US Army Corps
of Engineers
Chicago District

INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

EPA

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COMPREHENSIVE MANAGEMENT PLAN

VOLUME 1 OF 2

FINAL
FEASIBILITY REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

JANUARY 1999

US Army Corps
of Engineers
Chicago District

INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

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FINAL FEASIBILITY REPORT

JANUARY 1999

COMPREHENSIVE MANAGEMENT PLAN
INDIANA HARBOR AND CANAL
MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

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COMPREHENSIVE MANAGEMENT PLAN
INDIANA HARBOR AND CANAL
MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

INTRODUCTION

GENERAL

Indiana Harbor and Canal (IHC) is an authorized Federal navigation project located in East Chicago, Indiana. Project features include breakwaters at the harbor entrance and a deep-draft navigation channel. The pertinent Congressional documents, acts and work authorized in connection with the IHC Federal project are summarized in the following tabulation. The bottom sediments in the IHC are contaminated and not suitable for open water disposal in Lake Michigan, nor are they suitable for unconfined upland disposal or beneficial use. Consequently, dredging to maintain adequate navigation depths has not been conducted at this harbor since 1972 due to the lack of an approved economically feasible and environmentally acceptable disposal facility for dredged materials from IHC.

Acts	Work Authorized	Documents
Jun. 25, 1910	Maintenance of outer harbor. Maintenance of inner harbor channel when deeded free of cost to and accepted by the United States.	H. Doc. 1113, 60th Cong., 2d Sess.
Mar. 4, 1913	Breakwaters.	H. Doc. 690, 62d Cong., 2d Sess.
Mar. 2, 1919	Lighthouse crib, present length and alignment easterly and northerly breakwaters.	Rivers and Harbors Committee Doc. 6, 65th Cong., 2d Sess.
Mar. 20, 1922	Reduce length of channel to be maintained in extension to Lake George.	Public Law 176, 67th Cong.
Mar. 3, 1925	Authorized Secretary of War to modify project so far as relates to length and alignment of breakwaters and to sell Youngstown Steel and Tube Co. about 1,180 linear feet of shoreward end of existing north breakwater.	
Mar. 2, 1929	Accept 2.3 acres of land for construction of the Forks Turning Basin.	
July 3, 1930	Existing project channel width and depth in Lake George Branch and turning basin at the Forks.	Rivers and Harbors Committee Doc. 21, 71st Cong., 2d Sess.
Jul. 30, 1932	Authorized Secretary of War to sell Inland Steel Co., about 1.903 linear feet of southerly end of existing east breakwater.	Public Law 219, 72d Cong.
Aug. 30, 1935	Extended easterly breakwater, dredge entrance channel and outer harbor, deepen channel between bulkhead fills, widen main stem of canal and portion of Calumet River Branch to 141st St.	Rivers and Harbors Committee Doc. 29, 72d Cong., 1st Sess.
Aug. 28, 1937	Modified conditions of local cooperation required before enlargement of Indiana Harbor Canal is undertaken by United States.	Rivers and Harbors Committee Doc. 13, 75th Cong., 1st Sess.
Jul. 14, 1960	Increase authorized depths of 29 feet in outer harbor entrance channel; 28 feet in outer harbor, and 27 feet in canal entrance channel to first E.J. & E. Ry, Bridge.	H. Doc., 195, 86th Cong., 1st Sess.

REPORT AUTHORITY/SCOPE

There is no legislative authority, such as a Congressional resolution or line item in a Water Resources Development Act, which specifically authorizes or directs the Corps of Engineers to prepare this feasibility report. It has been a long standing HQUSACE policy that the authority to operate and maintain any navigation project

extends to providing a CDF. Paragraph 12.b. of Policy Guidance Letter No. 47, Cost Sharing for Dredged Material Disposal Facilities and Dredged Material Disposal Facility Partnerships, discusses HQUSACE policy regarding the development, approval and funding of dredged material disposal facilities for maintenance of existing Federal navigation projects. Paragraph 12.b.(3) of Policy Guidance Letter No. 47 states, "Specific congressional authorization is not required for disposal facilities needed for operation and maintenance of authorized Federal navigation projects."

In 1975, the Chicago District began to formulate an economically feasible and environmentally acceptable plan for disposal of dredged materials from the IHC. This effort included four distinct phases of plan formulation which are described later in this report. On December 7, 1992, the District presented a briefing to representatives of the Headquarters, U.S. Army Corps of Engineers (HQUSACE), on the results of the plan formulation completed up to that time. The HQUSACE subsequently recommended that the Chicago District submit a draft Comprehensive Management Plan (CMP) Report on the IHC dredged material disposal issue, as a decision document. That guidance was contained in a CECW-LM 2d Endorsement, dated January 25, 1993, on a CENCC-PP basic Memorandum, dated October 30, 1992, subject: Indiana Harbor and Canal Confined Disposal Facility (CDF) Policy Issues.

On May 17, 1993, the District Engineer briefed the Acting Assistant Secretary of the Army for Civil Works [ASA(CW)]. In a Memorandum to the Director of Civil Works, dated May 21, 1993, the Acting ASA(CW) provided further guidance regarding preparation of this CMP Report, primarily concerning Resource Conservation and Recovery Act (RCRA) liability and cost sharing issues.

A draft CMP Report, dated June 1993, was prepared in response to the Acting ASA(CW) and HQUSACE guidance. A Feasibility Review Conference on this report was held in September 1993 at HQUSACE. Representatives of the ASA(CW), the Washington Level Review Center, the HQUSACE, the North Central Division, and the Chicago District attended the conference. The results of this conference were summarized in a CENCC-DDE(PM) Memorandum for Record (MFR), dated October 12, 1993, subject: Feasibility Review Conference - Comprehensive Management Plan, IHC Maintenance Dredging and Disposal Activities, which was furnished to the Acting ASA(CW) and HQUSACE.

Subsequent guidance to the District Engineer on revisions to be made in the CMP Report before its distribution for public and agency review was furnished in a CECW-LM memorandum, December 20, 1993, subject: Project Guidance Memorandum for the Comprehensive Management Plan, IHC Maintenance Dredging and Disposal Activities.

This Final CMP Report incorporates the guidance provided in the CECW-LM December 20, 1993 memorandum. It also incorpoates guidance provided by the ASA(CW) in a memorandum, dated 17 September 1998, on cost sharing; comments provided in connection with the independent technical review completed in October 1998; and comments provided by the Washington level policy compliance review team in November 1998.

The report consists of this main feasibility report, a Final Environmental Impact Statement (FEIS) and supporting appendices. The appendices are listed in the table of contents which precedes this main report. The CMP report is divided into two volumes. Volume 1 contains the feasibility report and the FEIS. Volume 2 contains Appendices A through W.

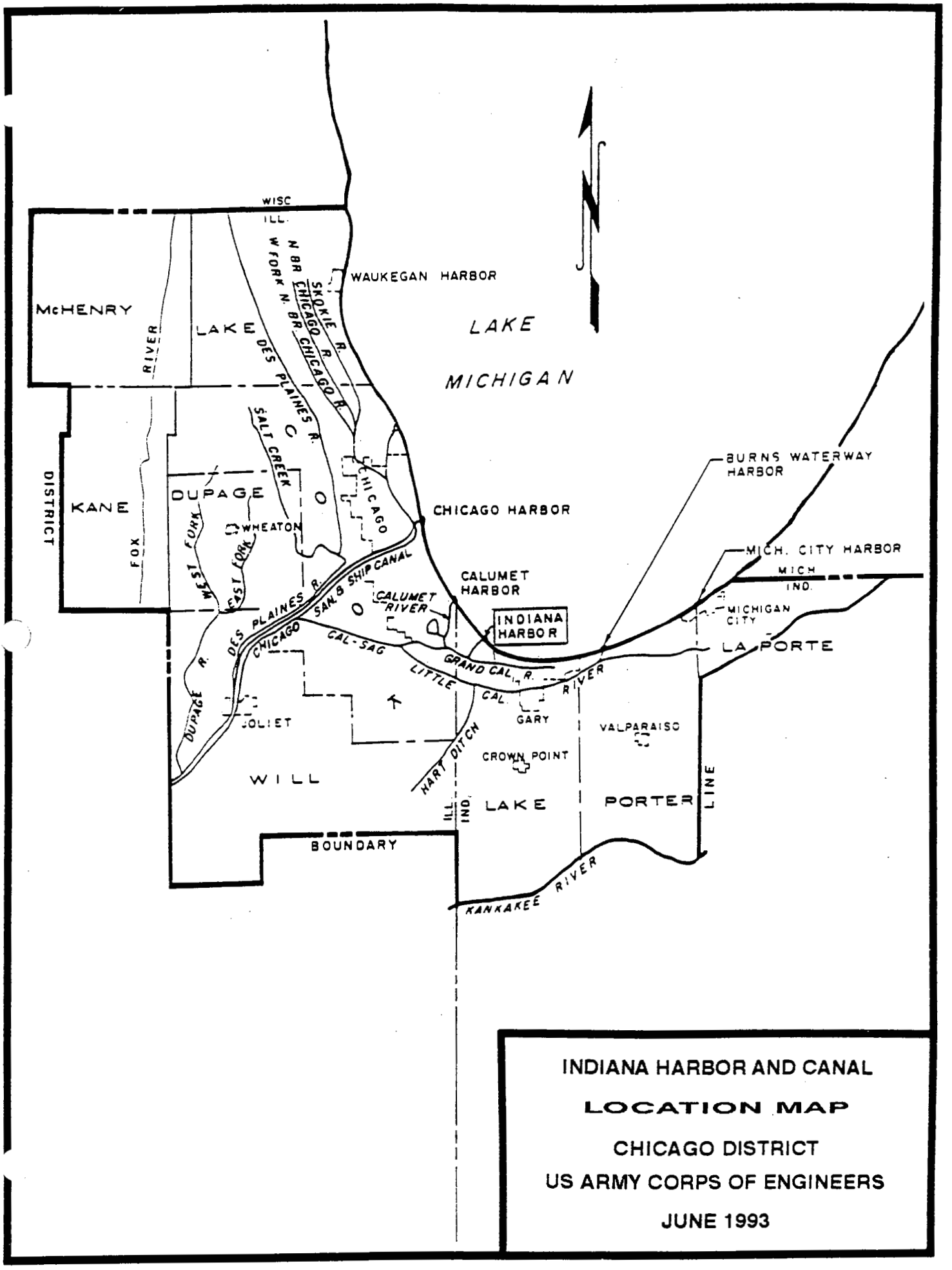
DESCRIPTION

GENERAL

Indiana Harbor is located in East Chicago, Lake County, Indiana, as shown on Figure 1. It is on the southwest shore of Lake Michigan, 4-½ miles east of the Indiana-Illinois State line and 17 miles from downtown Chicago. The nearest Federal harbors are Calumet Harbor, Illinois and Indiana, 7 miles northwest and Burns Waterway Harbor, Indiana, 14 miles southeast. Indiana Harbor has an entrance channel and outer harbor protected by breakwaters, and an inner harbor. The inner harbor consists of the Indiana Harbor Canal and its two branches. The main channel extends from the lakeward E. J. & E. Railway bridge to The Forks, a distance of 7,400 feet. Near The Forks, there is a small turning basin located on the southeast side of the canal about 600 feet lakeward of Canal Street. From The Forks, the Lake George Branch extends west for a distance of 6,800 feet and the Calumet River Branch extends south for about 2 miles where it joins the Grand Calumet River.

The LTV Steel Company and the Inland Steel Company are located on the northwest and southeast sides of the IHC, respectively, between Lake Michigan and Cline Avenue, a distance of about 3 miles. These two companies are the primary harbor users. The U.S. Gypsum Company and several major petroleum companies also have docks along the Canal and the Calumet River and Lake George Branches. However, the only petroleum company which presently uses the harbor and canal for deep-draft navigation is the Amoco Oil Company which is located on the north side of the Lake George Branch just upstream of The Forks.

The Inland Steel Company is the fourth largest steel manufacturer in the U.S. and employs over 10,000 people at its Indiana Harbor plant. Inland Steel is a fully integrated steel manufacturing facility which, in recent years, started production of cold-rolled steel sheets and galvanized steel in a joint venture with Nippon Steel of Japan in New Carlisle, Indiana. Two subsidiaries, I/N Tek and I/N Kote, use steel manufactured at Inland's



INDIANA HARBOR AND CANAL

LOCATION MAP

CHICAGO DISTRICT

US ARMY CORPS OF ENGINEERS

JUNE 1993

Figure 1

Inland's Indiana Harbor plant. Mill upgrades and blast furnace relining were completed at Inland's Indiana Harbor plant in the mid-1990's.

The LTV Steel Company is the second largest steel manufacturer in the U.S. and employs over 4,700 at its Indiana Harbor works. LTV's Indiana Harbor plant is a fully integrated plant with continuous casting and coating facilities. LTV upgraded its tin mill and relined its blast furnaces in the mid-1990's. LTV operates two steel mills. The Indiana Harbor mill is the base mill which is usually run at full capacity, while its mill in Cleveland, OH is the swing capacity mill.

The Amoco Oil Company plant at Indiana Harbor is Amoco's oldest and second largest refinery. The refinery opened in 1891 and processed 17,000 barrels of crude oil a day at that time. Today, this refinery employs 1,600 employees and processes 405,000 barrels of crude oil a day. This plant makes 700 products, including 7 million gallons of gasoline per day. It also produces diesel fuel, jet fuel, furnace oil, motor oils, wax, and asphalt.

WATER LEVELS

Water levels and channel depths discussed in this report are referred to low water datum for Lake Michigan, which is 576.8 feet above mean water level at Father Point, Quebec, I.G.L.D., (1955 International Great Lakes Datum). The IHC have essentially the same water level as Lake Michigan. Ordinary fluctuations of water levels at this project are of the same magnitude and frequency as apply generally to other harbors on Lake Michigan. The lowest seasonal lake stages prevail during the winter months and the highest during the summer months. In the 90-year period, 1903-1992, the highest monthly mean stage was 5.00 feet above low water datum in October 1986 and the lowest was 1.39 feet below in February 1964, a range of 6.39 feet.

In addition to the annual fluctuations, local oscillations of irregular magnitude and duration occur. These result from storms and variations in winds and barometric pressure over the entire lake surface. Changes in water levels may range from a few inches to about three feet for periods varying from a few minutes to several hours. The continually fluctuating water levels of Lake Michigan cause currents in the inner harbor channels, particularly through bridge draws. The Indiana Harbor entrance is exposed to northeast storms having a maximum fetch of 300 miles. The stronger winds of autumn, winter and early spring are usually westerly.

NAVIGATION SEASON

The average opening date for the navigation season at the Straits of Mackinac (connecting Lakes Michigan and Huron) is March 21st; the average closing date is January 15th. Indiana

Harbor is open for navigation throughout the year, except for occasional brief periods when drifting ice fields, driven by winds, jam the harbor entrance.

EXISTING FEDERAL NAVIGATION PROJECT

AUTHORIZATION/STATUS

The existing Federal navigation project at the IHC was authorized by the River and Harbor Acts of 1910 and subsequent Acts of 1913, 1919, 1922, 1925, 1930, 1932, 1935, 1937, 1960, and 1965. The existing project is complete.

DESCRIPTION

The Federal navigation project is shown on Figure 2 and consists of the following features:

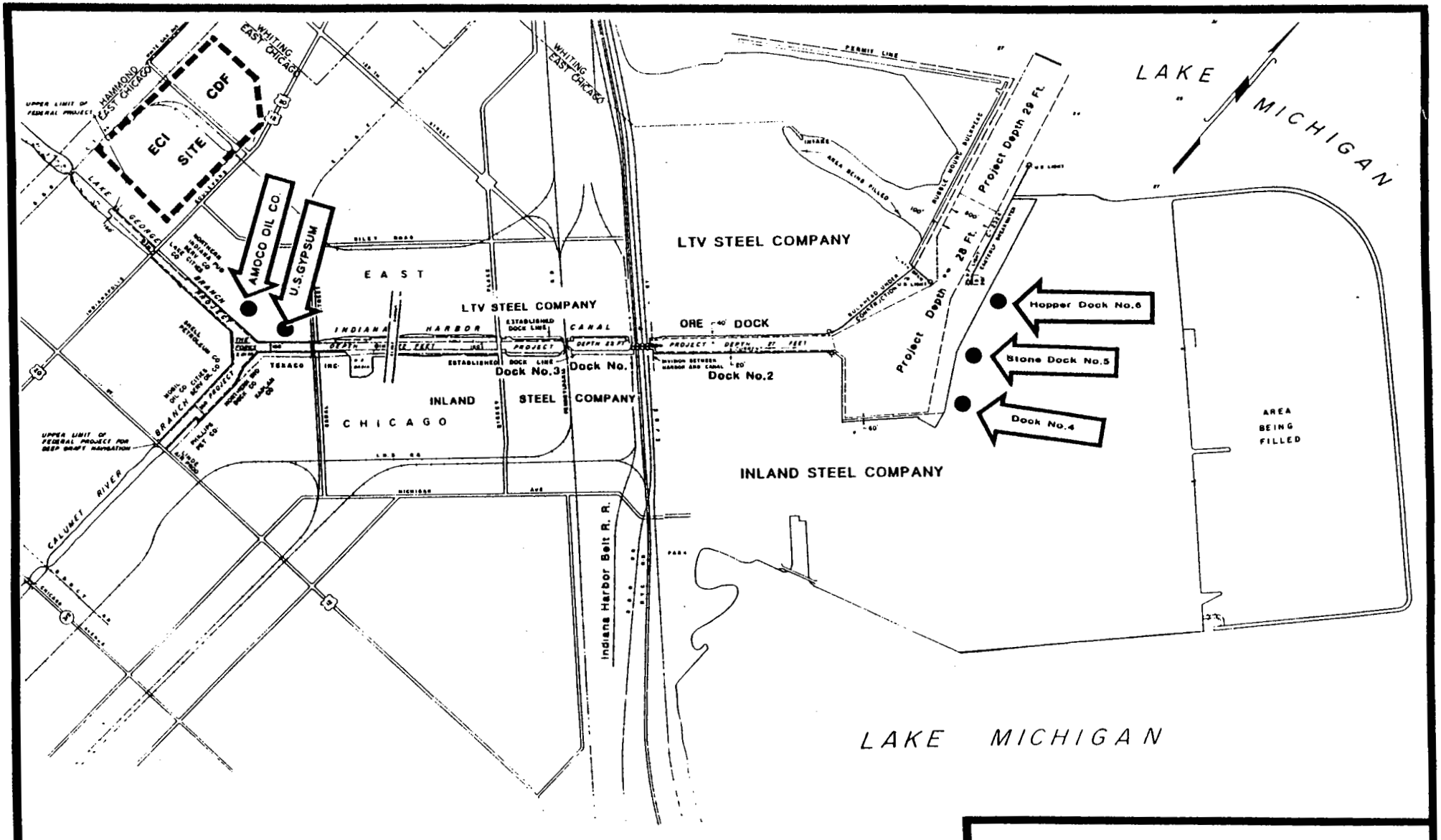
- Northerly rubblemound breakwater, 1,120 feet long.
- Easterly reinforced concrete-caisson breakwater, 201 feet long.
- Easterly rubblemound breakwater, 2,234 feet long, and a lighthouse crib.
- An outer harbor approach channel, generally 800 feet wide with a depth of 29 feet.
- An anchorage and maneuver basin in the outer harbor, 28 feet deep, and canal entrance channel 27 feet deep.
- A main canal, generally 160 feet wide and 22 feet deep.
- A turning basin lakeward of Canal Street, 22 feet deep.
- A turning basin at The Forks, 22 feet deep.
- The Calumet River Branch, generally 160 to 250 feet wide and 22 feet deep.
- The Lake George Branch, generally 160 feet wide and 22 feet deep.

TERMINAL AND TRANSFER FACILITIES

The principal terminal and transfer facilities located along the IHC lakeward of the E.J.& E. Railway bridge consist of five docks and related structures owned by the Inland Steel and LTV Steel Companies, as shown on Figure 2. These docks have a total berthing space of 9,600 lineal feet and are used primarily for receipt and storage of iron ore and limestone. Inland has three docks, with a total berthing space of 3,100 feet, located in the outer harbor area. Of the three docks, the stone dock (No. 5) and the hopper dock (No. 6) are the principal docks used. Dock No. 4, located in the east corner of the outer harbor anchorage and maneuver basin, is used periodically for receipts of stone.

Both Inland and LTV operate extensive iron ore docks along the Canal immediately downstream of the E.J.& E. Railway bridge. The Inland dock (No. 2) is approximately 3,200 feet long and the LTV dock is about 3,300 feet long.

Figure 2



INDIANA HARBOR AND CANAL

EXISTING FEDERAL NAVIGATION PROJECT

CHICAGO DISTRICT

US ARMY CORPS OF ENGINEERS

JUNE 1993

Upstream of the E.J.& E. Railway bridge there are major terminal and transfer facilities located all along the main canal and the Calumet River and Lake George Branches. Most of the facilities were used in the past for handling cargoes via deep-draft vessels and barges serving Inland Steel and petroleum companies, such as Amoco, Citgo, Mobil and Phillips. However, many of the petroleum company dock facilities are not being used at the present time. Inland docks Nos. 1 and 3 are located immediately upstream of dock No. 2. Dock No. 1, located between the Indiana Harbor Belt Railroad bridge and the Pennsylvania Railroad bridge is presently being used for receipts of petroleum products by barge. Dock No. 3, located between the Pennsylvania Railroad bridge and Dickey Place bridge, has been used in the past for deliveries of iron ore and stone to Inland's plant 3 blast furnace. However, this dock has not been used in recent years because the blast furnace has not been active.

The Amoco Oil Company operates a dock with a usable berthing area 1,430 feet long on the north side of the Lake George Branch immediately upstream of The Forks. Amoco ships petroleum products, primarily fuel oils and asphalt, from this dock by specialized tankers.

The U.S. Gypsum Company has operated a dock with a usable berthing space of 1,000 feet on the north side of the canal between the Canal Street bridge and The Forks. U.S. Gypsum historically received gypsum rock by deep-draft vessels but recently switched to a different source of material and does not expect to use the harbor and canal in the future for waterborne commerce. The Safety-Kleen Company also operates a dock along the north side of the Lake George Branch immediately downstream of the Indianapolis Boulevard bridge for shipment of refined lubricating oils by barge.

WATERBORNE COMMERCE

EXISTING COMMERCE

Indiana Harbor received over 15 million tons of waterborne commerce in 1990, second only to the Port of Chicago in tonnage received on Lake Michigan. Of this total, over 12 million tons were received by the Inland Steel and LTV Steel Companies. The primary materials received by the steel mills are iron ore pellets and stone. The Amoco Oil Company, the Safety-Kleen Company, and U.S. Gypsum accounted for the remaining receipts which included petroleum products and stone. Amoco shipped 1,098,000 tons of fuels and asphalt in 1991, and 2,014,500 in 1992.

Table B-1 of Appendix B, Economic Analysis, summarizes the existing LTV Steel Company and Inland Steel Company waterborne commerce receipts at Indiana Harbor. Iron ore pellets, or taconite, are shipped to IHC from Duluth/Superior or Taconite Harbor, Minnesota or Escanaba, Michigan. A small percentage of

the total ore shipments is Wabush, a type of iron ore which is shipped from Point Noire, Canada. Stone, or calcite is shipped from Calcite, Stoneport, or Doloport in Michigan. U.S. fleet vessels making deliveries to IHC are dedicated to this trade and return empty to the point of origin. Ports of origin and destination are shown in Figure B-2 of Appendix B. Shipments from the Amoco Oil Company dock are made to a variety of Great Lakes ports.

