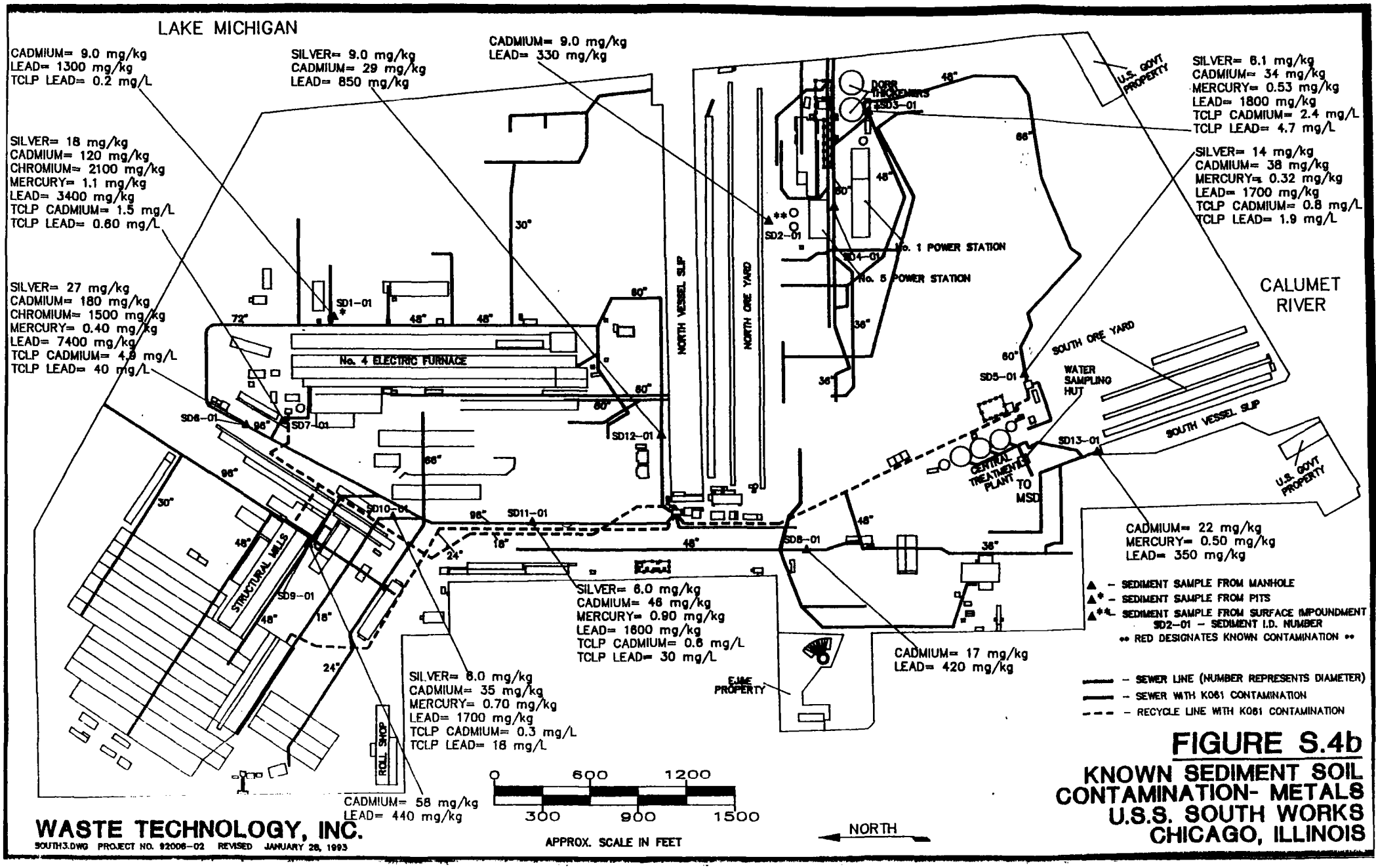