PROJECTED COMMERCE

Tonnage to the Inland Steel and LTV Steel Companies is projected to increase from slightly over 12 million tons in 1990 to 12.7 million tons in 1997, the first year in which project benefits are assumed to accrue. In 2030, the total shipments to Inland Steel and LTV Steel are projected to reach 14.9 million tons and by 2040 tonnage is expected to reach 15.5 million tons. These estimates include forecasts of deliveries from all ports and for all commodities. The estimate of benefits in this report is based on domestic receipts of iron ore pellets and stone, which is expected to increase from a total of 10.1 million tons in 1990 to 12.4 million tons in 2030, and on shipments of asphalt and fuel from Amoco which are expected to increase from a total of 1.1 million tons (7 million barrels) in 1992 to 1.8 million tons in 2030.

The forecasts are based on the assumption that the future increase in tonnage delivered is a result of increased demand for steel. Future tonnage increases are linked with growth in Bureau of Economic Analysis (BEA) projections for earnings in durable goods in the Great Lakes Region as shown in Table B-2 of Appendix B. This method somewhat understates growth as productivity gains are not measured nor are the expected increases in the Inland Steel Company operations resulting from their subsidiary continuous cold-rolling mill and steel galvanizing lines. There are no long-term industry projections currently available for these items.

Iron Ore Pellets

The primary iron ore districts in the U.S. are grouped around the southern and northwestern shores of Lake Superior in Michigan, Minnesota and Wisconsin. The chief iron ranges are the Marquette and the Menominee in Michigan; the Penokee-Gogebic in Wisconsin; and the Mesabi, the Cuyuna, and the Vermillion in Minnesota. The Mesabi is the largest of the ranges. Most of the deposits of high grade ore have been depleted such that in the future most of the U.S. iron ore must come from low grade formations. The formation from which the deposits are derived is known as taconite, which contains about 25 to 30 percent iron. Pieces of rock from the taconite formation are crushed and ground into fine particles. The iron bearing particles are separated from the rest with magnets. The concentrate is then rolled into pellets, heated, and hardened.

The reserves in taconite are much larger than the original reserves of high grade ore. There are 10 billion tons of material in the Mesabi Range alone. This amount of raw iron ore, by itself, would supply U.S. iron needs for 50 to 75 years at a growth rate of 2 percent annually. The reserves in the Marquette Range are not well documented. However, they are substantially less than the reserves in the Mesabi Range. Estimated potential reserves are between 20 and 50 years, according to the Michigan Basin Geological Society.

Several factors influence the pellet origin mix, such as mine production, strikes, and the configuration of the blast furnace. Transportation cost savings can be realized by using pellets from Escanaba, however, the mines could not maintain the necessary high output. The pellet origin mix is assumed to remain constant for purposes of analysis. The projected tonnages by origin and vessel class are shown in Table B-3 of Appendix B; the projected tonnages are summarized in Table 1.

Stone

Calcite, in the form of limestone or dolomite is widely used in steel manufacture as a flux material. Calcite acts as an aid in the extraction of a blast furnace charge by fusing with unwanted material and forming a more liquid slag. It is one of the most common and widespread minerals and is found in the form of limestone or dolomite in masses of sedimentary rock in the Midwest. The stone delivered to Indiana Harbor generally originates from either Calcite or Stoneport, Michigan on Lake Michigan. The projected tonnages are shown in Table B-4 of Appendix B and are summarized in Table 1.

Asphalt

Asphalt is a high boiling semi-solid black or brown variety of bitumen either naturally occurring or derived via processing of petroleum. Asphalt consists of hydrocarbons that have been combined with nitrogen, sulfur, and oxygen. While the constituents of asphalt are extremely variable, the physical properties are very stable except when heated. Heavy Venezuelan and Mexican crudes are napthenic in nature and have high asphalt content. Asphalt transportation requires special storage and handling equipment, with vessels dedicated to the trade. The most common uses of asphalt are road surfaces and building construction. The asphalt shipped from Indiana Harbor is produced at the Whiting Amoco Refinery. The projected tonnages are shown in Table B-5 of Appendix B and summarized in Table 1.

Fuel Oils

Fuel oil consists largely of residues from crude oil distillation. These are generally blended with other fractions (products with lighter or heavier molecular weights) to obtain the required viscosity. Fuel oils are transported either by pipeline or in tanker vessels to distribution points. Fuel oils are used

primarily in steam generation for power stations, ships' boilers and industrial boilers. The fuel oils shipped from Indiana Harbor are produced at the Amoco Whiting Refinery. The projected tonnages are shown in Table B-6 of Appendix B and summarized in Table 1.

Table 1 Projected Waterborne Commerce at Indiana Harbor and Canal, Tons

Year	Iron Ore Receipts	Stone Receipts	Asphalt Shipments	Fuel Shipments
1992[1/]	8,788,000	1,432,000	1,148,000	866,000
2000	9,355,000	1,525,000	1,243,000	938,000
2010	9,923,000	1,617,000	1,373,000	1,036,000
2020	10,234,000	1,667,000	1,517,000	1,145,000
2030	10,674,000	1,740,000	1,676,000	1,264,000
2040	11,133,000	1,815,000	1,883,000	1,383,000

[1/] Actual tonnage shown for 1992.

VESSEL FLEET COMPOSITION

EXISTING FLEET

The number of U.S. fleet vessels on the Great Lakes has declined over the past 10 years, dropping to 185 vessels in 1990 from a high of 302 in 1980. However, the average carrying capacity for self-unloaders has increased by 81 percent over the same time period. This is due to the economies of scale inherent in shipping. There are only two U.S. fleet small (classes 1-4) bulk carriers. Forty-seven ships in the U.S. fleet are medium size (classes 5-8) vessels. All 14 of the large vessels (classes 9 and 10) are self-unloaders and all are part of the U.S. fleet. The large vessels are ore carriers, loading in Minnesota or Michigan.

Shipments to LTV Steel are contracted to various shipping companies. The Inland Steel Company both operates its own fleet and contracts to outside shipping companies. Iron ore pellet shipments to LTV are in general made in class 10 vessels. The Inland Steel Company fleet is comprised of two self-unloaders, the Wildred Sykes (Class 6) and the Joseph L. Block (Class 7), and a straight deck bulk freighter, the Edward L. Ryerson (Class 7). These vessels account for 56 percent of total tonnage shipped to Inland Steel from U.S. ports. The remaining 44 percent is shipped via contract carriers, predominately in class 10 vessels or seaway size vessels. Based on conversations with

Inland Steel operations representatives, Inland plans to convert the Ryerson to a self-unloader and move to the more efficient larger vessels consistent with the availability of the required capital.

Shipments from Amoco are contracted to various shipping companies. Shipments of fuels are primarily made by the Coastwise Trading Company, a subsidiary of Amoco, via a self-powered tank barge, the Great Lakes (Class 3). Asphalt shipments from Indiana Harbor to Chicago are made by shallow draft barge and to other U.S. port destinations by deep-draft tanker barge (Class 2). Safety-Kleen uses shallow-draft barges.

PROJECTED FLEET

Fleet forecasts indicate that past trends towards larger vessels should continue; however, vessel size is limited by the Soo Locks. Currently the Poe Lock is the largest lock and a constraint to vessel size. In the absence of another Poe size lock, no change in fleet mix is assumed for this report.

PROBLEMS AND ISSUES

GENERAL

Prior to 1972, dredged material from the IHC was disposed of in a designated open water area of Lake Michigan or in the permitted lakefills of the Inland Steel or the Youngstown Sheet & Tube (LTV) Companies located on the east and west sides of the harbor entrances, respectively. In 1972, the United States Environmental Protection Agency (U.S. EPA) determined that disposal in Lake Michigan was no longer acceptable due to the polluted character of the dredged material. No maintenance dredging has been undertaken at this Federal project since 1972 because an economically feasible and environmentally acceptable method of dredged material disposal has not been approved. This is causing deep-draft navigation difficulties and associated increases in the transportation costs of waterborne commerce. In addition, between 100,000 and 200,000 cubic yards of polluted sediments are being discharged annually through the IHC to Lake Michigan.

HARBOR AND CANAL SEDIMENTS

Sediment Sources

There are three major sources which account for the sediment entering the Indiana Harbor Canal/Grand Calumet River (IHC/GCR). They are municipal and industrial discharges, combined sewer overflows, and urban runoff which contribute an estimated 152,000 CY (or 182 million pounds) of sediment to the IHC/GCR each year. There are 39 permitted outfalls on the IHC/GCR which serve municipal sewage treatments plants, integrated steel manufactur-

ing facilities, and chemical producers among others. In addition to these controlled point sources, the sanitary districts of Gary, Hammond, and East Chicago maintain combined sewer systems which overflow to the IHC/GCR during even light storm events.

Most of the IHC/GCR system has reached a steady-state condition, meaning there is a balance of sediment deposition and scour/transport. The result of this condition is a loading of 100,000 to 200,000 CY of sediment to Lake Michigan from the mouth of the Indiana Harbor each year. The annual sediment load to the lake contains an estimated 67,000 pounds of chromium, 100,000 pounds of lead, and 420 pounds of PCB's. The adverse impacts of this loading can be seen in the surface sediments of the nearshore lake for a distance of more than 5 miles from the harbor. The transport and re-suspension of this material in the littoral zone of the lakeshore greatly increases the exposure of sediment contaminants to the diverse and sensitive aquatic life which inhabits the area. It is also in this littoral zone that the contaminated sediment from IHC/GCR has the potential to impact man as the area provides both potable water supplies and recreational opportunities, including a sports fishery. Once contaminated sediments have moved from the IHC/GCR into Lake Michigan, they are essentially beyond remediation.

Actions taken against dischargers to the IHC/GCR by the U.S. EPA and the Indiana Department of Environmental Management (IDEM) will result in a reduction of sediment loading to the waterway. A Consent Decree between the U.S. EPA and the Gary Sanitary District has significantly reduced the number of combined sewer overflow events contributing sediment to the IHC/GCR. Other Decrees between the U.S. EPA and the USX Corporation and the Inland Steel Company will reduce sediment loadings to the waterway by returning company discharges of pollutants, including total suspended solids, to levels specified in their discharge permits.

Environmental dredging pursuant to the Consent Decrees will also reduce the amount of sediment entering the IHC navigation channel. Over the next several years, both USX and the Gary Sanitary District will be removing contaminated sediments from segments of the Grand Calumet River in order to comply with the terms of their agreements with the U.S. EPA. After dredging, sediments will be deposited in those river segments that would otherwise have been transported further downstream, either depositing in the navigation channel or displacing other sediments which would be deposited in the channel. The Inland Steel Company will also dredge the IHC in areas adjacent to their docks outside of the Federal navigation channel. A Consent Decree between the U.S. EPA and LTV Steel requires the company to dredge sediments from its water intake flume. This work will help to reduce shoaling at the harbor entrance and in the littoral zone of Lake Michigan.

Sediment Contamination Sources

Industrial and municipal outfalls, including combined sewer systems, are a primary source of pollution of the IHC/GCR sediments. Characterization of sediments in 13 miles of the Grand Calumet River and the IHC conducted by the USX Corporation pursuant to a Consent Decree with the U.S. EPA identified sediment contamination consistent with wastes from industries that either have discharged directly to the river, or have discharged indirectly to the river through local sewage treatment plants and combined sewer overflows. Many of these sources are located upstream of the IHC and contamination of sediments often occurs before deposition in the navigation channel.

The USX studies, partially completed in 1993, examined sediments from the point at which the Grand Calumet River emerges from a culvert on USX property to the Calumet River Branch and then along the Calumet River Branch to the 141st Street bridge, the upstream terminus of the Federal channel. The study area also included a short reach of the West Branch to Indianapolis Boulevard. In 36 transects from roughly the USX culvert to the Gary Sanitary District outfall, the characterization study showed that fully one-third of the 66 samples taken contained PCBs at concentrations greater than or equal to 500 parts per million. Sediments were contaminated with PCBs or elevated levels of hazardous wastes at 27 of the 36 transects.

The U.S. EPA and the IDEM are taking steps to address the numerous sources of sediment contamination in the navigation channel. The agencies' Northwest Indiana Action Plan, which establishes goals for environmental improvement in the area, places a high priority on enforcing compliance with discharge permits. The U.S. EPA and the IDEM are in the process of gathering data to use in the development of a Total Maximum Daily Load (TMDL) for pollutants entering the Grand Calumet River. The TMDL will provide information necessary to establish new, lower levels of pollutants allowed under future discharge permits.

The regulatory agencies are also taking steps to control the non-point sources of pollution that have and are contaminating the IHC/GCR sediments. The IDEM, through a U.S. EPA grant, is contracting for whole effluent toxicity testing (WETT) of combined sewer overflows (CSO's) to determine their effect on water quality. CSO control plans included in various Consent Decrees between the U.S. EPA and the sanitary districts of Gary, Hammond, and East Chicago require the implementation of minimum technologies at their sewage treatment plants. A Remedial Action Plan for the IHC/GCR, required by international agreement and prepared by the IDEM, identifies several projects to control non-point sources of pollution impacting sediments.

In addition to reducing the amount of new contaminants entering the IHC/GCR, the U.S. EPA and the IDEM are also enforcing the removal of existing contaminants from the river system. A Consent Decree between U.S. EPA and USX requires a minimum of

$5 million of sediment removal and disposal from the river reach between the USX culvert and the Gary Sanitary District outfall. Another Decree requires the Gary Sanitary District to spend at least $1.7 million removing sediment from the river between its outfall and Cline Avenue. These projects will reduce the pollutants entering the navigation channel through scour/transport of previously contaminated sediments. Consent Decree dredging by the Inland Steel Company outside of the navigation channel in the IHC and by LTV Steel Company in its water intake flume will reduce the amount of contaminated sediment entering the navigation channel through sloughing of channel sides.

Sediment Quality

A detailed analysis of the quality of the bottom sediments in the IHC is given in Appendix E, Sediment Quality. A brief summary of that analysis is provided in the following paragraphs.

Sediments in the harbor and canal are mostly silt and clay with some sand. The bulk chemistry from discrete sediment sampling events consistently shows high levels of metals, nutrients, oil and grease, and volatile solids. There is a lateral trend of decreasing levels as one moves downstream and into Lake Michigan. This trend is more distinct for some parameters than it is for others. The levels of total volatile solids show a clear trend of decreasing as one moves out of the harbor and canal, while the levels of iron vary widely throughout the harbor and canal and show no clear trend. There are no consistent vertical trends for most parameters. However, the database for PCBs displays both lateral and vertical trends.

Sampling of the IHC sediment in 1979 and 1983 detected PCBs in concentrations between 1 and 90 parts per million (ppm). The highest PCB concentrations were detected in the deeper sediment layers in the most upstream portion of the Calumet River Branch, and along the north bank of the main canal between the Indiana Harbor Belt Railroad and the Pennsylvania Railroad bridges, as shown on Figure 14. Approximately 70,000 CY of sediments are regulated for disposal under the Toxic Substances Control Act (TSCA). However, data from a 1988 sampling event detected PCBs in concentrations below concentrations detected in previous sampling events.

Bulk chemical analysis has shown the presence of PAH compounds in sediment samples. No discernible distribution trends are evident, but samples collected in 1985 showed elevated levels of several PAH compounds. The levels present in some samples are considered very high in comparison to values found in other Great Lakes harbor sediments.

The volume-weighted concentrations of measured contaminant parameters for IHC sediments were determined based on sediment sampling data. The concentrations determined from each sampling event were weighted against a representative volume of sediment

in order to determine the average concentration. The results are shown in Table 2. The IHC sediments are not suitable for open-lake disposal, unconfined upland disposal, or beneficial uses.

In 1990, the U.S. EPA collected core samples from six locations in the Indiana Harbor and Canal area. All of the samples were analyzed via the Toxicity Characteristic Leaching Procedure (TCLP), to determine the status of the project sediments under Subtitle C of RCRA in accordance with U.S. EPA policy. The USACE and the U.S. EPA have different national policies regarding the application of RCRA to dredged material. It is USACE policy that dredged material is not a solid waste, and its disposal is, therefore, not subject to the provisions of RCRA. In contrast, it is U.S. EPA policy that dredge material could require handling as a solid waste or potentially as a hazardous waste subject to the provisions of RCRA.

The 1990 TCLP results initially passed their laboratory review and were approved for regulatory use under U.S. EPA policy. However, further review of the 1990 TCLP results determined that the TCLP methodology for the organic constituents was not conducted properly and therefore the initial data approval for these compounds was reversed. During the interim, the 1991 TCLP sampling effort was completed. The 1991 sampling effort was based upon the results of the 1990 TCLP results. When the data quality problems associated with the 1990 results were found, U.S. EPA Region 5 decided to resample the entire Federal navigation channel in 1992. The purpose of the 1992 effort was to characterize the project sediments under Subtitle C of RCRA. The 1992 data was the basis of the regulatory determination provided by the U.S. EPA to the USACE in September 1993.

Only one regulatory exceedance was found to be associated with the 1990 TCLP data sets. This was a benzene value, which was found to have been obtained from a location outside of the limits of the navigation project. As noted above, this benzene value, along with all of the organic data from the 1990 TCLP data, was later found to be unusable for U.S. EPA regulatory determinations.

The 1992 sediment TCLP characterization effort consisted of the collection of 16 sediment core samples from 14 locations covering all sections of the Federal channel. Two of the 16 core samples were field duplicates which were collected from two separate locations in the channel. The samples were analyzed via the TCLP for metals, volatiles, semi-volatiles, pesticides, and herbicides. With the exception of one of the samples, all of the TCLP results were found to be acceptable for U.S. EPA regulatory determinations and to be below the TCLP regulatory thresholds. The sample with an exceedance was a field duplicate that failed for benzene and had a laboratory error which rendered that particular result unusable for regulatory determinations. Consequently, the U.S. EPA/IDEM determined that all of the project sediments, with the exception of the sediments associated with the benzene exceedance, would not be regulated as a RCRA

hazardous waste if dredged. The sediments represented by the benzene exceedance were determined to be "presumptively hazardous" if dredged. The designation "presumptively hazardous" means that upon dredging, these sediments would require handling in accordance with RCRA Subtitle C, unless further retesting clarified that the sediments did not exhibit the hazardous waste characteristic of toxicity for benzene.

If these sediments continue to be classified by the U.S. EPA/IDEM as hazardous after further sampling and testing for benzene is completed, they will not be dredged as part of the Federal navigation project. These materials will have to be addressed by non-Federal interests as part of the site-specific remedial activities which will be undertaken in the berthing/dock areas adjacent to the Federal channel. If these sediments are dredged in the absence of further testing, they will require treatment in accordance with the standards under Subtitle C of RCRA prior to land disposal.

Table 2 Volume-Weighted Mean Concentrations of Indiana Harbor and Canal Sediments

Parameter	Volume-Weighted Mean Concentration[1/]
Volatile Solids	14.1%
COD	207,575
Oil & Grease	63,627
TKN	2,929
Ammonia	845
Cyanide	1.4
Manganese	1,914
Phosphorus	2,555
Arsenic	53
Barium	45
Cadmium	11
Chromium	370
Copper	156
Iron	144,623
Nickel	99
Lead	837
Zinc	3,669
Mercury	0.7
PCB's	8.9

[1/] All concentrations are mg/kg dry weight, unless otherwise noted.

Sedimentation Rates

A detailed analysis of sedimentation rates in the IHC was completed, including development of a computer model to simulate the sedimentation process. In addition, a computer model was constructed to simulate the dredging process and evaluate alternative dredging plans. This work is described in Appendix Q, Sedimentation Investigation and Dredging Plans, and is summarized later in this report in a section titled "Sedimentation Analysis" contained in the discussion on plan formulation.

NAVIGATION PROBLEMS

There is an estimated 1 million CY of backlog dredging at the IHC. The resulting inadequate channel depths are causing deep-draft vessels to plow through sediments at various locations in the Federal channel, moving polluted sediments around and pushing them into berthing areas and other areas located along dockfaces outside of the Federal channel. In addition, ships come into the harbor loaded at less than optimum vessel drafts. There is also restricted use of various docks requiring unloading at alternative docks and double handling of bulk commodities to the preferred dock. Some vessels approaching the Inland Steel Company docks have to temporarily berth in the navigation channel and then be winched into the docks as they are unloaded and their draft decreases. These problems are currently causing increased transportation costs of waterborne commerce at IHC, presently estimated at $12.4 million annually. These additional costs are estimated to increase to $17.3 million by the year 2031. The basis for these estimates is developed in Appendix B, Economic Analysis. These economic losses are supported by the following statement contained in the report titled, 1992 Annual Report, Lake Carriers' Association, 1993 Objectives: "Indiana Harbor has not been dredged for nearly 20 years. Ships trading into Indiana Harbor forfeit as much as 16 inches of draft, or more than 4,300 tons of cargo each arrival."

The primary shoaling problem areas are in the outer harbor anchorage and maneuver basin in Reaches 3 and 4 (Figure 13) and the canal area of Reaches 5 and 6 in the vicinity of the five downstream railroad bridges. Vessels have difficulty navigating and turning in Reaches 3 and 4 and sometimes run aground in Reach 4. The shoaling in Reaches 5 and 6 causes time consuming delays in unloading cargo. Vessels delivering commodities to the docks near the five bridges must unload some cargo downstream to reduce their draft before moving upstream to complete unloading. This is the shallowest area in Reach 5, where the depth in the Federal channel averages 24 feet. Upstream of the five bridges, Reach 8 is the controlling reach under existing conditions.

ENVIRONMENTAL ISSUES

The IHC/GCR region is identified as one of 43 Great Lakes Areas of Concern by the International Joint Commission. Much of this concern is related to the quality of watercourse sediments. Polluted sediments are continually put into suspension due to propeller action of commercial ships. Major storm events flush polluted sediments from the harbor into Lake Michigan. The adverse impact can be seen in the movement of the sediment in the nearshore zone for a distance of more than 5 miles from the harbor entrance, potentially affecting water supply intakes, and sport fishing and recreation areas. It is estimated that between 100,000 and 200,000 CY of polluted sediment are being discharged from the harbor into the lake annually. Dredging will remove approximately 4.67 million CY of contaminated sediments from the ambient environment in Northwest Indiana and will partially mitigate the currently unrestrained migration of these materials into the near shore areas of Lake Michigan.

PLAN FORMULATION OBJECTIVES

NATIONAL PLANNING OBJECTIVE

The guidelines for Federal agency planning are outlined in the Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies", signed by the President on 3 February 1983. The objective of water and related land resources project planning by Federal agencies is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to the national economic development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units and economic efficiency. Water and related land resources project plans are formulated to alleviate problems and take advantage of opportunities in ways that contribute to this objective.