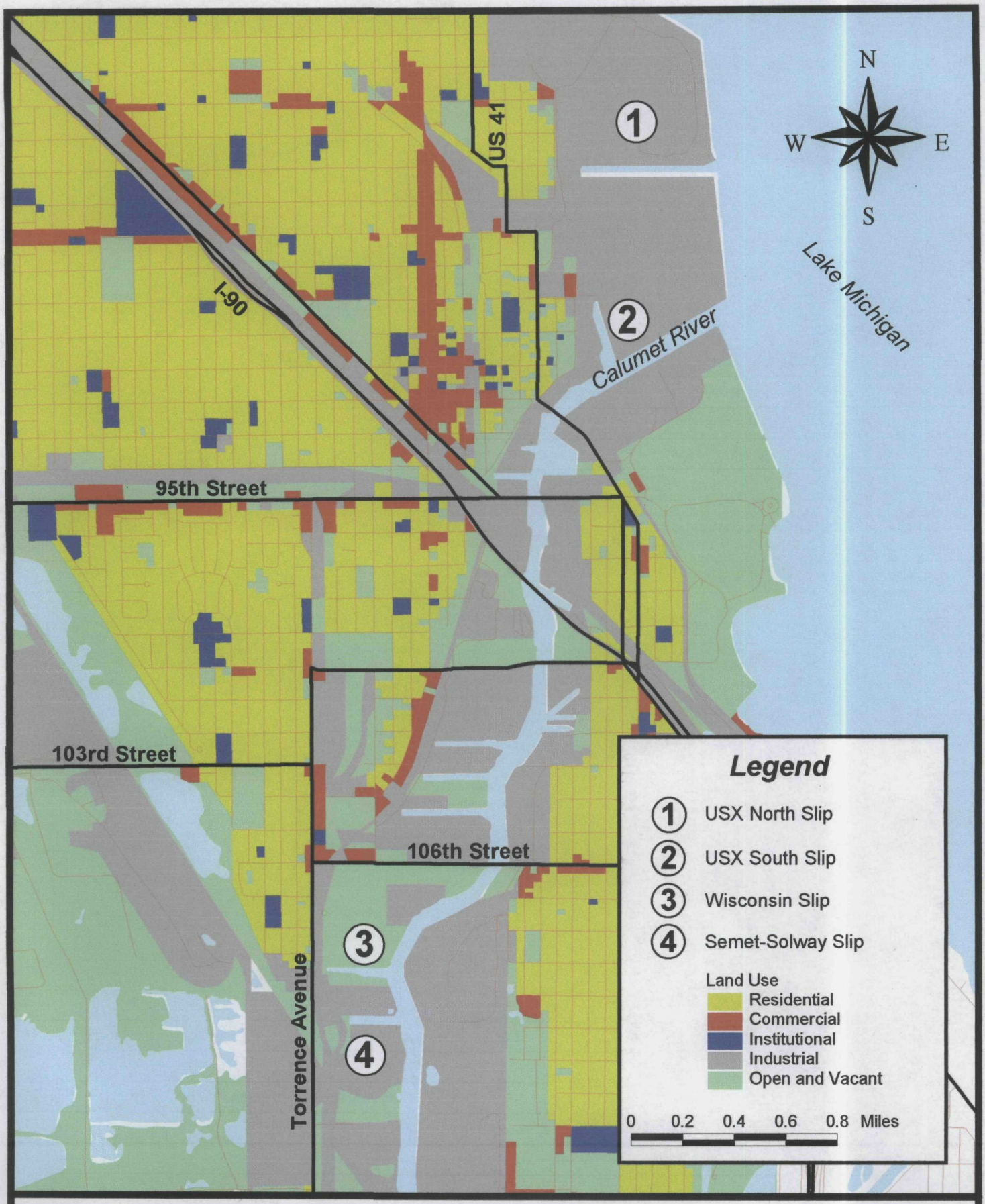


FIGURE S.4b

KNOWN SEDIMENT SOIL CONTAMINATION- METALS
U.S.S. SOUTH WORKS
CHICAGO, ILLINOIS

APPENDIX 5:

COMMUNITIES SURROUNDING THE VESSEL SLIPS



Boat Slips at The Former USX Site and the Wisconsin Steel Site

Mapping by CNT March 6, 2000

APPENDIX 6:

RACIAL AND ECONOMIC COMPOSITION OF COMMUNITIES SURROUNDING THE VESSEL SLIPS

Location – 2.0 mile radius at 41.739718, -87.536471 (USX South Works, Chicago, IL), 1990 Census Data

Location	2.0 mile radius at 41.739718, -87.536471
# Block Groups Included	65
Number of Persons	71,139
Number of Families	16,828
Number of Households	23,830
Median (est.) Household Income	25,432
Age 0 thru 4	5,929
Age 5 thru 9	5,923
Age 10 thru 19	12,267
Age 20 thru 49	31,571
Age 50 thru 64	9,222
Age 65 and over	6,227
White	12,527
Black	46,537
Indian	171
Asian	193
Other Race	11,711
Hispanic	19,333
Owner Occupied	10,154
Renter Occupied	13,676
Percent Age 0 thru 4	8.3
Percent Age 5 thru 9	8.3
Percent Age 10 thru 19	17.2
Percent Age 20 thru 49	44.4
Percent Age 50 thru 64	13.0
Percent 65 and over	8.8
Percent White	17.6
Percent Black	65.4
Percent Indian	0.2
Percent Asian	0.3
Percent Hispanic	27.2
Percent Other Race	16.5
Percent Owner Occupied	42.6
Percent Renter Occupied	57.4

Location – 2.0 mile radius at 41.699539, -87.555250 (Wisconsin Steel Works, Chicago)
1990 Census Data

Location	2.0 mile radius at 41.699539, -87.555250
# Block Groups Included	48
Number of Persons	41,529
Number of Families	10,491
Number of Households	13,642
Median (est.) Household Income	28,529
Age 0 thru 4	3,134
Age 5 thru 9	3,258
Age 10 thru 19	6,720
Age 20 thru 49	17,420
Age 50 thru 64	6,003
Age 65 and over	4,994
White	20,945
Black	12,154
Indian	95
Asian	121
Other Race	8,214
Hispanic	14,294
Owner Occupied	9,760
Renter Occupied	3,882
Percent Age 0 thru 4	7.5
Percent Age 5 thru 9	7.8
Percent Age 10 thru 19	16.2
Percent Age 20 thru 49	41.9
Percent Age 50 thru 64	14.5
Percent 65 and over	12.0
Percent White	50.4
Percent Black	29.3
Percent Indian	0.2
Percent Asian	0.3
Percent Hispanic	34.4
Percent Other Race	19.8
Percent Owner Occupied	71.5
Percent Renter Occupied	28.5

APPENDIX 7:

GREATER LAKE CALUMET REGION FLOW PATTERNS

HAZARDOUS WASTE RESEARCH AND INFORMATION CENTER
Illinois State Water Survey Division
1808 Woodfield Drive
Savoy, Illinois 61874

TN88-009

A Monitoring and Evaluation Plan for Surface Water Contaminants and Sediments Within the Greater Lake Calumet Area and Southwestern Shores of Lake Michigan