U.S. ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA)

The U.S. EPA's primary interest in maintenance dredging at the IHC is in removing contaminated sediments from the Grand Calumet River ecosystem, currently an Area of Concern (AOC) under the Great Lakes Water Quality Agreement. The dredging of the navigational channel by the U.S. Army Corps of Engineers would remove tons of low-level contaminants that denigrate the river system. Northwest Indiana is currently one of the geographical target areas of the U.S. EPA, Region V, where numerous initiatives in enforcement, pollution prevention, and public outreach are taking place. In conjunction with the U.S. EPA enforcement activities in the AOC, pollution moving into Lake Michigan can be curtailed by completing the dredging project. The construction of the proposed CDF on the ECI site addresses two concerns in the

AOC. First, the ECI site is, perhaps, the only site available to build the CDF that minimizes transport and local opposition concerns. Second, the CDF is part of the solution to the environmental cleanup required at the ECI site, further reducing contamination sources in the Grand Calumet River system.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM)

The IDEM is working with the U.S. EPA in implementing a joint enforcement strategy to restore the quality of the air, soil, surface water and groundwater in the IHC/GCR region of northern Lake County, Indiana. Integral to the restoration of these resources is the remediation of contaminated sediments in the IHC/GCR. In view of its Remedial Action Plan for the IHC/GCR region, the IDEM desires removal of the contaminated sediments from the Federal navigation channels in the IHC. Maintenance of the navigation project will permit the Federal channels to act as a sediment trap for contaminated sediments moving downstream toward Lake Michigan.

COMPREHENSIVE MANAGEMENT PLAN (CMP) OBJECTIVES

The following are the planning objectives for this CMP:

- Contribute to the reduction in commercial navigation transportation costs at IHC during the 1998 - 2031 period of analysis.

- Contribute to the improvement of the quality of the bottom sediment at IHC, thereby contributing to the improvement of water quality at the south end of Lake Michigan during the 1998 - 2031 period of analysis.

FORMULATION OF ALTERNATIVE PLANS

An extensive formulation process was undertaken over a 19-year period to develop a cost-effective and environmentally acceptable plan for maintenance dredging and dredged material disposal at the IHC which would also be supported by concerned federal, state and local agencies and other local interest groups. The process included five distinct phases which are discussed in the following paragraphs.

INITIAL PHASE: MID-1970'S

Prior to 1972, dredged material from the IHC was disposed of in a designated open water area of Lake Michigan or in the permitted lakefills of the Inland Steel or the Youngstown Sheet & Tube (LTV) Companies located on the east and west side of the harbor entrances, respectively. In 1972, the U.S. EPA determined that disposal in Lake Michigan was no longer acceptable due to the polluted character of the dredged material.

During the period 1975 to mid-1978, the Chicago District completed site/engineering investigations and a DEIS for use of the Inland Steel Company lakefill for dredged material disposal under the authority of Section 123 of the Rivers and Harbors Act of 1970 (PL 91-611). The legislation authorized the construction of confined dredge disposal facilities to hold maintenance dredgings generated over a period not to exceed 10 years. Only dredged sediments classified as polluted by the Administrator, U.S. EPA, could be placed within a confinement area. Under this program, cost of construction and maintenance was to be primarily borne by the Federal Government with local interests required to provide rights-of-way, hold and save the United States free from damages, operate and maintain the CDF, and contribute 25 percent of the CDF construction cost which was subject to a waiver. The design capacity was to be based on an estimate of the total amount of polluted material which would be dredged in a particular harbor over a period of 10 years.

The initial investigation concentrated on use of the Inland lakefill as had been done previously, except that an existing gap in the lakefill containment structure was to be closed to preclude migration of material placed in the lakefill into Lake Michigan. However, in April 1978, the U.S. EPA advised the District Engineer that construction of a separate impermeable containment facility within the existing Inland lakefill was required. The U.S. EPA would not approve use of the existing lakefill.

In view of the U.S. EPA comments and requirements, the District Engineer undertook a study of the feasibility of constructing a CDF (CDF) inside of the Inland Steel Company lakefill. The proposed location of the CDF was in the northeast corner of the lakefill. The subsequent investigations indicated that construction of a CDF at this location would be extremely costly and had significant technical and policy issues which would require substantial additional study. The technical issues included such items as the degree of acceptable Lake Michigan wave overtopping of the CDF, the type of containment structures required to properly confine the dredged material within the existing lakefill structure, and the potential impact of the deposition of polluted dredged material in the CDF on the surrounding groundwater. Policy issues included the appropriateness of constructing a Federal facility within a private, permitted lakefill and the associated liabilities. In view of the high construction cost and the outstanding issues, the District Engineer concluded that a comprehensive investigation of alternative dredged material disposal sites/plans was warranted.

SECOND PHASE: LATE 1970'S TO MID-1980'S

In the late 1970's, the Chicago District began a comprehensive investigation of 16 alternative CDF sites under the Section 123 authority. The results of this investigation were published in a report titled "Site Selection Study, Indiana Harbor, Indiana, Confined Disposal Facility", dated May 1983. That report is on file in the Chicago District Office. The site selection

report lead to preparation of a letter report and DEIS titled "Indiana Harbor Confined Disposal Facility", dated February 1986, copies of which are also on file in the Chicago District Office. The letter report and DEIS recommended construction of a CDF in Lake Michigan at a site known as Jeorse Park under the Section 123 authority. Following extensive agency and public coordination of the letter report and DEIS, the Jeorse Park plan was dropped from further consideration because of significant public opposition and lack of support for the plan by the U.S. EPA and the State of Indiana. The results of the 1983 site selection studies and the 1986 letter report are summarized in the following paragraphs.

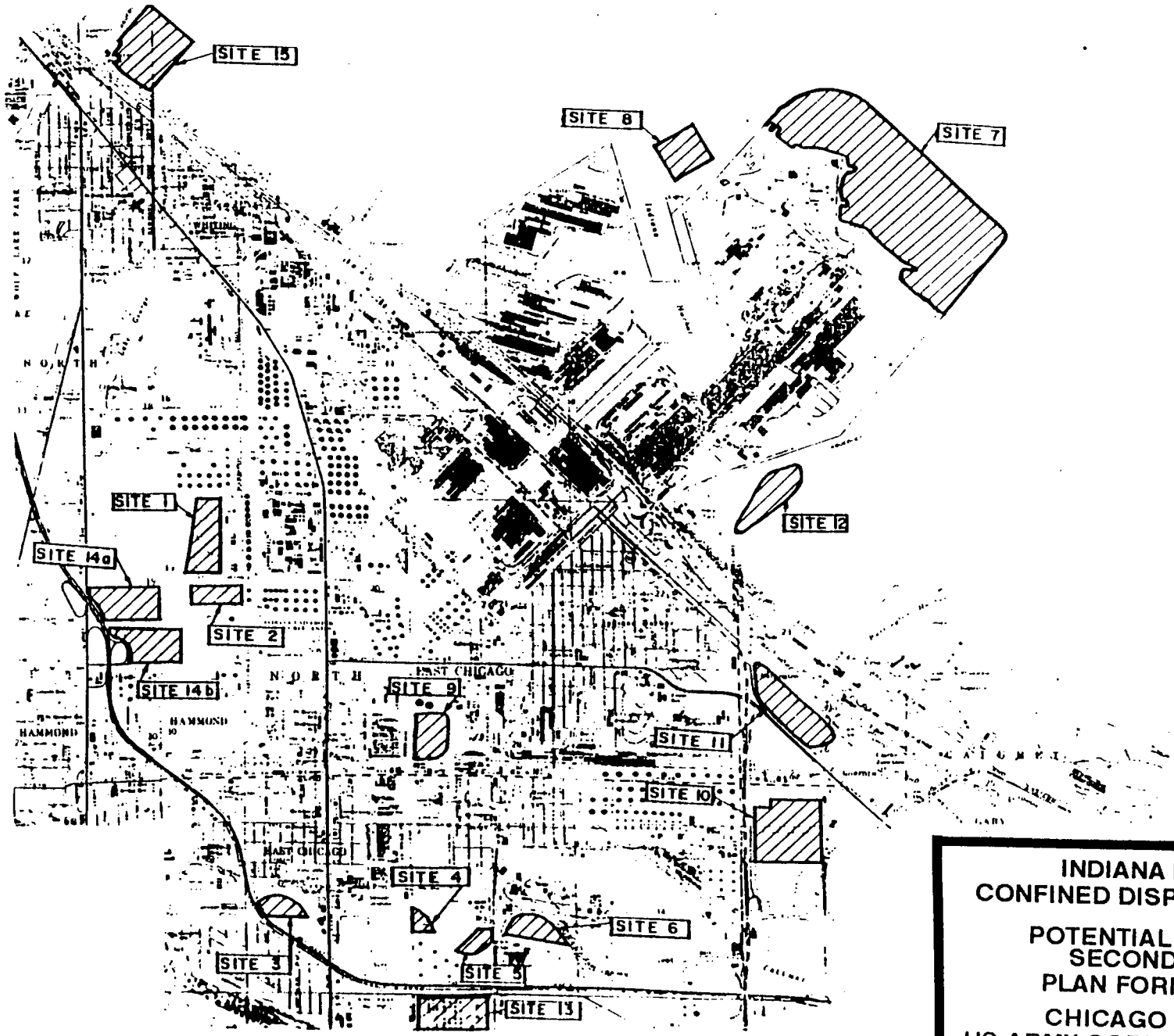
Site Selection Study

This study considered confined disposal facilities at 16 alternative sites, as shown on Figure 3. Twelve of these sites were located in upland areas; the remaining four were located in Lake Michigan. The 10-year CDF design capacity used in the site selection study was 1.85 million CY for dredged materials from the IHC Federal navigation project. This included an estimated 820,000 CY in backlog dredging and 1,030,000 CY in estimated maintenance dredging over the 10-year period. An additional 150,000 CY for private dredging from dock areas and approaches was included at those sites which physically could accommodate the additional yardage.

Based on preliminary screening studies, four sites were selected for detailed study. These included Site Nos. 11, 12, 14b and 15. Site Nos. 11 and 14b were upland sites and Nos. 12 and 15 were lake sites. A description of each of the four sites and a discussion of their capacity, design characteristics, associated methods of dredging and disposal, costs, and environmental impacts, are given on pages 11-19 of the 1983 site selection report. The remaining 12 sites were dropped from consideration due to environmental, engineering or operational problems or lack of public support, as summarized on pages 19-21 of the 1983 site selection report and in Appendix E of the 1986 letter report.

Letter Report

The design, cost engineering, and environmental impact analysis of the four CDF sites/plans investigated in the 1983 site selection study were refined during preparation of the letter report. This included reducing the 10-year CDF design capacity from 2 million to 1.3 million CY. The estimated amount of backlog dredging was reduced from 820,000 to 700,000 CY, which reflected the elimination of the dredging and disposal of the TSCA material. The 10-year maintenance dredging volume was reduced from 1,030,000 to 500,000 CY and the allowance for private dredging was reduced from 150,000 to 100,000 CY.



INDIANA HARBOR
CONFINED DISPOSAL FACILITY

POTENTIAL CDF SITES
SECOND PHASE
PLAN FORMULATION

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

Figure 3

A summary of the pertinent information regarding the four CDF sites/plans and the reason for selection or elimination of each alternative as the preferred alternative follows. Table 3 summarizes the estimated cost of each alternative.

Site 11

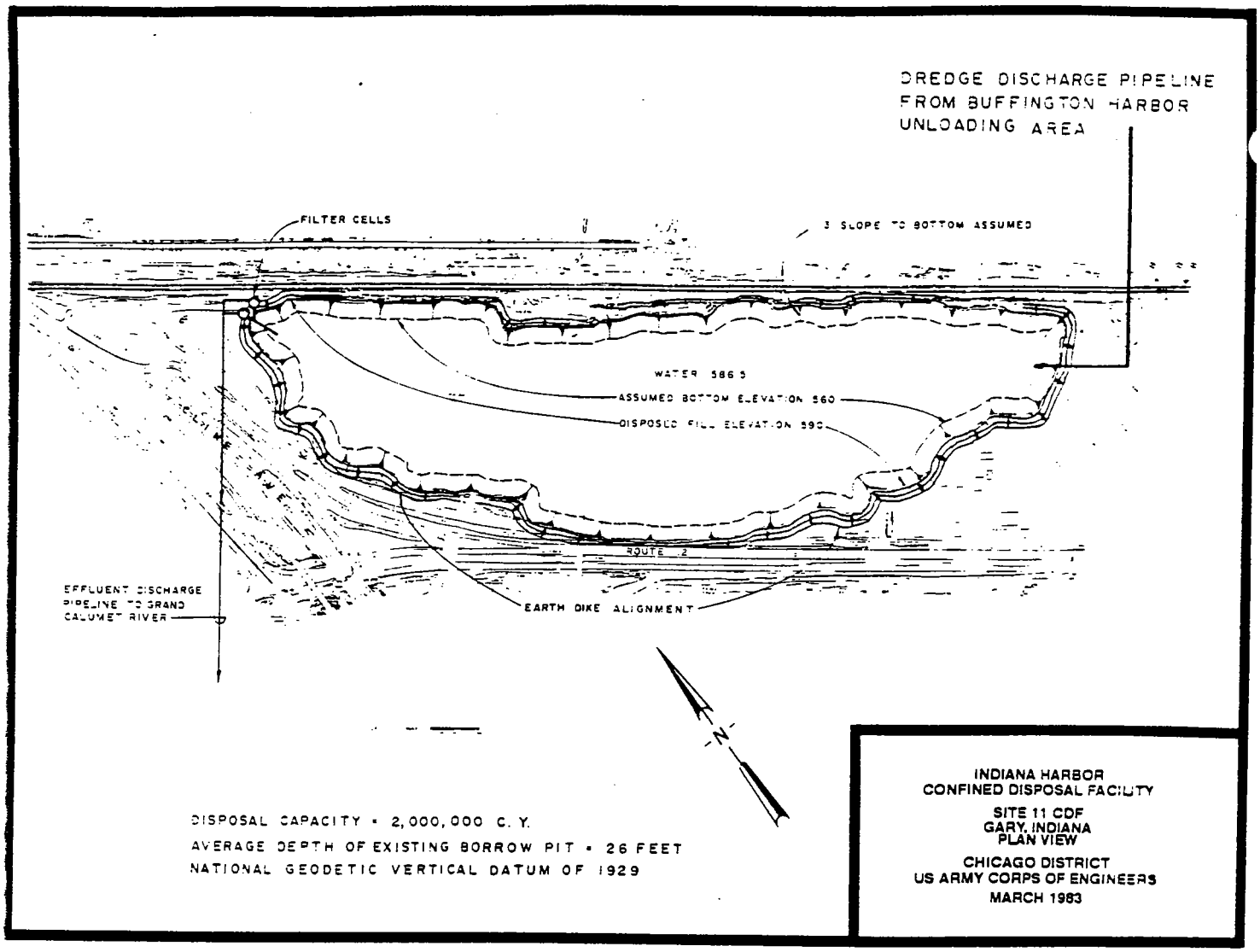
- Location and Description: Site 11 was an upland site located in Gary, Indiana. The site was a submerged borrow pit of approximately 95 acres bordered on the northeast by the former Penn Central Railroad, on the south by a power transmission line, on the southeast by Industrial Highway and on the west by a power transmission line. Figure 4 shows the CDF plan for this site.

- Capacity: This site was capable of holding 1,200,000 CY of dredged material. Sufficient capacity was also available for the 2-foot clay seal and 3-feet of topsoil.

- Retaining Structure: Because of the high groundwater table at this site, a bentonite slurry trench would be constructed around the entire circumference of the pit to permit dewatering After the pit was dewatered, a 5-foot thick clay liner would be constructed with an underdrain system to minimize hydrostatic uplift on the clay liner. The site would be divided into primary and secondary settling areas separated by a dike made of compacted earth. The return water and precipitation would be removed from the primary settling area, polymer flocculent added, and discharged to the secondary settling area. Treated return water would be pumped from the secondary settling area to the Grand Calumet River. A typical section through the CDF at Site 11 is shown on Figure 4.

- Operational Aspects: Dredging would be accomplished by a closed clamshell, with dredged material placed in scows. The scows would be moved to an unloading area at Inland Steel or near Buffington Harbor. From there, dredgings would be trucked to the disposal area. After the disposal area was filled and the dredged material dewatered and consolidated, the site would be capped by a 2-foot thick clay seal and 3-feet of topsoil, which would be seeded.

- Environmental Assessment: The environmental resources of the site are composed of a 95 acre borrow lake with a narrow terrestrial border. The terrestrial habitat of the lake shoreline is dominated by weedy herbaceous species common to the region such as chickory, smooth brome, sweet clover, and cottonwoods. Wildlife species inhabiting the upland area include species common to urban areas such as song sparrows, mourning doves, american goldfinch and eastern cottontail rabbit. A bank swallow colony has been established in high sandy banks along the eastern portion of the site. The lake itself provides a resting and foraging area for waterfowl and herring gulls. Information on aquatic populations in the lake is limited, however a fishery exists at the site. Existing fish populations include sunfish (green, redear, and bluegill sunfish, bass, catfish (bullhead


DREDGE DISCHARGE PIPELINE
FROM BUFFINGTON HARBOR
UNLOADING AREA
FILTER CELLS
3 SLOPE TO BOTTOM ASSUMED
WATER 586.5
ASSUMED BOTTOM ELEVATION 560
DISPOSED FILL ELEVATION 590
ROUTE 2
EFFLUENT DISCHARGE
PIPELINE TO GRAND
CALUMET RIVER
EARTH DIKE ALIGNMENT
N
DISPOSAL CAPACITY = 2,000,000 C. Y.
AVERAGE DEPTH OF EXISTING BORROW PIT = 26 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 11 CDF
GARY, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

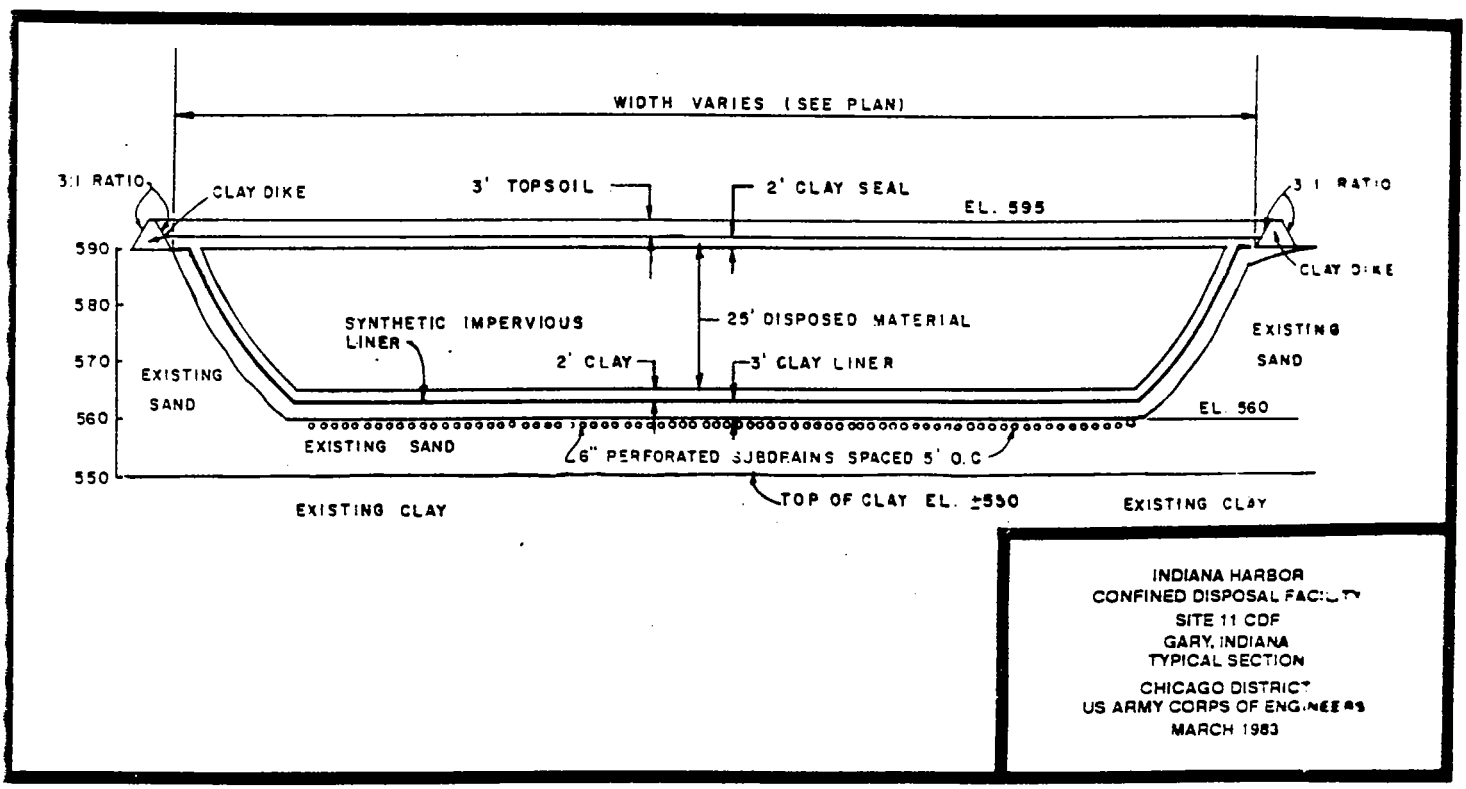

WIDTH VARIES (SEE PLAN)
3:1 RATIO
CLAY DIKE
3' TOPSOIL
2' CLAY SEAL
EL. 595
3:1 RATIO
CLAY DIKE
590
580
570
560
550
SYNTHETIC IMPERVIOUS
LINER
25' DISPOSED MATERIAL
2' CLAY
3' CLAY LINER
EXISTING
SAND
EXISTING
SAND
EL. 560
EXISTING SAND
6" PERFORATED SUBDRAINS SPACED 5' O.C
TOP OF CLAY EL. ±550
EXISTING CLAY
EXISTING CLAY
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 11 CDF
GARY, INDIANA
TYPICAL SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

Figure 4

and channel catfish), and yellow perch. The use of the site would convert the 95 acres of aquatic habitat into terrestrial habitat similar to the surrounding area. Aquatic populations and habitat used by waterfowl as a resting area would be destroyed as a result of disposal operations and conversion to terrestrial habitat. The site is used as a fishing pond by local residents.

- Reasons for Site Elimination: Site 11 was eliminated for the following reasons:

  - Anticipated problems in dewatering and sealing the site.
  - Higher construction costs.
  - Loss of current use by local fishermen.
  - Potential recreational development of the site.
  - No local support or local sponsor for use of this site.