by

Nani G. Bhowmik and William P. Fitzpatrick

Illinois State Water Survey
Champaign, Illinois

Printed June 1988

Reprinted June 1992

Illinois Department of Energy and Natural Resources

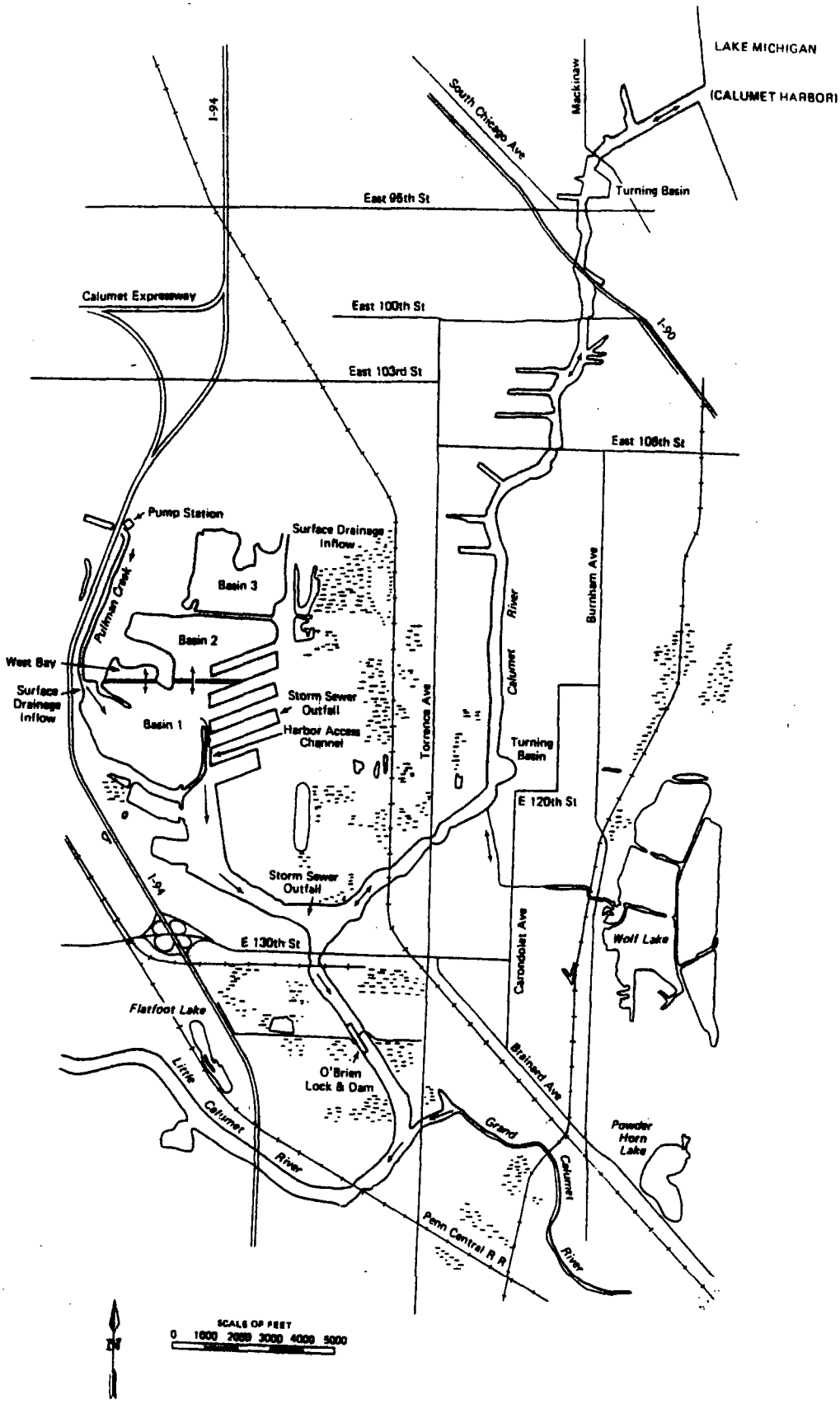


Figure 4. Greater Lake Calumet region

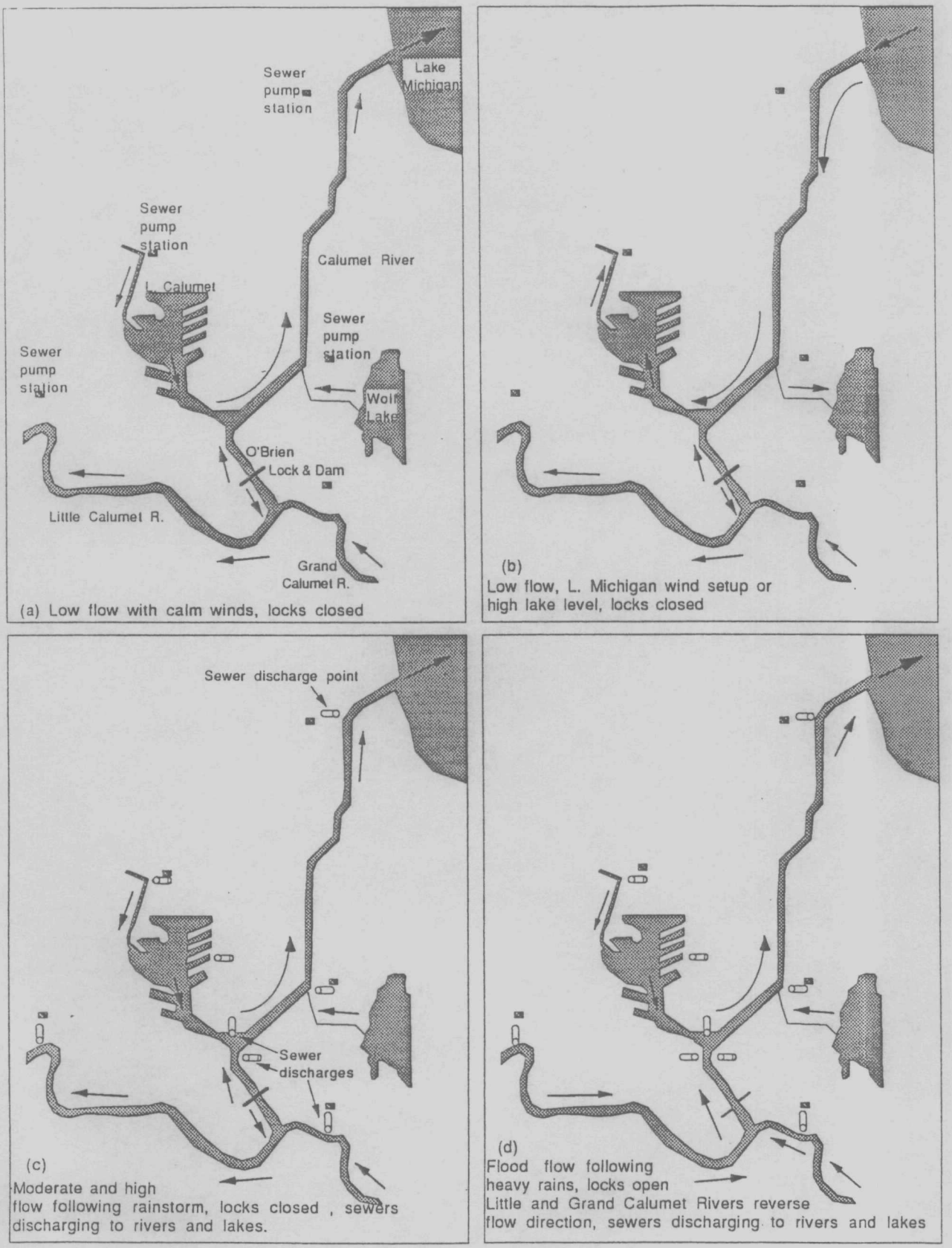


Figure 5. Typical flow patterns in the greater Lake Calumet region

APPENDIX 8:

MEMO TO CITY OF CHICAGO DEPARTMENT OF ENVIRONMENT

Memo

To: Acting Commissioner William Abolt, City of Chicago Department of Environment

From: Michael Siola, Calumet Environmental Resource Center
David Klein, Calumet Project for Industrial Jobs
Ignacio Correa-Ortiz, Center for Neighborhood Technology
Bob Wisz, Hegewisch Chamber of Commerce
Father Alfredo Gundrum, Saint Kevin Church
Tirso Villafuerte, South Deering Empowerment Assocation
Lynne Cunningham, Southeast Chicago Development Commission
Marian Eymes, Southeast Environmental Task Force
George Michko, Veterans Park Improvement Association
John Buchanan, 10th Ward Alderman

CC: Commissioner Christopher Hill, City of Chicago Department of Planning and Development
Don Wadleigh, Army Corps of Engineers Chicago District
Tony Ianello, Illinois International Port District
Eileen Figel, South Works Project Manager, City of Chicago DPD
Edith Ardiente, Navistar International Corp.
John Zaborske, USX Realty Development.
Gary King, Illinois EPA
Mardi Klevs, US EPA
Greg Vanderlaan, Arcadis, Geraghty & Miller
Gayle Walker, Envirocom
Keith Harley, Chicago Legal Clinic
Kimberly Gray, Northwestern University
Michele Moss, Sierra Club
Joyce O'Keefe, Open Lands Project
Eleanor Roemer, Friends of the Parks
Joanna Hoelscher, Citizens for a Better Environment
James Landing, Illinois Audubon Society

Date: February 11, 1999

Re: Wisconsin Steel Works and USX Boat Slips Cleanup

The 237 acres of vacant land at the former Wisconsin Steel Works site, located at the corner of 106th Street, Torrence Avenue and the Calumet River, constitute one of the largest industrial parcels in Southeast Chicago available for redevelopment.

For over one year, the communities of South Deering, Veterans Park, Jeffrey Manor, Trumbull Park, East Side, and Hegewisch, along with regional and city-wide organizations, have been meeting to monitor the site's conditions, its remediation, and future redevelopment. This memorandum is from this multi-neighborhood coalition.

There are three separate cleanup efforts at the former Wisconsin Steel Works site:

- the Navistar International Corp.-owned part of the former site, currently under the Illinois EPA voluntary cleanup program,
- the Three Mill parcel, and
- the two boat slips on the Calumet River.

A coordinated effort between the Navistar property cleanup and the cleanup of the other two sites is extremely important for the future development of the entire site.

In December 1996, a consent order between Illinois EPA and Navistar International Corp. was entered. This consent order known as a "voluntary cleanup program" combines state and federal action. Navistar has already completed a Phase II Remedial Investigation Work Plan and a Preliminary Risk Assessment. Site investigation tasks have already begun and remedial actions, depending on the investigation, could be completed in two to three years.

The US Army Corps of Engineers Chicago District plans to dredge the Calumet River navigable channel between Summer 1999 and Summer 2000. They have offered to work with individual owners to incorporate dredging of berthing areas and slips into this effort at cost, a unique opportunity for slip owners and dock operators to save costs in the mobilization and demobilization of dredging equipment.

We formally request that the City of Chicago provide leadership on the cleanup of the Wisconsin Steel and USX boat slips:

1. **Submit Application.** An application for a permit for dredging and removal should be submitted to the US Army Corps of Engineers at 111 N. Canal St., Suite 600, Chicago, Illinois 60606, no later than April 1999. The Illinois International Port District has agreed to transmit all applications to the Corps en masse to assure expedited processing. The application form is attached (for more copies contact Ignacio Correa-Ortiz 773-278-4800 ext.120, or Don Wadleigh 312-353-6400 ext.4015).
2. **Sediment Sampling of Four Boat Slips.** We request that the City of Chicago sample sediments from two boat slips at the Wisconsin Steel Works site (Semet-Solway Slip, Wisconsin Slip) and from two boat slips at the USX site (North Slip, South Slip). This sampling is required by the Army Corps of Engineers to ensure that sediments going to the Confined Disposal Facility at Iroquois Landing meet the site's restrictions. We estimate total sampling to cost between $3,000 and $15,000. Sampling and testing needs to be completed no later than 30 days after the application for dredging and removal is submitted.
3. **Secure Funding.** The cost of dredging the four boat slips and transporting the dredged material to a Confined Disposal Facility will be between $20.50 and $24.50 per cubic yard. We estimate the Wisconsin Steel slips to have approximately 16,000 cubic yards of sediment, and the USX slips to have approximately 35,000 cubic yards. Total cost of the operation, including sampling and testing, could range from $750,000 to $1,250,000. We request the City of Chicago to coordinate with Navistar, US Steel, Illinois EPA and US EPA to devise a funding strategy. Funding must be secured before permits are awarded (estimated August 15, 1999).
4. **Coordinate Funding.** The Illinois International Port District has agreed to coordinate the funding of the dredging operation. A Memorandum of Agreement (MOA) will be signed by the Illinois International Port District and the Army Corps of Engineers granting the Corps access to escrowed funds. A similar agreement between the City of Chicago and the Illinois International Port District will be needed. The agreements must be executed by the time of the solicitation for bids (estimated July 1, 1999), with funds available by contract award (estimated August 15, 1999).