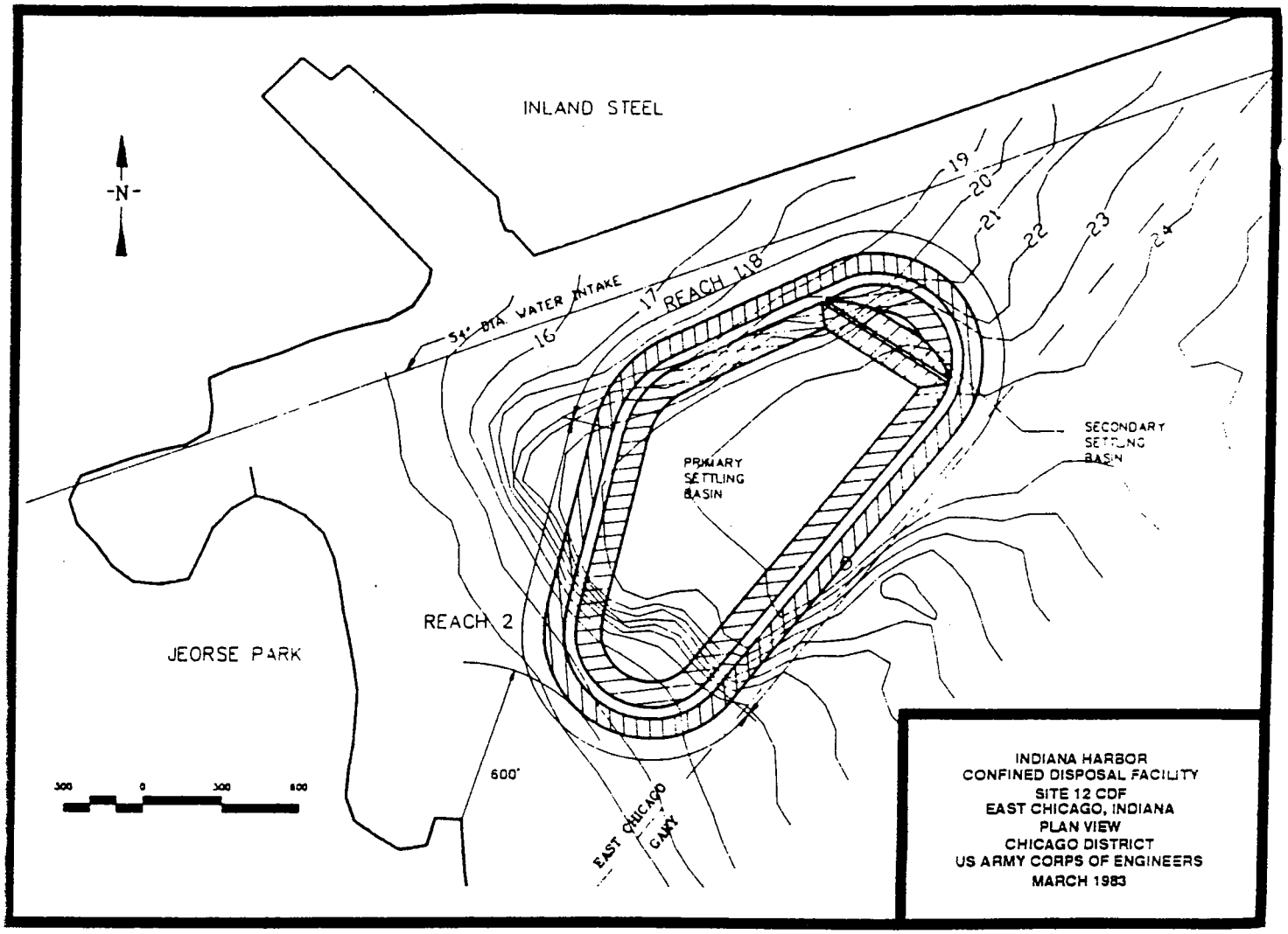
Site 12

- Location and Description: Site 12 was a lake site located southeast of the Inland Steel lakefill and east of Jeorse Park in East Chicago, Indiana. The CDF would consist of a 43-acre triangular shaped island, as shown on Figure 5. The site and shape of the facility was selected in order to create a sheltered water area in which the city of East Chicago planned to develop a small-boat harbor.

- Capacity: Approximately 1,300,000 CY of dredged material would have been placed in the CDF to elevation +10.0 LWD. The dike would be constructed to a top elevation of +15.0 LWD. The additional capacity would be provided to prevent backwashing into Lake Michigan in the event waves overtopped the containment dikes and inundated the disposal area. The CDF would be capped with 2 feet of clay and 3 feet of topsoil and then seeded. The purpose of the cap would be to provide a seal to prevent surface water from leaching into the facility and to prevent uptake of dredged material contaminants by plants and animals.

- Retaining Structure: The containment structure would consist of a stone-filled dike with a prepared limestone core, as shown on Figure 5. A synthetic filter fabric and a graded sand filter would be placed on the disposal side to filter-out the suspended solids so that the filtrate passing through the dike would meet Lake Michigan water quality standards. The sand for the filter would be dredged from underneath the dike peri-meter and from within the CDF and placed on the inside slope of the dike.

- Operational Aspects: The bottom sediments would be mechanically dredged utilizing a closed clamshell to reduce turbidity in the upper water column. The dredged material would be placed in scows and towed to a rehandling area at the CDF. The dredged material would be removed from the scows using a closed clamshell and side-cast over the dike into the CDF. A drip pan would be used at the rehandling area to prevent dredged material from spilling into the lake during rehandling operations.


INLAND STEEL
-N-
54" DIA. WATER INTAKE
REACH 1&8
16
17
19
20
21
22
23
24
PRIMARY SETTLING BASIN
SECONDARY SETTLING BASIN
REACH 2
JEORSE PARK
600'
300
0
300
600
EAST CHICAGO CANAL
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 12 CDF
EAST CHICAGO, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

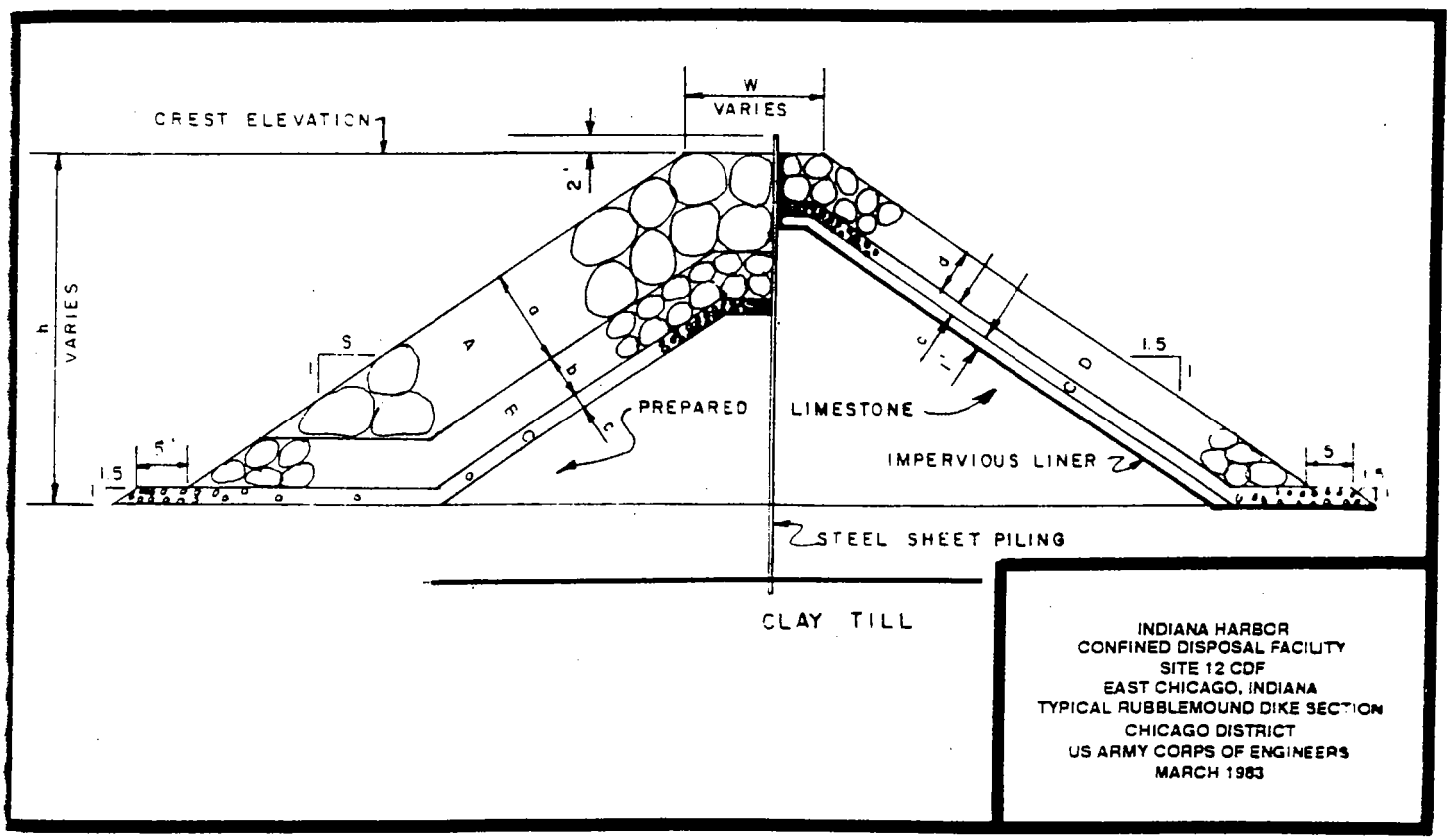

W
VARIES
CREST ELEVATION
2'
h
VARIES
S
1
1.5
5'
PREPARED
LIMESTONE
IMPERVIOUS LINER
STEEL SHEET PILING
CLAY TILL
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 12 CDF
EAST CHICAGO, INDIANA
TYPICAL RUBBLEMOUND DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

Figure 5

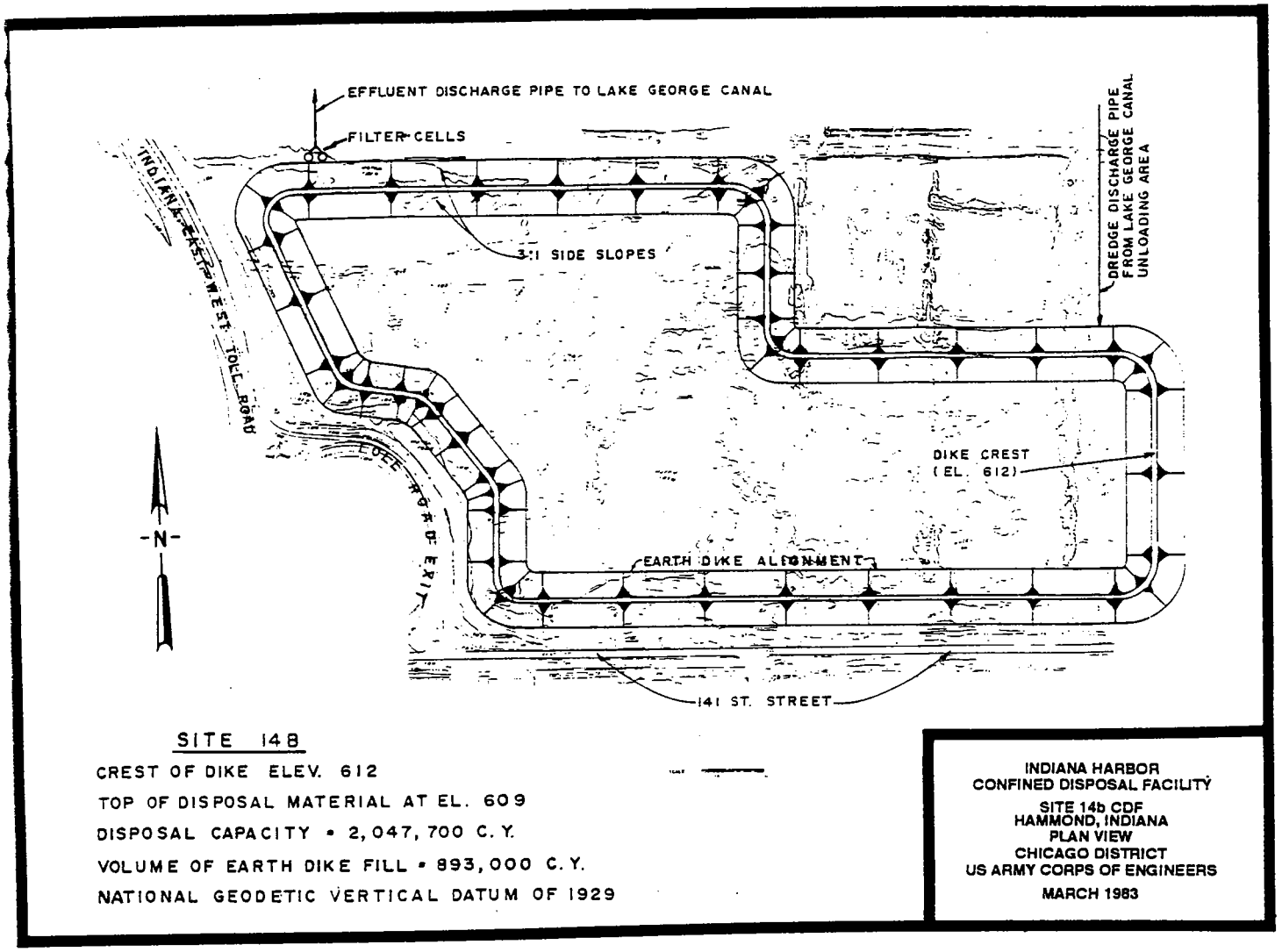
- Environmental Assessment: The Indiana Department of Natural Resources (IDNR) annually imprints and stocks chinook salmon and lake trout into Lake Michigan at Jeorse Park. Brown trout are common in the area of Site 12 because of past IDNR imprinting and stocking of the species at Jeorse Park. Yellow perch and smelt are also common and are popular with sport and recreational fishermen. Other aquatic organisms in the immediate area of the site would include: herrings, carps, minnows, catfish, sunfish, flatworms, segmented worms, clams, snails, crustaceans, and insect larvae. Minimizing impacts on the aquatic organisms in the area and protecting the water quality of Lake Michigan in general, and specifically at the nearby water intake structure, were factors receiving special consideration in the design of Site 12. Provision for enough freeboard at all times prior to final capping of the facility would be necessary to prevent overflow resulting from wave overtopping of the structure during storms. The surrounding lake shore and harbor areas are primarily industrial. No adverse social impacts were anticipated if Site 12 was used as a disposal facility.

- Reasons for Site Selection: Site 12 was selected as the preferred CDF site for the following reasons:

  - It was the alternative with the lowest CDF construction cost and the lowest annual dredging cost.
  - It was the only site for which a local public sponsor, the Lake County Board of Supervisors, was willing to provide the items of local cooperation originally required by Section 123. The Section 123 requirement for local cooperation was dropped in 1984 by the Office, Chief of Engineers (OCE) during its review of the Fiscal Year 1986 Operations and Maintenance (O&M) budget. At that time, the OCE moved the IHC CDF funding from the O&M Diked Disposal Program to the O&M General Program. The OCE phased out the Dike Disposal Program because it could be argued that the 10-year period authorized by Section 123 of the 1970 River and Harbor Act expired in 1980. The Lake County Board Commission was subsequently advised that local sponsorship of the CDF was no longer required. In a letter dated December 27, 1984, the Board of Commissioners indicated its desire to continue as the local project coordinator.

Site 14b

- Location and Description: Site 14b was an upland site of approximately 83 acres, located in Hammond, Indiana as shown on Figure 6. The southern boundary is 141st Street, the western boundary is the interchange of the East-West Indiana Tollroad, the northern boundary is the edge of an existing wetland and the eastern boundary is an existing tree line. The entire area appears to have been a former wetland area which has been filled. All of this site lies within the 100-year floodplain. If selected, compensatory storage would have had to be provided.


EFFLUENT DISCHARGE PIPE TO LAKE GEORGE CANAL
FILTER CELLS
INDIANA EXPRESSWAY
TOLL ROAD
3:1 SIDE SLOPES
DREDGE DISCHARGE PIPE FROM LAKE GEORGE CANAL UNLOADING AREA
DIKE CREST (EL. 612)
EARTH DIKE ALIGNMENT
141 ST. STREET
-N-
SITE 14B
CREST OF DIKE ELEV. 612
TOP OF DISPOSAL MATERIAL AT EL. 609
DISPOSAL CAPACITY = 2,047,700 C.Y.
VOLUME OF EARTH DIKE FILL = 893,000 C.Y.
NATIONAL GEODETIC VERTICAL DATUM OF 1929
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 14b CDF
HAMMOND, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

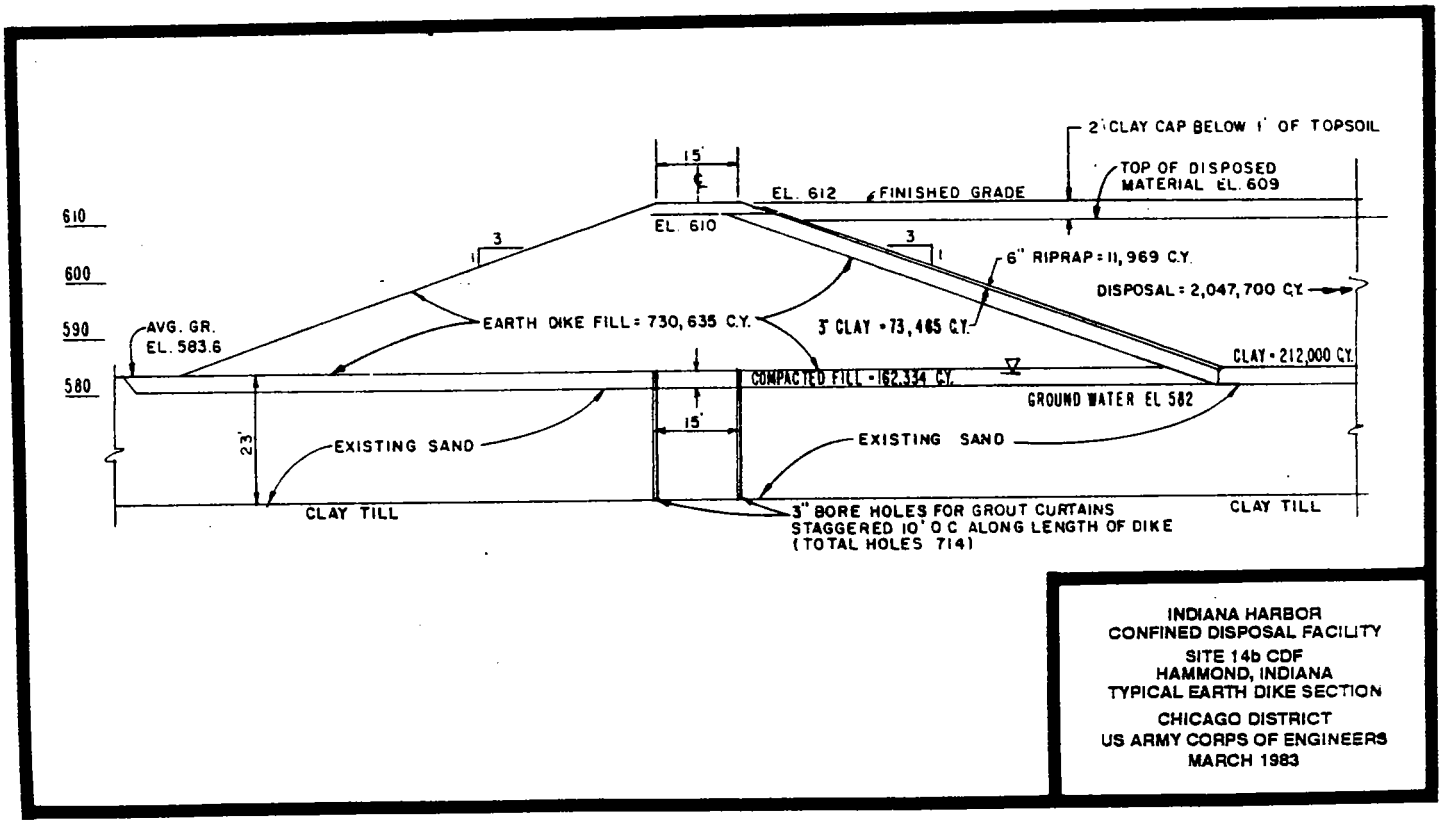

2' CLAY CAP BELOW 1' OF TOPSOIL
TOP OF DISPOSED MATERIAL EL. 609
15'
EL. 612
FINISHED GRADE
EL. 610
610
600
590
580
3
1
6" RIPRAP = 11,969 C.Y.
DISPOSAL = 2,047,700 C.Y.
AVG. GR. EL. 583.6
EARTH DIKE FILL = 730,635 C.Y.
3' CLAY = 73,465 C.Y.
CLAY = 212,000 C.Y.
COMPACTED FILL = 162,334 C.Y.
GROUND WATER EL 582
23'
EXISTING SAND
CLAY TILL
3" BORE HOLES FOR GROUT CURTAINS STAGGERED 10' O.C. ALONG LENGTH OF DIKE (TOTAL HOLES 714)
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 14b CDF
HAMMOND, INDIANA
TYPICAL EARTH DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

Figure 6

- Capacity: The site was capable of holding the 10-year maintenance dredging requirement of 1,200,000 CY, the estimated 100,000 CY of private dredgings, and 2-feet of clay cover and 3-feet of topsoil.

- Retaining Structure: An earthen dike 18 feet high would be constructed, with a 5-foot thick clay liner along the interior dike face and bottom, as shown on Figure 6. The site would be divided into a primary and a secondary settling area separated by an earthen cross dike. The return water and precipitation would be removed from the primary settling area, polymer flocculent added, and discharged to the secondary settling area. Treated return water would be pumped from the secondary settling area to the Lake George Branch.

- Operational Aspects: Dredging would be by closed clam-shell, with dredged material placed in scows. The scows would be transported to an unloading area in the Lake George Branch of the Indiana Harbor Canal, just east of Indianapolis Boulevard. From there the material would be trucked to the disposal facility. The completed CDF would be capped and seeded.

- Environmental Assessment: The site is an upland area of limited terrestrial habitat. Most of the site is composed of barren fill with scattered patches of vegetation. The upland vegetation consists of weedy species such as cottonwoods, golden-rod, and chickory. The northeast corner of the site supports a small pond with emergent wetland vegetation. Other than the small pond, the site provides little or no wildlife habitat. Aquatic resources are unknown but would be limited to the small wetland pond on the site. The use of the site would result in the loss of low quality terrestrial and aquatic habitat and creation of terrestrial habitat, similar to what currently exists.

- Reasons for Site Elimination: Site 14b was eliminated for the following reasons:

  - The city of Hammond was opposed to locating the CDF on Site 14b because the site is suitable for industrial use which would increase its tax base and provide jobs.
  - Site 14b is located in the 100-year floodplain. If Site 14b had been selected, compensatory storage would have had to be provided.
  - The Chicago District could not get a right-of-entry permit to take soil borings to determine the character of the soil and to determine if a dike structure could be built on the site.
  - No local support or local sponsor existed for use of this site.

Site 15

- Location and Description: Site 15 was a lake site adjacent to the city of Hammond filtration plant. The CDF plan would consist of constructing an off-shore island of approximate-

ly 52 acres. Under this plan, local interests could have developed a marina between the existing shore and CDF, as shown on Figure 7.

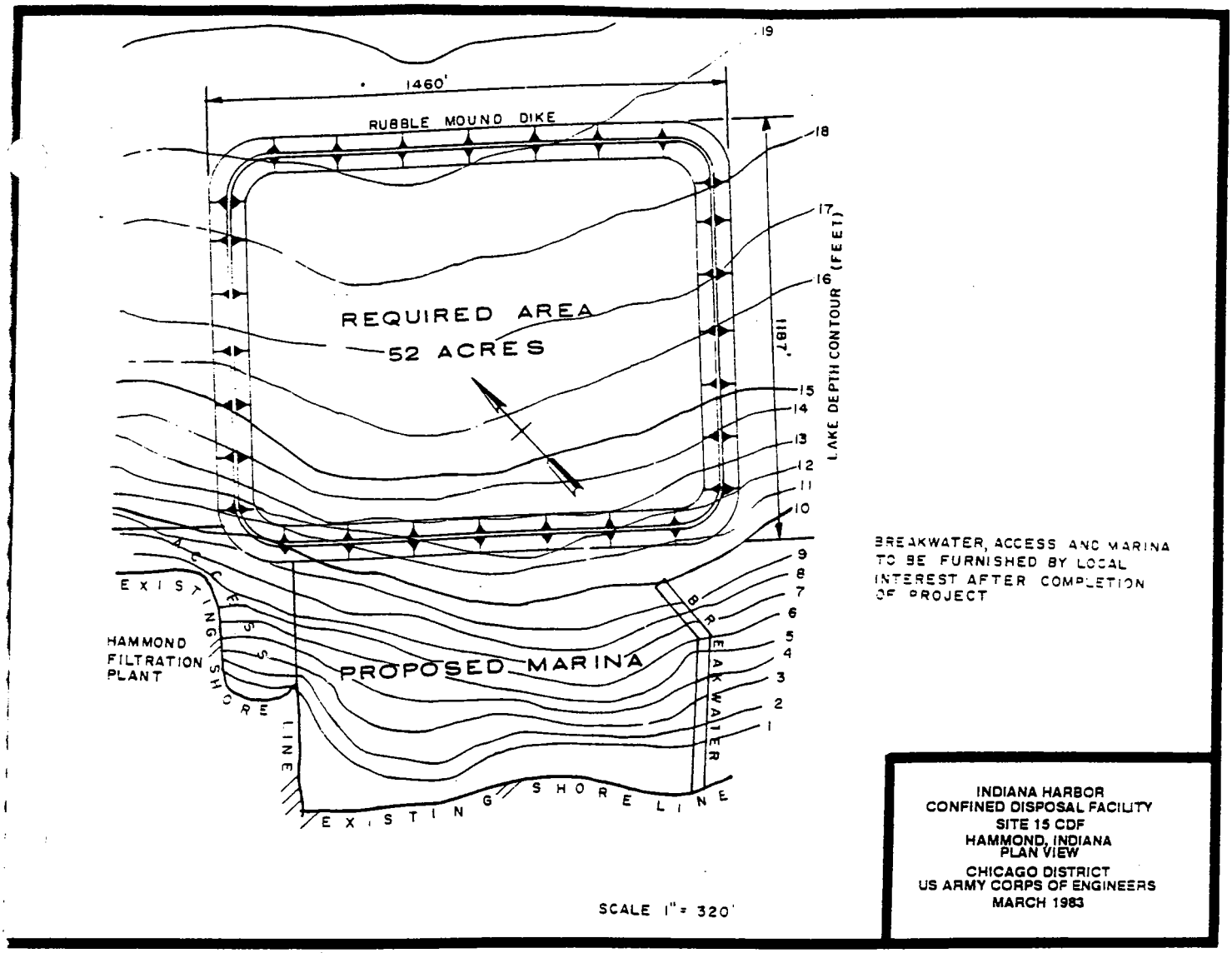
- Capacity: The design capacity would have been sufficient to hold the 10-year maintenance dredging requirement of 1,200,000 CY, plus the estimated 100,000 CY of private dredging. The dredge material would be placed inside the confinement area to +17.0 LWD. The dike would be constructed to a top elevation of +22.0 LWD. The additional capacity would be provided to prevent backwashing into Lake Michigan in the event that waves overtopped the containment dikes and inundated the disposal area. Sufficient capacity would also be provided for a clay seal and topsoil on top of the dredged material after completion of the 10-year maintenance dredging period.

- Retaining Structure: The containment structure would consist of a stone-filled dike with a prepared limestone core, as shown on Figure 7. A plastic filter fabric and a sand filter would be placed on the disposal side to filter-out the suspended solids.

- Operational Aspects: The bottom sediments would be mechanically dredged utilizing a closed clamshell to reduce turbidity in the upper water column. The dredged material would be placed in scows and towed to a rehandling area at the CDF. The dredged material would be removed from the scows using a closed clamshell and side-cast over the dikes into the CDF. A drip pan would be used at the disposal area to prevent dredged material from spilling into the lake during the rehandling operations.

- Environmental Assessment: The environmental resources at this site are primarily composed of near-shore littoral aquatic communities. Invertebrate organisms inhabiting the lake bottom are composed of typical midge larvae, snails, and fingernail dams. Fish populations that have been observed at the site are represented by a wide variety of sport fish (chinook salmon, lake trout, rainbow trout, yellow perch, alewife and gizzard shad). Wildlife species using the site would be limited to migrating waterfowl and local gull populations. Waterfowl use would be limited, since the site is not sheltered from wind and wave action. The use of the site would convert 43 acres of Lake Michigan aquatic habitat into terrestrial habitat and destroy the existing invertebrate population. Fish and wildlife would be displaced during the construction period. The conversion of 43 acres of Lake Michigan into terrestrial habitat would have no long-term affect on the near-shore aquatic resources.

- Reasons for Site Elimination: Site 15 was eliminated for the following reasons:
  - Excessive high dike to prevent backwash from overtopping.
  - Higher construction cost.
  - No local support or local sponsor existed for use of this site.


1460'
RUBBLE MOUND DIKE
REQUIRED AREA
52 ACRES
1187'
LAKE DEPTH CONTOUR (FEET)
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
EXISTING ACCESS SHORE LINE
HAMMOND FILTRATION PLANT
PROPOSED MARINA
BREAKWATER
EXISTING SHORE LINE
BREAKWATER, ACCESS AND MARINA TO BE FURNISHED BY LOCAL INTEREST AFTER COMPLETION OF PROJECT
SCALE 1" = 320'
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 15 CDF
HAMMOND, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

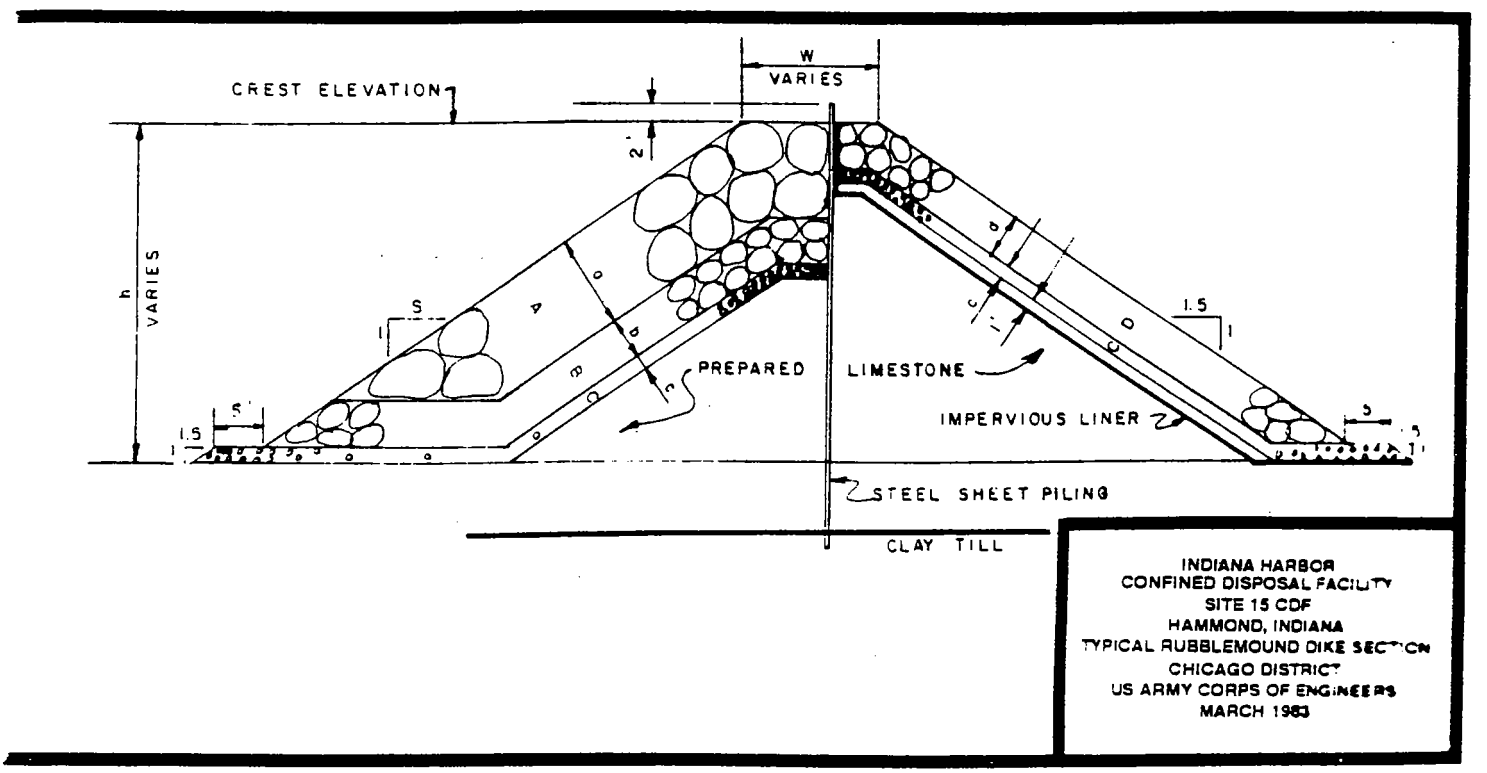

W
VARIES
CREST ELEVATION
2'
h
VARIES
S
1
A
B
C
D
PREPARED
LIMESTONE
IMPERVIOUS LINER
1.5
1
5'
STEEL SHEET PILING
CLAY TILL
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
SITE 15 CDF
HAMMOND, INDIANA
TYPICAL RUBBLEMOUND DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
MARCH 1983

Figure 7

Estimated Costs

Table 3 summarizes the estimated costs of the alternative CDF plans investigated.

Table 3 Estimated Costs, Alternative Dredging and Confined Disposal Facility Plans, Second Phase Plan Formulation [1]

Item	Site 11	Site 12	Site 14b	Site 15
First Cost [1]				
Construction Costs	$17,000,000	$22,247,000	$15,591,000	$25,224,000
Land Cost	420,000	4,000	1,092,000	5,000
Easement Cost	53,000	0	0	0
Total First Cost	$17,473,000	$22,251,000	$16,683,000	$25,229,000
Dredging Cost	14,128,000	8,694,000	13,186,000	8,694,000
Clay Cap & Topsoil	5,673,000	2,946,000	6,067,000	2,941,000
Total Cost	37,274,000	33,891,000	35,936,000	36,864,000
Annual Costs				
Interest during Construction	180,000	230,000	173,000	260,000
Interest & Amortization (3-5/8%)	2,678,000	3,410,000	2,565,000	3,867,000
Dredging	1,461,000	899,000	1,363,000	899,000
Clay Cap & Topsoil	380,000	197,000	407,000	197,000
Total Annual Charges	4,699,000	4,736,000	4,508,000	5,223,000

[1] Source: Appendix E, Letter Report, Indiana Harbor Confined Disposal Facility, dated 1986.
[2] Based on 1986 price levels.

Draft EIS Coordination

On February 6, 1986, the DEIS on the proposed Jeorse Park CDF was released for agency and public review. A public meeting to discuss the DEIS was subsequently held on March 18, 1986 in East Chicago, Indiana. The DEIS compared the impacts of the Jeorse Park CDF plan to the no action or future without project condition. Since there was no local sponsorship for any upland site, including Sites Nos. 11 and 14b, the DEIS did not provide an assessment of environmental impacts of constructing the CDF at any specific upland site. Instead the DEIS presented an evaluation of the environmental impacts of a CDF at a generic upland site at the request of the U.S. EPA.

The DEIS review process exposed substantial public opposition to construction of an in-lake CDF. The U.S. EPA and the concerned State of Indiana agencies preferred the use of an upland site for disposal of the Indiana Harbor contaminated sediments. The U.S. EPA assigned a rating of E0-2 to the DEIS. The EO portion of the rating indicated the U.S. EPA had environmental objections to the proposed Jeorse Park plan because seepage from the CDF could result in violation of State of Indiana Lake Michigan water quality standards, because a problem with contaminants upstream of the Federal navigation project would remain after dredging of the navigation channel, and because the U.S. EPA had concerns about adequate monitoring and maintenance of the CDF. The numerical 2 of the DEIS rating indicated Category 2 (Insufficient Information) because the information in the DEIS was considered to be insufficient by the U.S. EPA to fully assess the impacts that should be avoided in order to fully protect the environment. A State of Indiana review team composed of representatives from the Department of Environmental Management, Department of Natural Resources and the State Board of Health had concerns similar to those of the U.S. EPA and indicated that it could not recommend approval of the proposed Jeorse Park CDF as it was designed. Due to the substantial opposition to the Jeorse Park plan, a final EIS was never prepared.

Following completion of the DEIS review period, a meeting was held on May 19, 1986 between the U.S. Army Corps of Engineers, the U.S. EPA and the State of Indiana. The results of this meeting eventually lead to the third phase in the plan formulation process which included a detailed study of four CDF sites and 18 treatment technologies for dredged materials.

THIRD PHASE: MID-1980'S TO LATE 1990

In letters dated July 16, 1986 and October 27, 1986, the Governor of Indiana suggested an investigation of potential CDF sites within the existing Inland Steel Company lakefill and at a site known as the J-Pit in Gary, Indiana. The Chicago District Engineer conducted public coordination meetings in 1987 and 1988 to obtain comments and suggestions from agencies and the public on additional dredging and disposal alternatives to be considered. Following these meetings, four CDF sites and 18

treatment technologies were selected for detailed investigation, in addition to alternative dredging techniques, as discussed in the following paragraphs.

In a letter dated January 30, 1989, the U.S. Fish and Wildlife Service suggested filling in the Lake George Branch upstream of the Amoco Oil Company dock with dredged material. Other suggestions included using the Lucas Berg CDF in Worth, Illinois, and filling steel storage tanks located in existing petrochemical tank farms in the IHC area. These alternatives are also discussed in the following paragraphs.

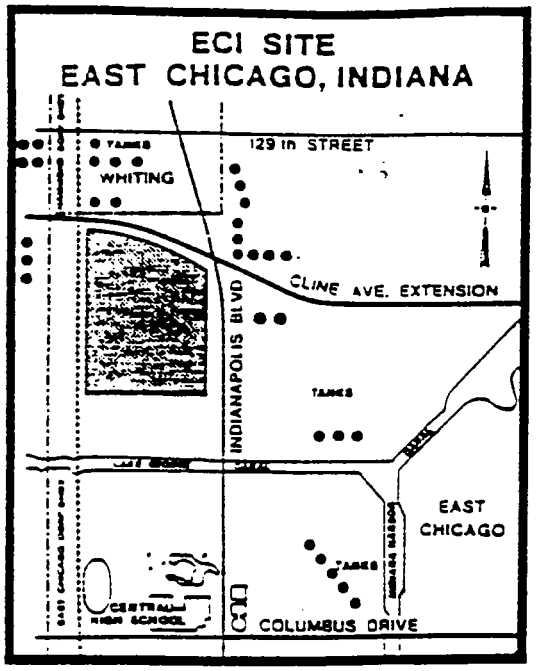
Confined Disposal Facility Alternatives

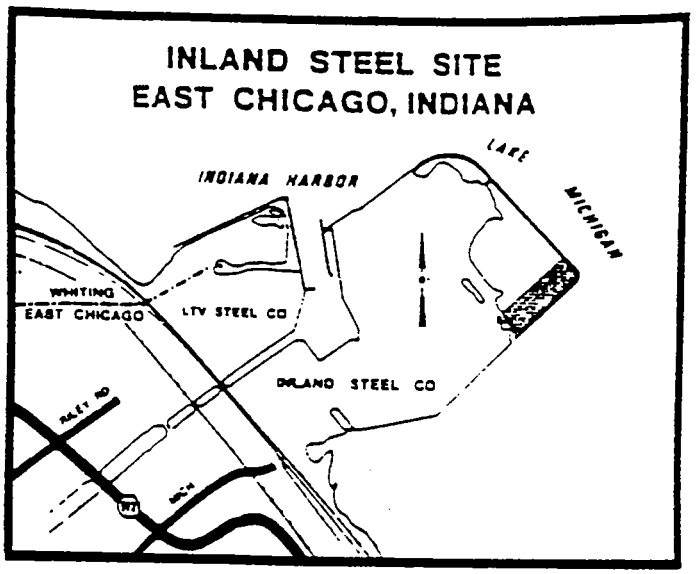
The four alternative CDF sites are shown in Figure 8. They included the Inland Steel lakefill, East Chicago, Indiana; 141st Street, Hammond, Indiana; J-Pit, Gary Indiana; and the ECI Site, East Chicago, Indiana. The target CDF design capacity in the third phase of project formulation was based on a 30-year planning period. The maintenance dredging backlog at IHC was estimated at approximately 1 million CY. It was further estimated that dredging of an additional 2 million CY of sediment unsuitable for open-water disposal would be required over the 30-year period. This included an estimated 250,000 CY of polluted dredged materials from private or other related dredging. The private dredging would be undertaken in dock areas adjacent to the Federal navigation channel. Other related dredging may be undertaken in areas in the vicinity of the Federal channel for purposes of environmental remediation or as part of demonstrations of innovative dredging and/or disposal alternatives.

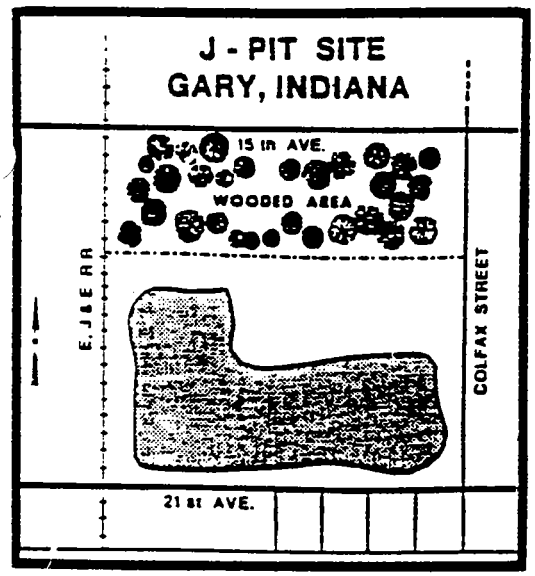
Inland Steel Lakefill

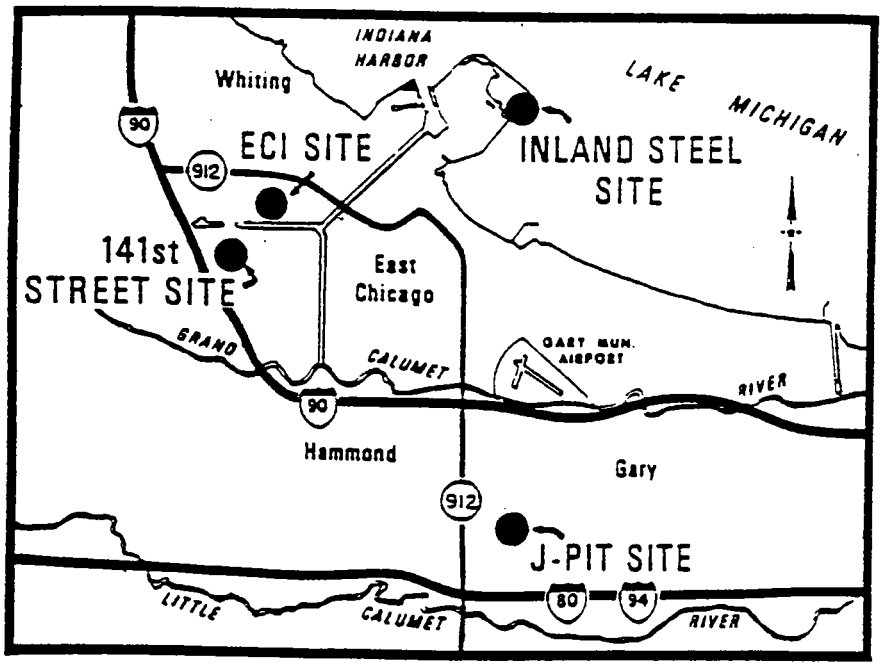
This alternative consisted of constructing a CDF within the existing Inland Steel Company sheet pile bulkhead lakefill area. The CDF would cover an area of approximately 120 acres and be located in the northeast corner of the lakefill area, as shown on Figure 9. It would be rectangular in shape and consist of a rubblemound dike with a prepared limestone core. The CDF would be divided into 3 cells, each with a capacity for about 1 million CY of dredged material.