The following is a list, provided by the US Army Corps of Engineers, of laboratories who can perform the sediment testing: Great Lakes Analytical
1380 Busch Parkway
Buffalo Grove, IL 60089
(847) 808-7766

ARDL, Inc.
1801 W. Forest St.
Mt. Vernon, IL 62864
(618) 244-3235

Waste Management
2100 Cleanwater Dr.
Geneve, IL 60134
(630) 208-3100

Core Labs
7726 Moller Rd.
Indianapolis, IN 46268
(317) 875-5894

Heritage Environmental Services, Inc.
7901 W. Morris St.
Indianapolis, IN 46231
(317) 390-3182

encl

APPENDIX 9:

LIST OF DOCUMENTS

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1. ARCADIS Geraghty & Miller, Inc., Ecological Risk Assessment, Former Wisconsin Steel Works, Prepared for Navistar International Transportation Corp., Chicago, Illinois (December 1999).

2. ARCADIS Geraghty & Miller, Inc., Final Draft Preliminary Risk Assessment Wisconsin Steel Works Chicago, Illinois, Prepared for Navistar International Transportation Corp., (March 1998).

3. Bhowmik, Nani G. and Fitzpatrick, William P., A Monitoring and Evaluation Plan for Surface Water Contaminants and Sediment Within the Greater Lake Calumet Area and Southwestern Shores of Lake Michigan. Illinois State Water Survey, Champaign, Illinois, Printed June 1988, Reprinted June 1992 (Hazardous Waste Research and Information Center, Illinois State Water Survey Division, TN88-009).

4. ChemRisk Division of McLaren/Hart Environmental Engineering Corporation, Human Health Risk Assessment for the South Works Site, Chicago, Illinois, Prepared for USX Corporation, (August 25, 1995).

5. ChemRisk Division of McLaren/Hart Environmental Engineering Corporation, Final Preliminary Human Health and Ecological Risk Assessment for the South Works Site, Chicago, Illinois, Prepared for USX, (March 1995).

6. ChemRisk Division of McLaren/Hart Environmental Engineering Corporation, Preliminary Human Health and Ecological Risk Assessment for the South Works Site, Chicago, Illinois, Prepared for USX, (December 1994).

7. Coffey, Mike, U.S. Fish and Wildlife Service: Rock Island, Illinois, Ecological Study and Impact Assessment at the Wisconsin Steel Works Site, Final Report, Prepared for the U.S. Army Corps of Engineers, Buffalo District, (1994).

8. Environmental Law Program of the Chicago Legal Clinic, Inc., Just Beneath the Surface: Groundwater And the Future of Southeast Chicago's Neighborhoods, A Status Report, (November, 1995).

9. Fahsl, Emily and Lamb, Matthew, Northwestern University, Risk Assessment and Site Characterization of the Wisconsin Steel Works Site, (June 8, 1998).

10. Hazardous Waste Research and Information Center, Illinois State Water Survey Division, A Preliminary Environmental Assessment of the Contamination Associated with Lake Calumet Cook County, Illinois, printed February, 1988 # RR-019.