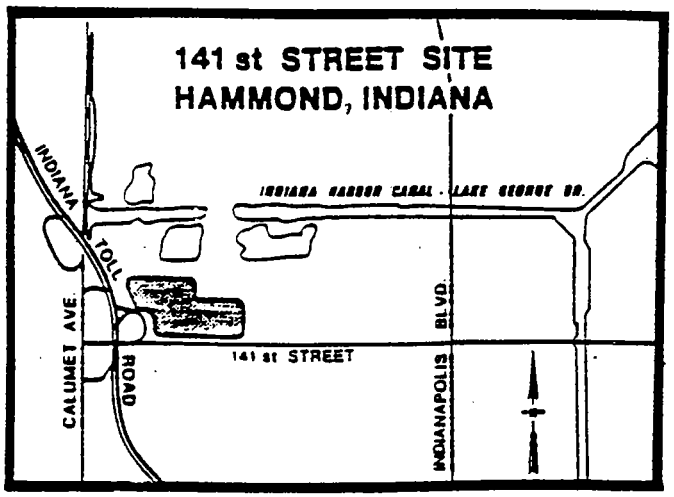
Two alternatives were considered to prevent migration of pollutants through the rubblemound structure. One alternative consisted of constructing a bentonite slurry or soil mix cut-off wall in the middle of the rubblemound structure, extending from the top of the prepared limestone to 13 feet below the lake bottom. The second alternative consisted of lining the inside of the cells with either a Fabric form grouted mattress or high density polyethylene impermeable liner. Figure 9 shows a typical section through the dike. After each cell was filled up to an









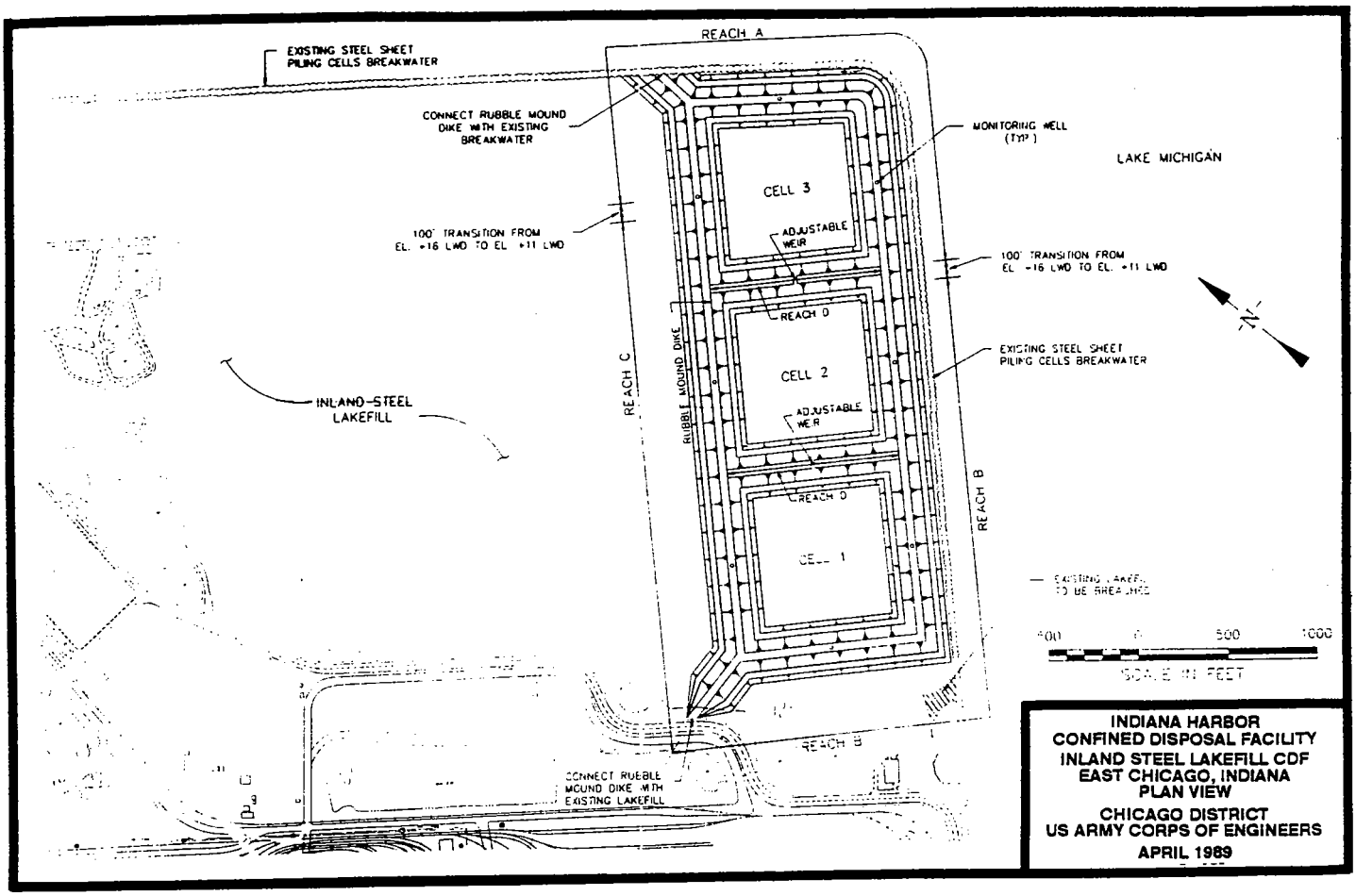


INDIANA HARBOR
CONFINED DISPOSAL FACILITY

POTENTIAL CDF SITES
THIRD PHASE
PLAN FORMULATION

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

Figure 8


REACH A
EXISTING STEEL SHEET PILING CELLS BREAKWATER
CONNECT RUBBLE MOUND DIKE WITH EXISTING BREAKWATER
MONITORING WELL (TYP)
LAKE MICHIGAN
CELL 3
ADJUSTABLE WEIR
100' TRANSITION FROM EL. +16 LWD TO EL. +11 LWD
100' TRANSITION FROM EL. +16 LWD TO EL. +11 LWD
REACH D
CELL 2
EXISTING STEEL SHEET PILING CELLS BREAKWATER
INLAND-STEEL LAKEFILL
REACH C
RUBBLE MOUND DIKE
ADJUSTABLE WEIR
REACH B
REACH D
CELL 1
EXISTING LAKEFILL TO BE BREACHED
400 0 500 1000
SCALE IN FEET
REACH B
CONNECT RUBBLE MOUND DIKE WITH EXISTING LAKEFILL
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
INLAND STEEL LAKEFILL CDF
EAST CHICAGO, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

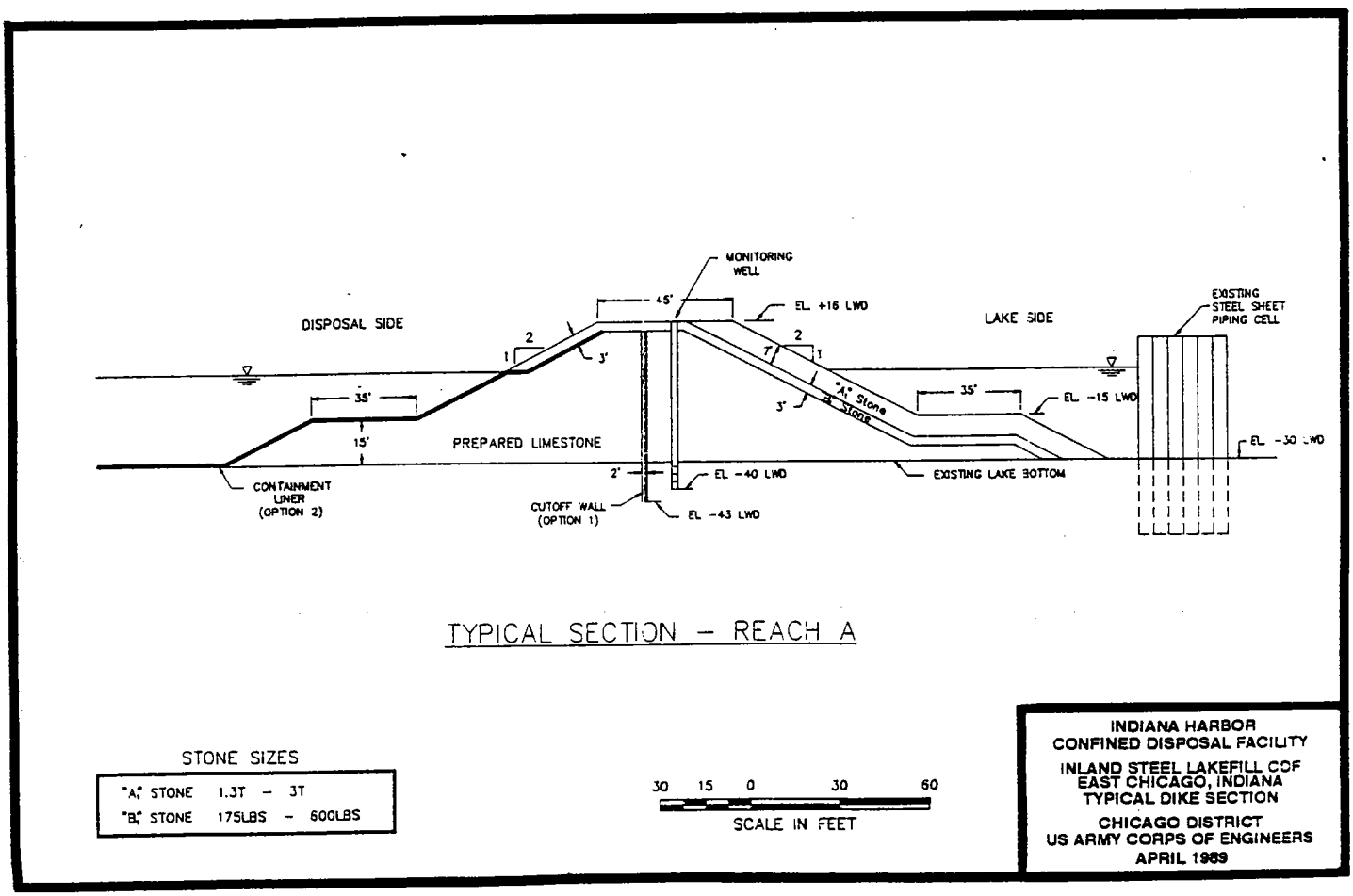

MONITORING WELL
45'
EL +16 LWD
DISPOSAL SIDE
LAKE SIDE
EXISTING STEEL SHEET PIPING CELL
2
1
3'
2
1
3'
"A" Stone
"B" Stone
35'
35'
EL -15 LWD
15'
PREPARED LIMESTONE
EL -30 LWD
2'
EL -40 LWD
EXISTING LAKE BOTTOM
CONTAINMENT LINER (OPTION 2)
CUTOFF WALL (OPTION 1)
EL -43 LWD
TYPICAL SECTION - REACH A
STONE SIZES
"A" STONE 1.3T - 3T
"B" STONE 175LBS - 600LBS
30 15 0 30 60
SCALE IN FEET
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
INLAND STEEL LAKEFILL CDF
EAST CHICAGO, INDIANA
TYPICAL DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

Figure 9

elevation of 5 feet below the crest of the dike, it would be capped with 2 feet of clay, 1-foot of drainage layer, and 2 feet of topsoil and seeded.

141st Street, Hammond, Indiana

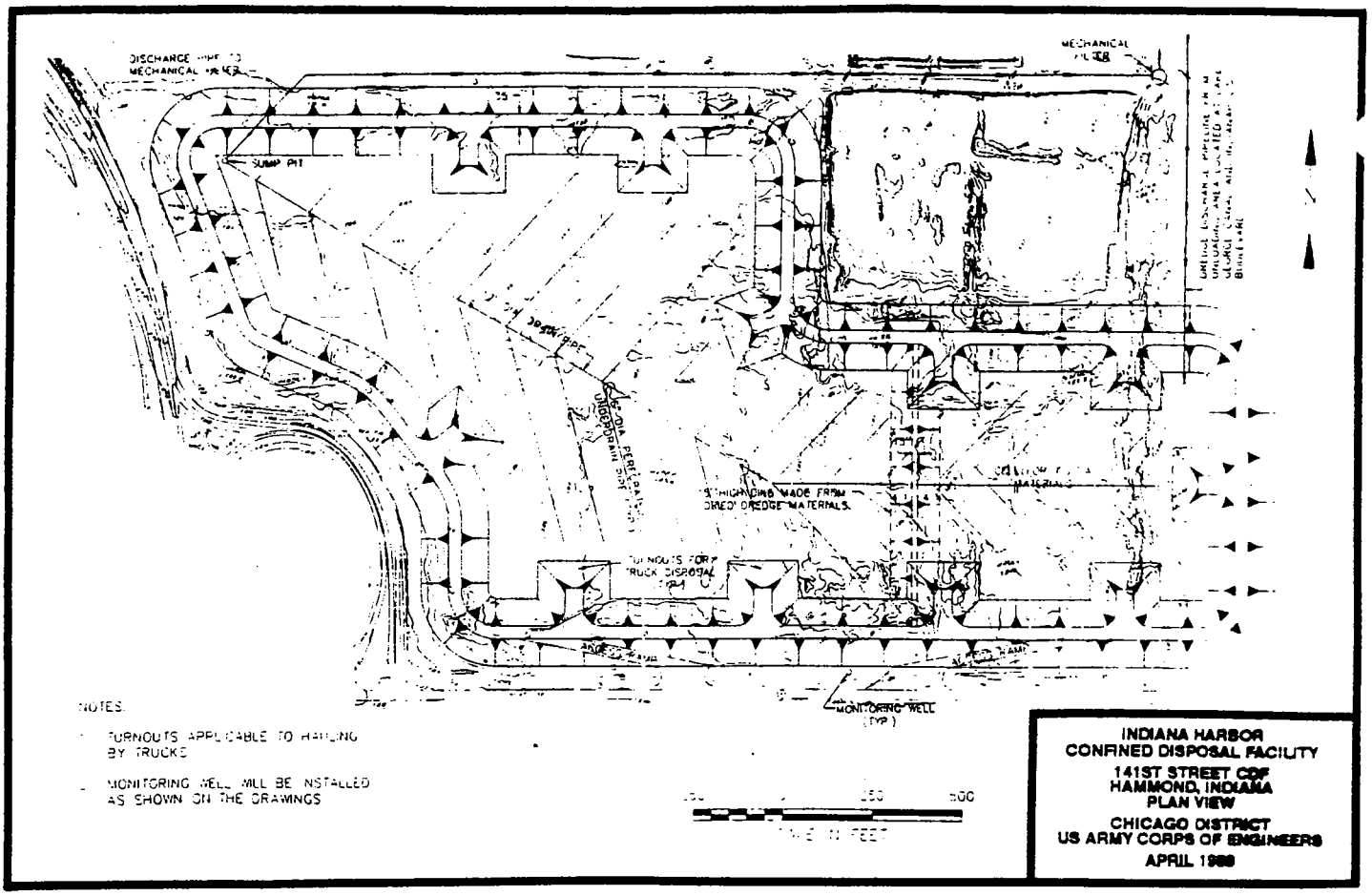
In this alternative, an 83-acre CDF would be constructed immediately north of 141st Street and east of the Calumet Avenue interchange of the Indiana Tollway, as shown on Figure 10. The design capacity would be only 2 million CY due to the limited real estate that is available. The location of this site is the same as Site No. 14b investigated previously in the second phase of plan formulation.

The CDF would be constructed of earth dikes using off-site materials. The inside slope of the dike would be lined with a 3-foot layer of compacted clay, extending from the crest to the toe of the dike. A soil bentonite slurry wall would be constructed along the inside perimeter of the dike extending from the lower end of clay liner to the soft to stiff clay strata located 23 feet below the existing ground surface. Figure 10 shows a typical section through the dike. The existing ground surface inside the CDF would be graded to drain towards the sump pit located in the northwest corner. A drainage system would be constructed on top of the graded ground surface. An effluent discharge pipe from the sump pit would connect to a mechanical filter located just outside the CDF and would be discharged to the Hammond Sewer Treatment Plant. The CDF would be capped when full with 2 feet of clay, a 1-foot drainage layer and 2 feet of topsoil and seeded.

J-Pit, Gary, Indiana

A CDF at this location would be constructed in a sand borrow pit located on the western edge of the city of Gary, as shown on Figure 11. It would cover an area of 80 acres and have a capacity of 3 million CY. The borrow pit is 30 feet deep and covers an area of 120 acres. Therefore, a dike running north to south would have to be constructed to form the east side of the CDF and limit its capacity to 3 million CY.

The east dike would be constructed using on-site materials excavated from the bottom of the pit. The existing pit slopes on the north, south and west sides would be stabilized by filling and grading to a 3:1 slope. The bottom of the pit, which is composed of stiff clay strata, would be excavated from 5 to 10 feet deep to obtain the material needed to build up the slopes and the east dike. The graded slopes and the inside slope of the cross dike would be lined with a 3-foot layer of compacted clay extending from the crest to the toe of the dike. A soil-bentonite slurry wall would be constructed along the perimeter of the CDF except along the east dike. There would be no need to construct a slurry wall along the dike because it would be constructed of compacted clay materials. Figure 11 shows typical sections through the east dike and illustrating the reconstruction of the existing pit slopes.


SUMP PIT
MONITORING WELL (TYP.)
NOTES:
TURNOUTS APPLICABLE TO HAULING BY TRUCKS
MONITORING WELL WILL BE INSTALLED AS SHOWN ON THE DRAWINGS
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
141ST STREET CDF
HAMMOND, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

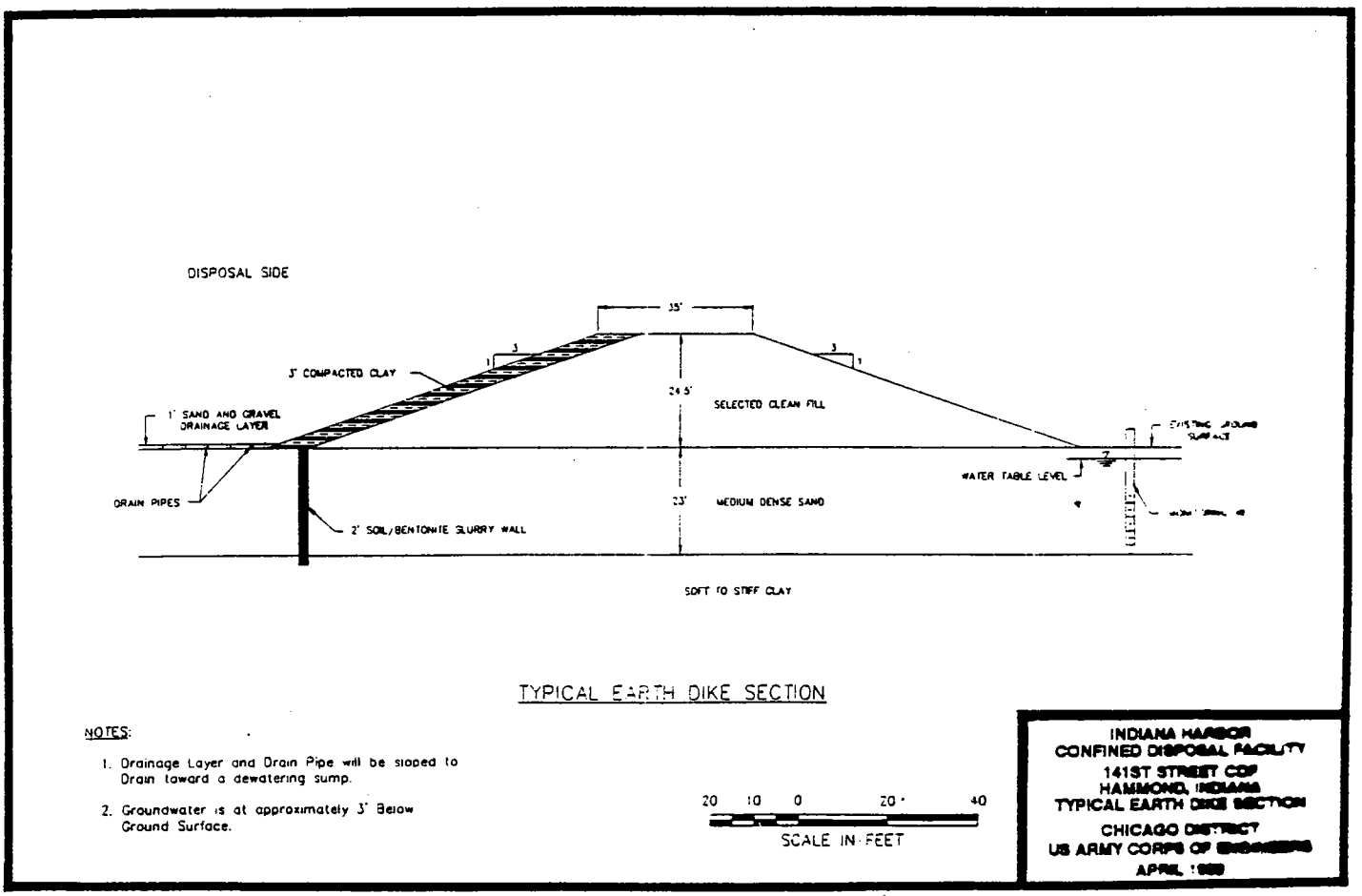
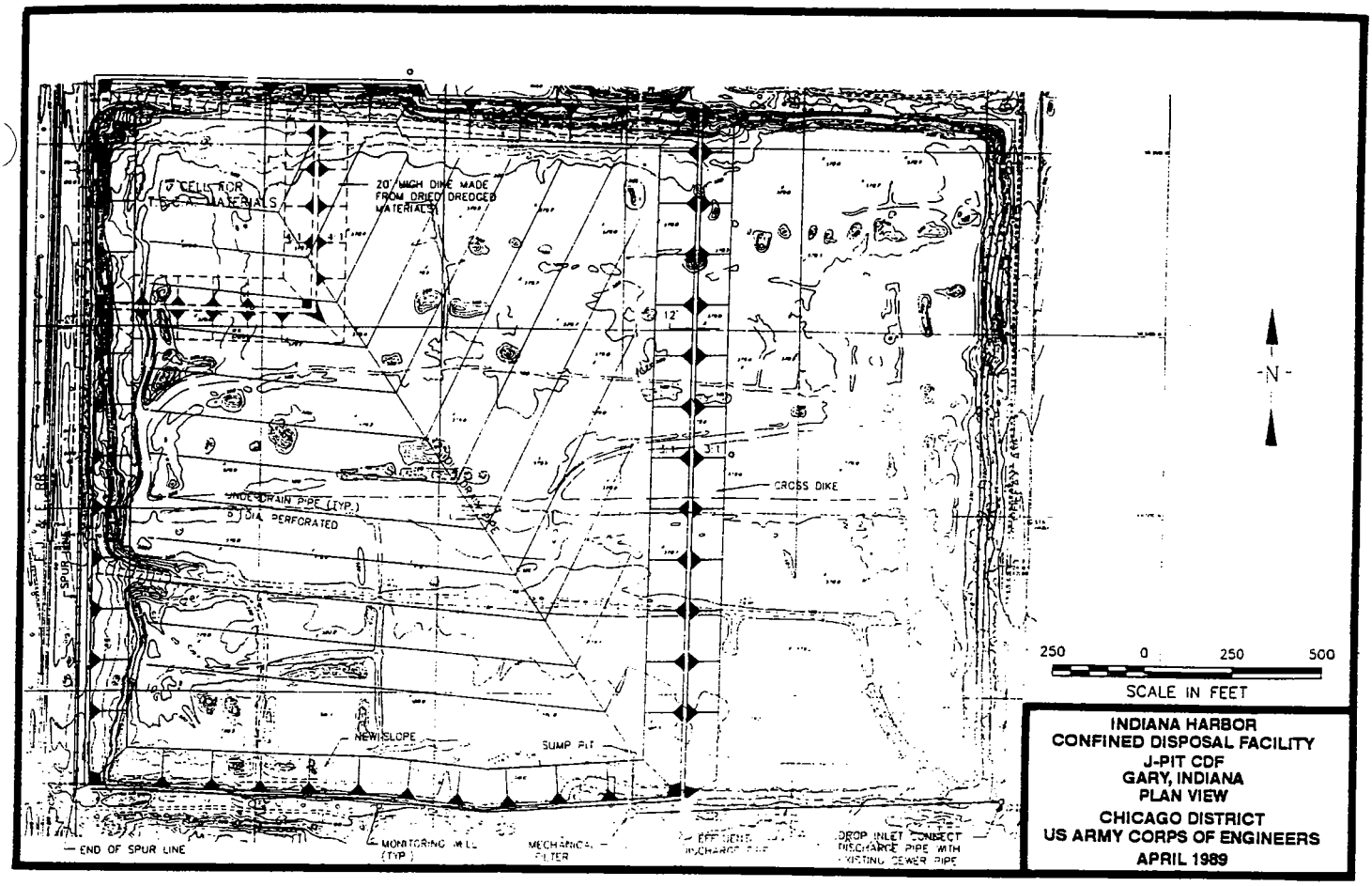

DISPOSAL SIDE
35'
3'
1'
3'
1'
3' COMPACTED CLAY
1' SAND AND GRAVEL DRAINAGE LAYER
24.5'
SELECTED CLEAN FILL
WATER TABLE LEVEL
DRAIN PIPES
23'
MEDIUM DENSE SAND
2' SOIL/BENTONITE SLURRY WALL
SOFT TO STIFF CLAY
TYPICAL EARTH DIKE SECTION
NOTES:
1. Drainage Layer and Drain Pipe will be sloped to Drain toward a dewatering sump.
2. Groundwater is at approximately 3' Below Ground Surface.
20 10 0 20 40
SCALE IN FEET
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
141ST STREET CDF
HAMMOND, INDIANA
TYPICAL EARTH DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

Figure 10


9 CELL FOR TOXIC MATERIALS
20' HIGH DIKE MADE FROM DRIED DREDGED MATERIALS
12'
3:1
CROSS DIKE
UNDERDRAIN PIPE (TYP.)
9" DIA. PERFORATED
NEW SLOPE
SUMP PIT
END OF SPUR LINE
MONITORING WELL (TYP.)
MECHANICAL FILTER
EFFLUENT DISCHARGE PIPE
DROP INLET CONNECT DISCHARGE PIPE WITH EXISTING SEWER PIPE
N
250 0 250 500
SCALE IN FEET
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
J-PIT CDF
GARY, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