11. Kay, Robert T., Duwelius, Richard F., Brown, Timothy A., Micke, Frederick A., and Witt-Smith, Carol A. in cooperation with USEPA, Geohydrology, Water Levels and Directions of Flow, and Occurrence of Light-Nonaqueous-Phase Liquids on Ground Water in Northwestern Indiana and the Lake Calumet Area of Northeastern Illinois, US Geological Survey, Water Resources Investigations Report 95-4253, (1996).

12. Kay, Robert T., Duwelius, Richard F., Prinos, Scott T., in cooperation with USEPA, Groundwater Quality in the Calumet Region of Northwestern Indiana and Northeastern Illinois, US Geological Survey -- Water-Resources Investigations Report 95-4244, June 1993.

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13. Kay, Robert T., Greeman Theodore K., Duwelius, Richard F., King, Robin B., and Nazimek, John E., US Geological Survey and Petrovski, David M., US EPA, Characterization of Fill Deposits in the Calumet Region of Northwestern Indiana and Northeastern Illinois, US Geological Survey – Water-Resources Investigations Report 96-4126.

14. Letter from William Child, Chief of Bureau of Land at IEPA to Keith Harley, Chicago Legal Clinic, RE: LPC 0316515061 – Cook, USX South Works/Chicago, General Correspondence (response to comments regarding opposition to issuing a no-further remediation letter to USX), (July 31, 1997).

15. Letter from William Child of IEPA, to Bill Eyring of Center for Neighborhood Technology, RE: LPC 0316515061 – Cook, USX South Works/Chicago, General Correspondence (questing comments regarding opposition to issuing a no-further remediation letter to USX) [attached IEPA materials regarding NFR letter] (January 29, 1996).

16. Letter from US Steel to Ms. Vickie Moy of IEPA, RE: Groundwater Management Zone Request South Works Site (November 13, 1995).

17. Letter from Jim O'Brien of IEPA to Larry Eastep of USX, Subject: USX-South Works Documents (review of Sampling Plan, Environmental Assessment, and Phase II Environmental Assessment), (June 14, 1994).

18. Roadcap, George S. and Kelly, Walton R., Shallow Ground-Water Quality and Hydrogeology of the Lake Calumet Area, Chicago, Illinois, Illinois State Water Survey, Interim Report, Prepared for The Illinois Department of Energy and Natural Resources, Springfield, IL and The United States Environmental Protection Agency Chicago, IL, (March, 1994).

19. Splitstone & Associates, Technical Support for Site-Specific Groundwater Remediation Objectives, USX Realty Development, South Works Site, Chicago, Illinois, (March 8, 1996).

20. USS Former South Works Steelmaking Facility, Illinois Pre-notice Site Cleanup Program, Fact Sheet 1 (September 20, 1995).

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22. USS Former South Works Steelmaking Facility, Illinois Pre-notice Site Cleanup Program, Fact Sheet 3 – Human Health Risk Assessment (January 4, 1996).

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24. Waste Technology, Inc., Remediation Activities at the Former South Works Site: Chicago, Illinois, Prepared for USX Realty Development, (September 4, 1996).

25. Waste Technology, Inc., Groundwater Sampling Report of the Former South Works Plant, Chicago, Illinois, Prepared for USX Realty Development, (October 23, 1995).

26. Waste Technologies, Inc., Phase III Environmental Assessment of the Former South Works Plant, Prepared for USX Realty Development, (September 13,1994).

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28. Waste Technologies, Inc., Phase I Environmental Assessment of the Former South Works Plant, Prepared for USX Realty Development, (February 1993).

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30. Waste Technology, Inc., Supplementary Report for South Works Environmental Report, Chicago, Illinois, Prepared for USX Realty Development, (January 9, 1993).

31. Wisconsin Steel Works, Response to Comments on the Final Draft Phase II Remedial Investigation Work Plan and Final Draft Preliminary Risk Assessment for the Former Wisconsin Steel Works Site, (July 2, 1998).

32. U.S. Army Corps of Engineers, Buffalo District, Wisconsin Steel Works Site Characterization Interim Report, prepared for U.S. Department of Commerce Economic Development Administration (1994).