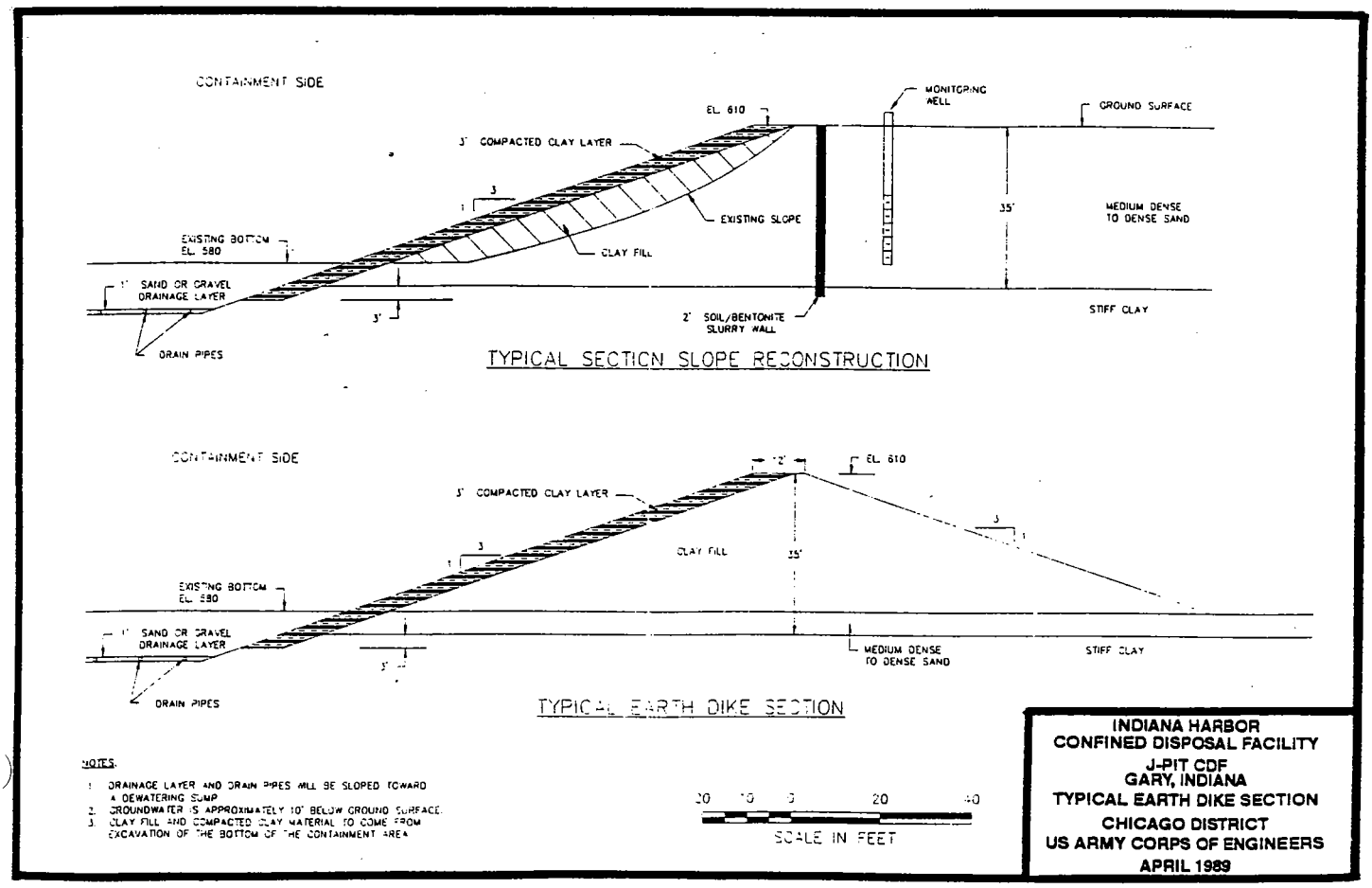

CONTAINMENT SIDE
EL. 610
MONITORING WELL
GROUND SURFACE
3' COMPACTED CLAY LAYER
3
1
EXISTING SLOPE
35'
MEDIUM DENSE TO DENSE SAND
EXISTING BOTTOM EL. 580
CLAY FILL
1' SAND OR GRAVEL DRAINAGE LAYER
3'
2' SOIL/BENTONITE SLURRY WALL
STIFF CLAY
DRAIN PIPES
TYPICAL SECTION SLOPE RECONSTRUCTION
CONTAINMENT SIDE
12'
EL. 610
3' COMPACTED CLAY LAYER
CLAY FILL
35'
EXISTING BOTTOM EL. 580
1' SAND OR GRAVEL DRAINAGE LAYER
MEDIUM DENSE TO DENSE SAND
STIFF CLAY
DRAIN PIPES
TYPICAL EARTH DIKE SECTION
NOTES:
1. DRAINAGE LAYER AND DRAIN PIPES WILL BE SLOPED TOWARD A DEWATERING SUMP
2. GROUNDWATER IS APPROXIMATELY 10' BELOW GROUND SURFACE.
3. CLAY FILL AND COMPACTED CLAY MATERIAL TO COME FROM EXCAVATION OF THE BOTTOM OF THE CONTAINMENT AREA
20 10 0 20 40
SCALE IN FEET
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
J-PIT CDF
GARY, INDIANA
TYPICAL EARTH DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

Figure 11

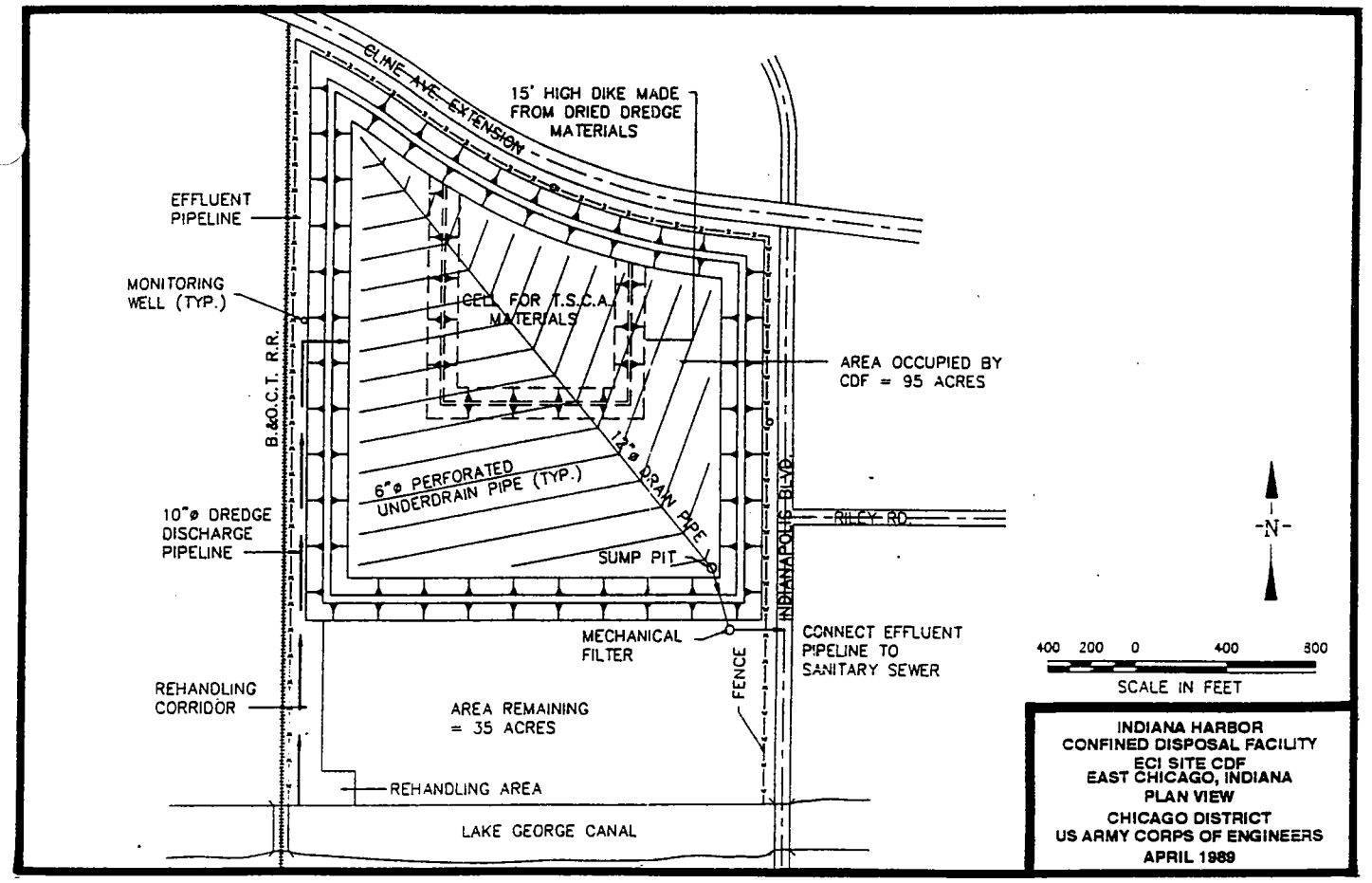
The bottom of the CDF would be graded towards a sump pit located in the southeast corner. A drainage system would be built on top of the graded bottom. An effluent discharge pipe from the sump pit would connect to a mechanical filter located just outside of the CDF and then run east to Colfax Avenue where a drop inlet or manhole would be constructed to connect with an existing sewer. After the CDF was filled to its capacity, it would be capped with 2 feet of clay, a 1-foot drainage layer and 2 feet of topsoil and seeded.

ECI Site, East Chicago, Indiana

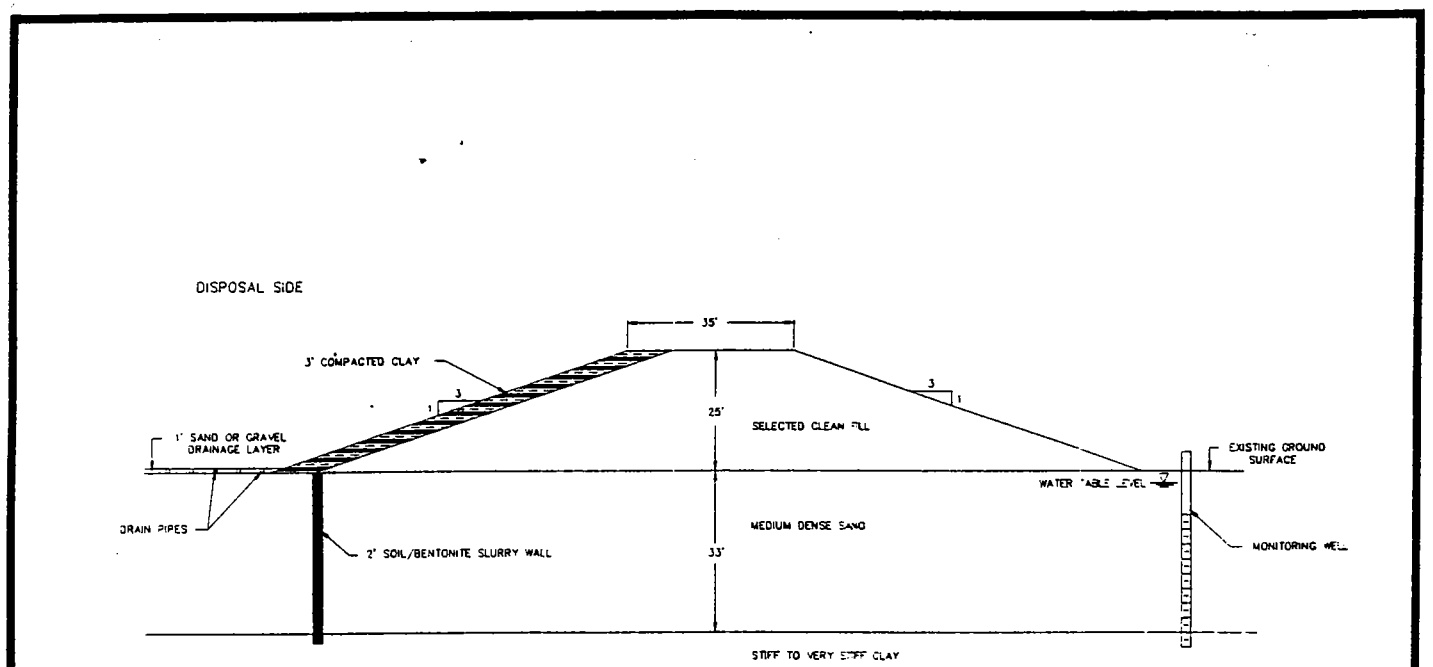
This CDF site consists of about 168 acres of land formerly occupied by an oil refinery owned by Atlantic Richfield Company and subsequently acquired by Energy Cooperative Industries (ECI). ECI filed for bankruptcy in 1981 and abandoned the site. In response to a bankruptcy court order, the old refinery, including oil tanks, pipelines, and buildings, were completely demolished above ground level. The site was leveled, cleaned of debris, covered with topsoil and seeded. The CDF would have a design capacity of 3.0 million CY and eventually occupy about 95 of 168 acres of the site.

The CDF would be constructed of earthen dikes, as shown on Figure 12, using off-site materials. Before construction of the dikes, some stripping of the upper soil surface would be necessary. The stripped soil would be contained within the CDF. Dikes would be constructed to a height of 25 feet above the existing ground surface. The inside slope of the dike would be lined with a 3-foot layer of compacted clay extending from the crest to the toe of the dike. A soil bentonite slurry wall would be constructed along the perimeter of the dike extending from the lower end of the clay liner to the clay strata 33 feet below the existing ground surface. A typical section through the dike is shown in Figure 12.

The existing ground surface inside the CDF would be graded to drain towards a sump pit located in the northwest corner. A drainage system would be constructed in shallow trenches backfilled with sand and gravel below the graded ground surface. This drainage system would be composed of a network of perforated underdrain and drain pipes connected to the sump pit and covered with a 1-foot layer of sand or gravel filter. The sump pit would be constructed of corrugated metal pipe at the bottom. An effluent discharge pipe from the sump pit would connect to a filter system located just outside of the CDF. The effluent from the sump would pass through a sand/anthracite filter followed by an activated carbon filter before being discharged into an interceptor sewer connected to the East Chicago Sanitary District sewer lines if treatment was determined to be needed. After the CDF was filled, it would be capped with 2 feet of clay, 1-foot of drainage layer and 2 feet of topsoil and seeded.



INDIANA HARBOR
CONFINED DISPOSAL FACILITY
ECI SITE CDF
EAST CHICAGO, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989



TYPICAL EARTH DIKE SECTION

NOTES:

1. Drainage Layer and Drain Pipe will be sloped to Drain toward a dewatering sump.
2. Groundwater is at approximately 3' Below Ground Surface.

20 10 0 20 40
SCALE IN FEET

INDIANA HARBOR
CONFINED DISPOSAL FACILITY
ECI SITE CDF
EAST CHICAGO, INDIANA
TYPICAL EARTH DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

Figure 12

Other Disposal Alternatives

The U.S. Fish and Wildlife Service suggested that dredged material be disposed of by filling the Lake George Branch upstream of the Amoco Oil Company dock. This alternative would eliminate the use of this portion of the Federal channel for existing or future navigation use and would cause drainage problems upstream. Filling of this channel could also cause direct and indirect impacts to adjacent and upstream wetlands. A very preliminary analysis indicates that the existing channel would have a very limited capacity (less than 300,000 CY) and the closure of this reach might interfere with existing water, gas and sewer pipelines which cross the channel. This alternative was eliminated from further consideration for these reasons.

The Lucas Berg CDF, located in Worth, Illinois, was constructed by the U.S. Army Corps of Engineers in 1981-1982 for the disposal of contaminated dredged materials from the Calumet-Sag Channel. This site is located over 20 miles away (by barge) from the mouth of Indiana Harbor and would require Section 401 certification from the Illinois Environmental Protection Agency (IEPA). Disposal of dredged materials from IHC would violate the agreement with the local sponsor, the Metropolitan Water Reclamation District of Greater Chicago, concerning the use of this facility. The Lucas Berg CDF was constructed to serve a different navigation project, the Illinois Waterway. Disposal at this existing CDF was eliminated from further consideration for these reasons.

The IHC area has several petrochemical industries which use steel storage tanks. Disposal and/or storage of dredged materials from IHC in tank farms was eliminated from further consideration for engineering reasons. A typical oil storage tank is designed to hold about 5,062,500 gallons (25,000 CY) of fluid. To store 3,000,000 CY of dredged materials would require 120 tanks, occupying an area of about 240 acres. Steel storage tanks were designed to hold semi-solid materials, and would require modification. In addition, the filling, dewatering, and maintenance of the tanks would be problematic.

Sediment Treatment Technologies

A total of 18 treatment technologies were investigated in connection with the disposal of potential dredged materials from Indiana Harbor. These technologies included the following:

Solidification/Stabilization	Biodegradation
Solvent Extraction	Steam Stripping
Incineration	Enzyme Degradation
Wet Air Oxidation	Composing
Polyethylene Glycol Dechlorination	Molten Salt
Supercritical Water Oxidation	UV/Ozone
Asphaltic Encapsulation	Ozonation
Pyrolysis	UV/Hydrogen
Vitrification	Metal Extraction

Each technology was analyzed and then evaluated based on eight weighted factors. The factors and their individual weights shown in parenthesis were as follows:

Safety	(10)	Effectiveness/Efficiency	(5)
Availability	(5)	Specificity	(5)
Reliability	(2)	Process Limitations	(10)
Processing Rate	(10)	Other Factors	(5)

Based on the evaluation, the 18 technologies were ranked in the order that they are listed in the previous paragraph. The three highest ranked technologies differed from the other technologies primarily in terms of availability, process limitations, and process rate. The qualities that separate these highly ranked technologies from the others include demonstrated effectiveness at pilot or field-scale for contaminated soil, practical process rates, and no technical limitations or other factors that bar implementation to dredged material. The nine lowest ranked technologies are characterized by lack of field-scale testing, significant process limitations, impractical processing rates, and poor or unknown reliability. There is no single characteristic or set of characteristics that separated the fourth through the eighth rank technologies from the other technologies. Factors that resulted in the ranking of this group were technology specific.

Following the completion of the technical screening process described above, the first four treatment technologies were selected as having the greatest potential for application to the Indiana Harbor sediments. These four were chosen based on their high rankings, which, in turn, were primarily a result of their demonstrated effectiveness at treating contaminated soils on a pilot or field- scale. A description of each of the four technologies is given in the following paragraphs. Further detailed information on the treatment technologies is given in Appendix G, Application of Treatment Technologies to Contaminated Sediments.

Solidification/Stabilization

Solidification/stabilization (S/S) is a technology designed to provide physical immobilization (solidification) with reduced accessibility of water by entrapment of contaminated solids in a hardened mass and chemical immobilization (stabilization) by alteration of the chemical form of contaminants so that they are less soluble and/or less leachable.

Solidification is accomplished by adding setting agents that react with water to form a hardened mass, somewhat like concrete. Material converted from a plastic to a solid state is expected to be less susceptible to leaching due to reduced accessibility of water to the contaminated solids within the hardened mass. Typical setting agents include portland cement, lime, flyash, kiln dust, slag, and combinations of these materials. Co-additives such as clay minerals, soluble silicates, and sorbents are sometimes used with the setting agents to give special properties to the final products.

Stabilization systems are usually formulated to minimize the solubility of metals by controlling Ph and alkalinity. Anions are more difficult to convert to insoluble forms, and most S/S systems rely on entrapment to immobilize anions. Stabilization (chemical immobilization) of organic contaminants against aqueous leaching is generally not thought to occur when portland cement and pozzolan-based systems are used. However, studies at the U.S. Army Corps of Engineers' Waterways Experiment Station (WES) with highly contaminated sediments indicate that these systems may actually reduce the leachability of PCB's. The stabilization processes responsible for reduced leachability are poorly understood at this time.

Although S/S has been applied at field scale to hazardous wastes, there have been no field demonstrations of the technology in the United States using dredged material. Solidification/stabilization systems with potentially useful application to Indiana Harbor sediments were investigated in laboratory scale studies at WES. These studies showed that S/S processing can convert the sediments to a hardened mass. No major technical obstacles to applying S/S technology were found. Chemical leach data showed that S/S reduced the mobility of most metals (but not all; some were increased), depending on the type of setting agent(s) and additive dosages used. Leachability of PCB's, long-term durability of solidified/stabilized products, and factors related to full-scale implementation were not investigated.

Data gaps remain to be filled before solidification can be recommended for full-scale application. Areas for additional work include scale-up factors, long-term durability, immobilization and volatilization potential for PCB's, and local availability of setting agents. Because long-term records on the durability of solidified/stabilized wastes are not available, the other major factor to consider for S/S processing of dredged material from Indiana Harbor is the potential for contaminant release due to deterioration of the solidified/ stabilized product.

Solvent Extraction

Extraction is the removal of chemical constituents from contaminated material with the objective of producing an uncontaminated residue. Extraction technologies use physical and chemical processes to transfer contaminants to another medium, generally a fluid, for treatment and disposal by another set of processes. Stripping, for example, involves transfer of volatile contaminants to a gas stream, and solvent extraction involves transfer to a liquid. Since metals cannot be degraded, they can only be removed and relocated. Sometimes treatment of organic contaminants after extraction can be carried out under more favorable conditions, at lower risk, and at reduced costs.

Solvent extraction is the transfer of contaminants from a solid or a liquid to another liquid. Solvent extraction has primarily been used to recover certain organic chemicals from wastewater (liquid-liquid extraction). Application of solvent extraction to mixtures of solids and water such as dredged

material is still developmental. For the most part, solvent extraction is based on differential affinity (solubility) of an organic chemical between a solvent and the material being extracted. For certain chemicals, a chemical reaction, such as complexation, with the solvent may be possible.

Various solvents are potentially applicable to dredged material including alcohols, amines, ketones, glycols, benzene, toluene, kerosene, Freon, and others. The selection of a solvent is a critical element in the design of a solvent extraction process. Finding a solvent that meets all criteria for an optimal system design is a difficult task. Desired qualities include low cost, high extraction efficiency, easy separation from dredged material, no tendency for emulsion formation, nonreactive, and nonhazardous. No one solvent will meet all criteria. For complex solids-water mixtures such as dredged material from Indiana Harbor, laboratory studies are required to determine the best compromise among desired qualities and the best ratio of solvent to material to be extracted.

Multiple contact and counter-current flow are necessary design elements for solvent extraction because only a certain degree of removal is possible in a single step. Solvent recovery and ultimate disposal of extracted contaminants are also integral parts of a system design. Solvent recovery, in particular, affects cost and technical efficiency. The other major factor to consider is that solvent extraction, at best, is a process that relocates contaminants to another medium for treatment and disposal by another set of processes. Unless degradation of organics after solvent extraction is more feasible than direct application of degradation processes to contaminated dredged material, solvent extraction may not be cost effective.

Incineration

Incineration uses high temperature (700 to 1,700 degrees C) thermal oxidation to convert organic wastes to ash and gaseous combustion products. The end product gas of incineration contains primarily carbon dioxide and water vapor plus hydrogen chloride, nitrogen oxides, phosphoric pentoxide, sulfur dioxide, particulates, and products of incomplete combustion. Air pollution control equipment is required. The types of incinerators capable of handling dredged material include multiple hearth, rotary kiln, and fluidized bed incinerators. An on-site rotary kiln is the type of incinerator with the greatest potential for application to dredged material from Indiana Harbor.

The destruction and removal efficiency of an incinerator depends on three factors: temperature, the amount of mixing which occurs between the air and the waste material, and the residence time of the waste material in contact with air in the incinerator. Temperature is affected by the amount of mixing, heating value of the waste, and feed rates for the waste, fuel, and air. Since the heating value (BTU content) of dredged material is too low to sustain combustion, special pretreatment such as dewatering and blending with fuel oil might be required

to make incineration feasible. Gravity dewatering requires long holding periods in containment facilities. The alternative, mechanical dewatering, may not be practical for high volume dredging projects. Thus, dewatering requirements significantly impact the efficiency of incineration.

Although inorganic materials (metals/salts) oxidize to an extent during incineration, in general they are not destroyed. Consequently, the inorganic materials fed to an incinerator will not be degraded and will require disposal as ash. Oxidation during incineration could render the metals in dredged material more mobile or more reactive in the environment. Since the Indiana Harbor sediments contain elevated levels of cadmium, chromium, lead, and zinc, the ash resulting from incineration could be classified as a hazardous waste. There are two types of ash produced during incineration: fly ash and bottom ash. Fly ash is the particulate matter entrained in exhaust gases leaving the incinerator which is usually captured in air pollution control equipment. Bottom ash is the ash remaining in the combustion chamber after incineration.

The amount of ash produced during incineration of hazardous wastes is usually very small (< 3 percent) in relation to the total mass of waste incinerated. Dredged material, however, consists primarily of inorganic material. The inorganic material in the Indiana Harbor sediment is estimated to be one-half of the in-situ sediment volume. This level of non-destructible residue would result in an enormous amount of bottom ash formation, as well as particulate emissions that must be disposed, possibly as a hazardous waste.

In addition to the potential for generating hazardous waste, other factors to consider about incineration involve system development. Developing the most efficient incineration system with optimal design parameters is a difficult task. At a minimum, an incinerator for the Indiana Harbor sediments would have to meet the destruction and removal efficiencies established by the U.S. EPA. Compliance is generally determined by trial burn. Trial burns are expensive and time consuming, and they provide information only on how well the incinerator operates under the conditions of the trial burn. No information is obtained about how performance fluctuates with future changes in operating conditions or waste feed characteristics. Thus, once a unit were approved, there would be a need for real-time monitoring to ensure effective operation and provisions for corrective action if performance specifications are not met.

Wet Air Oxidation

Wet air oxidation is technology based on aqueous phase oxidation of contaminants at elevated temperatures and pressure. Contaminants are oxidized at temperatures that are significantly lower than incineration temperatures. Air emissions are also lower. Wet air oxidation uses temperatures of 250 to 325 degrees C and pressures from 1,000 to 2,000 pounds per square inch gage

(psig). The process produces a vent gas that may contain volatile organics (requiring removal in air pollution control equipment) and a slurry containing inorganic ash and partially degraded organics. In a typical configuration, reactors are connected in series with the number of units determined by the specific application. Compressed air is pumped into the waste feed which is heated to the level necessary to support oxidation before entry into the reactor. A catalyst can be used to facilitate dissolution of oxygen. Conventional wet air oxidation uses heat and pressure to drive the dissolution of oxygen from air and the reaction with dissolved contaminants. Systems that use a catalyst to enhance oxygen transfer operate at lower temperatures, 150 to 200 degrees C. Lower temperatures mean lower fuel costs and lower capital costs.

The operating conditions for wet air oxidation are below the critical point of water. The lower temperature and pressure result in lower capital costs and fewer operational problems. Wet air oxidation, however, is not as effective in treating relatively insoluble organic chemicals, such as PCB's. Destruction efficiencies for PCB's are around 30-50 percent and, in accordance with the PCB regulations, an alternate method of destruction must achieve a destruction efficiency equivalent to a TSCA permitted incinerator or high efficiency boiler. In addition, the process has not been demonstrated for soils or dredged material. Demonstration is important because the contaminants in dredged material must first desorb before they can be oxidized. Other factors to consider in the implementation of wet air oxidation to dredged material from Indiana Harbor include solids disposal after treatment and process equipment development and design. The mobility of the metals in the Indiana Harbor sediments after wet air oxidation is unknown and could present a problem for solids disposal. For full-scale implementation of the technology to dredged material, the processing rate must be higher than in presently available equipment. The need for a high processing rate combined with the high operating pressures would require thick wall reaction vessels, special metals for construction, and complex reactor interiors to provide for proper mass transfer and reaction kinetics.

Alternative Dredging Techniques

Dredging may be performed using a variety of different equipment. There are two basic types of dredging: mechanical and hydraulic. Mechanical dredging physically removes sediments by the use of a large bucket or shovel. Hydraulic dredging removes sediments in a water slurry. In addition, there are a number of special purpose dredges for specific applications. A brief description of the alternative dredging technologies considered for use at Indiana Harbor is given in the following paragraphs. Detailed information on dredging techniques is contained in Appendix H, Dredging Technologies and Impacts.

Mechanical Dredging

Mechanical dredging is accomplished using dipper and bucket dredges. Sediments excavated with a mechanical dredge are placed into a barge, hopper, or scow for transport to the disposal location. Mechanical dredging removes sediments with about the same water content that they have in-place.

A dipper dredge is basically a barge-mounted power shovel. The dipper is a heavy duty excavator, useful for breaking up hard, compacted material. A bucket type dredge utilizes a bucket to excavate material. Dragline dredging is typically a land-based operation during which the bucket scrapes material from the waterway onto the river bank. A clamshell dredge is used, for the most part, to excavate soft or cohesive sediments and is especially useful for deep digging and dredging in close quarters.

Mechanical dredges may cause large amounts of sediment resuspension. The physical force of the bucket or dipper impacting the bottom, and the loss of sediments as the bucket or dipper is raised through the water column and emptied into a scow may cause sediment resuspension. A closed-bucket or environmental bucket is now manufactured that is designed to be totally enclosed when lifting dredged materials out of the water. This type of bucket minimizes the loss of polluted sediments as it is raised through the water and reduces the amount of drippings as the dredged materials are transferred to scows or barges. An example of this type of bucket is the Cable Arm Clamshell made by the Cable Arm, Inc., Trenton, Michigan, and the Hawco Environmental Bucket manufactured by the Hawco Manufacturing Company, Inc., Slaughter, Louisiana.

Hydraulic Dredging

Hydraulic dredges remove and transport sediment in a liquid slurry form. They are usually barge or ship mounted, and carry diesel or electric powered centrifugal pumps. Cutterhead, suction, dustpan, hopper, and special-purpose dredges are types of hydraulic dredges. Hydraulic dredges typically add four to nine volumes of water for each volume of in-place sediment removed.

A cutterhead dredge excavates with a revolving cutter surrounding the intake end of a suction pipe. The cutterhead cuts the sediment which is drawn into the pipe with a large volume of water. The sediment slurry is transported in a pipeline to the disposal site. Booster pumps must be used to pump the slurry greater distances. A suction dredge is simply a cutterhead dredge with the cutterhead removed. Suction dredges are only applicable for removing soft, unconsolidated sediments, with little or no debris. A dustpan dredge is a hydraulic suction dredge which uses a widely flared dredging head along which are mounted pressure water jets. The jets loosen and agitate the sediment, which is then captured in the dustpan head as the dredge advances. The dustpan dredge is typically used for shallow water dredging in large river channels.

A hopper dredge is a self-propelled seagoing ship with large containers (hoppers) used to store and transport dredged materials. Dredged material is pumped through dragarms and discharged into the hoppers. Hopper dredges are used to dredge large harbors and rivers with ample area to maneuver.

Environmental Controls

Dredging causes the resuspension of bottom sediments and associated impacts on water quality and aquatic life. The significance of dredging related impacts vary with the method of dredging, characteristics of the sediments, and the hydraulic and environmental characteristics of the waterway. Methods to reduce the impacts caused by dredging are discussed in the following paragraphs.

Silt curtains are large sheets of plastic or synthetic fabric suspended in the water to restrict the lateral movement of sediments resuspended during construction or dredging in a waterway. They typically have buoys at the surface and weights at the bottom. Silt curtains are sometimes used around dredges to limit the movement of sediments in the surface layer of the water column. The use of silt curtains is very difficult in waterways that are narrow or have swift currents. Oil booms are routinely used to contain oil spills or films on the surface of the water. They are very similar to silt curtains, except that the boom extends only a foot or two deep in the water. The use of oil booms around a dredging operation have the same type of problems as silt curtains.

There are a number of proprietary products available for adsorbing oil or grease contained by an oil boom. These products include bags and pads of granular chemicals that attract oil and grease and associated contaminants, but do not absorb water. If an oil film is expected during a dredging operation, these products could be placed within the area enclosed by the oil boom and periodically replaced as they become saturated with oil. Any products used to adsorb oil containing PCBs in concentrations of 50 ppm or greater will be disposed of in a TSCA approved incinerator or chemical waste landfill. There are no TSCA approved incinerators or chemical waste landfills in the area. The closest incinerator is in Kansas and the closest landfills are in New York and Alabama. The cost for landfilling PCB debris is approximately $100.00 to $165.00 per drum and the cost for incineration is $150.00 to $250.00 per drum.

Because of the narrow channel, highly variable currents in the IHC, and the difficulties with deployment around the dredging operation, the potential benefits from the use of silt curtains during the dredging at Indiana Harbor may be limited. Because of the high levels of oil and grease in the Indiana Harbor sediments, it is likely that an oil film will be produced during dredging. The use of oil booms and adsorbents to remove this oil from the water would be beneficial.

Selection of Dredging Equipment

The selection of dredging equipment is usually based on a number of factors, including:

- Quantity of material to be removed.
- Character of material (particle size, compaction, etc.).
- Physical site restrictions (water depths, channel widths, obstructions, etc.).
- Distance to disposal site.
- Compatibility with disposal operations.
- Availability of equipment.
- Cost of equipment use.

These criteria, which are discussed in detail in Appendix H, Dredging Technologies and Impacts, were used to determine the recommended dredging method for IHC.

Impacts of Alternatives

Estimated Costs

Dredging/Confined Disposal Facility Alternatives. Table 4 summarizes the first cost and annual costs of the four confined disposal facilities and the associated dredging/disposal techniques which were considered in detail. The construction cost estimates were based on October 1989 price levels. Average annual costs were based on a 50-year project life and an 8-7/8 percent interest rate. The detailed estimates are shown in Appendix K, Cost Estimates.

Sediment Treatment Technology Alternatives. Table 5 summarizes the estimated costs for the four treatment technologies considered in detail earlier in this report. The costs were developed based on information contained in reports by Carpenter (1986, 1987), Cullinane et al. (1986), and Ebasco (1987). These treatment processes have not been attempted on the scale of Indiana Harbor. Significant time and funds would have to be expended for further development before these technologies could be applied on such a scale. U.S. EPA guidance on preparation of feasibility studies of treatment technologies recognizes that the associated cost estimates may range within plus or minus 50 percent due to a number of uncertainties in the estimates that may not be accounted for such as technological problems and permitting. In developing the estimate for this report, the mid-range estimate was used. Average annual costs were based on a 50-year project life and an interest rate of 8-7/8 percent. Further information on the compilation of the estimated unit costs of the treatment technologies is contained in Appendix G, Application of Treatment Technologies to Contaminated Sediments.

Table 4 Estimated Costs, Alternative Dredging and Alternative Confined Disposal Facility Plans, Third Phase Plan Formulation

Costs	Inland Steel Site 3 Million CY	141st Street Site 2 Million CY	J-Pit Site 3 Million CY	ECI Site 3 Million CY
First Costs				
CDF Construction	$ 85,898,000	$14,019,000	$ 9,134,000	$15,790,000
Lands/Damages	11,500	1,814,000	2,070,000	4,428,000
Interest During Construction[1/]	21,140,000	1,258,000	411,000	945,000
Total Investment	$107,049,500	$7,091,000	$11,615,000	$21,163,000
Annual Costs				
Interest & Amortization [2/]	$ 9,637,700	$1,538,600	$1,045,700	$1,905,200
Annual CDF Operation	300	93,800	93,800	400
Annual CDF Maintenance	109,500	37,200	37,200	59,400
Annual Dredging	1,149,900	1,486,100	2,053,500	1,140,000
Subtotal	$10,897,400	$3,155,700	$3,230,200	$3,105,000
Earth Capping				
First Cost	$ 9,504,000	$8,793,000	$8,796,000	$11,294,000
Present Worth, Year 39 [3/]	345,000	1,244,000	317,000	407,000
Annual Cost	31,100	112,000	28,500	36,600
Total Average Annual Cost	$10,928,500	$3,267,700	$3,258,700	$3,141,600
Average Annual Cost/Cubic Yard	3.64	1.63	1.09	1.05
Dredging and Disposal	(0.38)	(0.74)	(0.68)	(0.38)
Confined Disposal Facility	(3.26)	(0.89)	(0.41)	(0.67)

1/ Includes interest during construction on lands since they are classified as non-productive at present time. Construction period: Inland Steel Lakefill, 5 years; 141st Street and ECI sites, 2 years; and J-Pit site, 1-½ years.

2/ 50 year project life @ 8-⅛ percent interest rate.

3/ Except for the 141st Street site which would occur in year 23.

Table 5 Estimated Costs, Sediment Treatment Technologies

Item	Treatment Technology: Solidification/ Stabilization	Solvent Extraction	Incineration	Wet Air Oxidation
Remove Large Debris (>12")	$ 2.00	$ 2.00	$ 2.00	$ 2.00
Remove Medium Debris (>2")	2.00	2.00	-	2.00
Dewater Sediments thru Underdrain System	1.00	1.00	3.00	1.00
Rehandle Sediments Into:				
Solidification Plant	2.00	-	-	-
Extraction Unit	-	2.00	-	-
Incinerator	-	-	2.00	-
Wet Air Oxidation Unit	-	-	-	2.00
Solidify Sediments	55.00	-	-	-
Extract Sediments	-	90.00	-	-
Incinerate Sediments	-	-	200.00	-
Oxidize Sediments	-	-	-	95.00
Incinerate Oil Fraction	-	40.00	-	-
Solidify Ash	-	-	45.00	-
Rehandle Solidified Material into Disposal Site	1.00	2.00	1.00	2.00
Treat Effluent & Drainage Water	3.00	5.00	4.00	7.00
Subtotal, Cost/Cubic Yard	66.00	142.00	257.00	111.0
Mobilization/Demobilization (25%)	21.00	39.00	68.00	32.00
Engineering & Design (15%)	12.00	24.00	41.00	19.00
Supervision & Administration (8%)	6.00	13.00	22.00	10.00
Process Development (7%)	6.00	11.00	19.00	9.00
Contingencies (25%)	21.00	39.00	68.00	32.00
Total Nominal Cost/Cubic Yard 1/	132.00	268.00	475.00	213.00
Total Average Annual Cost 2/	13,800,000	27,777,000	49,516,000	22,204,000
Average Annual Cost/Cubic Yard 2/	4.60	9.25	16.50	7.04

1/ Current cost of treatment of a cubic yard of sediment.
2/ Based on a 50-year project life and 8-⅞ percent interest rate.
3/ Total average annual cost ÷ 3 million cubic yards.

Environmental/Social Impacts

Table 6 summarizes the environmental/social impacts of various alternative actions considered in the third phase of project formulation, including taking no action, channel dredging, sediment treatment technologies, and confined disposal of polluted sediments. Further detailed information on these impacts is developed in the environmental impact statement which follows this report and in Appendix C, No Action; Appendix D, Biological Assessment; Appendix F, Environmental Engineering; Appendix G, Application of Treatment Technologies to Contaminated Sediments; and Appendix H, Dredging Technologies and Impacts.

Third Phase Conclusions

The "Final Rule for Operation and Maintenance of U.S. Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged Material into Waters of the U.S. or Ocean Waters" (33 CFR Parts 209, 335, 336, 337, and 338) provides for the environmental compliance of the U.S. Army Corps of Engineers' national dredging program. As required by this rule, this report evaluates all reasonable and practicable alternatives for the dredging and disposal of dredged materials from IHC and recommends an alternative that meets the definition of the Federal Standard.

The Federal Standard is defined in the above rule as the dredged material disposal alternative or alternatives identified by the U.S. Army Corps of Engineers which represents the least costly alternative consistent with sound engineering practices and meeting the environmental standards established by the Section 404(b) (1), Public Law 92-500, evaluation process or ocean dumping criteria. The application of Section 404 (b) (1) guidelines developed by the U.S. EPA, in cooperation with the U.S. Army Corps of Engineers, to the sediments from the IHC has shown that all dredged materials from this project are unsuitable for open-water disposal.

A comparison of the costs in Table 4 indicated that the least cost dredging and confined disposal alternative (ECI Site) was estimated at $3.14 million, or $1.05 per cubic yard, on an average annual basis. Table 5 shows that the least cost treatment process, solidification/stabilization, is estimated to be on-the-order of $13.8 million, or $4.60 per cubic yard, on an average annual basis. Other treatment processes would cost 2 to 3-1/2 times that amount. The treatment costs do not include the costs of dredging, temporary storage of the dredged materials to await the treatment process, or the final disposal site of the treated residual materials.

Table 6 Comparative Environmental/Social Impacts of Alternative Actions, Third Phase Plan Formulation

Resource	No Action	Channel Dredging	Advanced Treatment Technologies	Confined Disposal Facility Site				Structure Maintenance	Borrow Areas
				141st St.	J-Pit	Inland Steel	ECI Plans		
Geology/ Soils	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	Permanent removal of on-site soils, sand, gravel, or rock.
Groundwater	Any existing groundwater contamination at upland sites remain.	No impact.	Long-term isolation of potential groundwater contaminants	Isolation of groundwater contamination underneath the site.	No significant impacts.	No significant impacts.	Isolation of groundwater contamination underneath the site for original ECI plan. No impact EMS or EMC plans.	No impact.	Can not be determined at this time.
Sediment Quality	Existing sediments remain as a source of contamination to the Grand Calumet River and Lake Michigan	Removal of contaminated sediments from the Canal and Harbor. Reduction of contaminants entering Lake Michigan.	Removal and destruction or immobilization of some contaminants.	Containment of contaminated sediments on the site.	Containment of contaminated sediments on the site.	Containment of contaminated sediments on the site.	Containment of contaminated sediments on the site.	No impact.	No impact.
Water Quality	Continuation of water quality degradation due to contaminant release from sediments.	Short-term, localized increase in turbidity, suspended solids, and soluble contaminants. Long-term elimination of contaminant source.	Effluents from these technologies would require treatment prior to being discharged. Impacts similar to confined disposal.	No significant impact. Effluent would be discharged to the Hammond Wastewater Treatment Plant.	No significant impact. Effluent would be discharged to the Gary Sanitary Dist. Wastewater Treatment Plant.	Short-term, localized impact to Lake Michigan. Mixing with Lake Inland waters would quickly return mixing zone to ambient conditions.	No significant impact. Effluent would be discharged to the East Chicago Wastewater Treatment Plant.	Sediment resuspension would cause localized, short-term decrease in water quality.	Can not be determined at this time.
Terrestrial Communities	No significant changes in existing conditions. Continued potential for contaminant impacts in the food chain.	Potential for temporary increases in contaminant uptake during dredging.	Similar impacts as those for confined disposal sites.	Loss of several acres of wetlands requiring mitigation. Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	Loss of several acres of wetlands requiring mitigation. Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	No significant impacts.	Can not be determined at this time.
Threatened and Endangered Species	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	Can not be determined at this time.
Natural Areas and Public Lands	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	Can not be determined at this time.
Archaeological and Historic Resources	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	Can not be determined at this time.
Social Setting	Loss of waterborne commerce impacting area economy.	Temporary disruptions, but long-term benefits for commercial navigation.	Long-term operation impacts of increased odors, employment, noise, and traffic plus initial impacts of CDF construction.	Increased truck traffic resulting from hauling construction, dredged, and cap materials to the site.	Increased truck traffic resulting from hauling construction, dredged, and cap materials to the site. Impacts to	Increased traffic if cap material is hauled to site by truck.	Increased truck traffic resulting from hauling construction cap materials to the site.	Temporary, localized disturbances during repairs.	Temporary, local increases in area noise, dust, and traffic.

Table 6 (Cont'd) Comparative Environmental/Social Impacts of Alternative Actions, Third Phase Plan Formulation

Resource	No Action	Channel Dredging	Advanced Treatment Technologies	Confined Disposal Facility Site				Structure Maintenance	Borrow Areas
				141st St.	J-Pit	Inland Steel	ECI Plans		
Air Quality	Continued loss of volatile contaminants across the water/air interface of the canal, harbor, and lake to the air.	Potential for volatile contaminant release upon exposure of sediment to air, and from resuspension of solids.	Some volatile loss of contaminants from sediment drying, re-handling, and treatment.	Volatile contaminant release from drying sediments.	Volatile contaminant release from drying sediments.	Volatile contaminant release from drying sediments and CDF pond.	Volatile contaminant release from drying sediments.	Temporary increases in hydrocarbons due to equipment operations.	No signinficant impact.
Aquatic Communities	Continued exposure and uptake of contaminants by aquatic organisms.	Removal of benthic invertebrates and many contaminants. Exposure and uptake of contaminants by aquatic organisms due to sediment resupension and from underlying sediments.	Similar impacts as those for confined disposal sites.	Permanent loss of several acres of existing, degraded aquatic resources. Long-term reduction in contaminants impacting Lake Michigan aquatic resources.	Permanent loss of several acres of existing, degraded aquatic resources. Long-term reduction in contaminants impacting Lake Michigan aquatic resources.	Permanent loss of about 70 acres of nearshore habitat. Loss would occur with or without Federal action. Long-term reduction in contaminants impacting Lake Michigan aquatic resources.	No impacts.	No significant impacts.	Can not be determined at this time.
Energy Requirements	No significant impacts.	No significant impacts.	Large quantities of fuel or electricity would be required.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.
Cumulative Impacts	IHC would continue to be a significant source of contaminated sediments to Lake Michigan. Cumulative impacts of this source combined with other similar sources could be significant.	Significant reductions in contaminated sediments entering Lake Michigan would occur.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	Can not be determined at this time.

The primary drawback to the use of the Inland Steel site was its high CDF construction cost. An in-lake CDF in a high energy zone on the southeast corner of Lake Michigan would require massive stone dikes about 16 feet above the lake water surface to prevent wave overtopping and dike failure. Combining the cost of building this massive structure with the cost of providing a low-permeability dike seal in an in-water construction setting placed the cost per cubic yard of dredged material at this site two to three times higher than the cost per cubic yard of the other three sites.

Other drawbacks included: (1) the uncertain feasibility of low-permeability liner construction in that no facility has ever been built in a similar manner; (2) the impact of the loss of Inland Steel Company's plant expansion in the permitted lakefill area due to the CDF siting; (3) an undefined level of hazardous and toxic waste liability associated with previously filled areas adjacent to the CDF site; and (4) significant generalized concern by the environmental groups and the public over in-water CDF reliability.

The drawbacks of using the 141st Street site included: (1) significantly less available disposal area than at the other sites; (2) the high probability of groundwater contamination by petroleum products and associated potential liability along with some concern about the extent and nature of surface contamination due to historic filling and dumping on the site; (3) the potential impact of CDF activity to the wetlands adjacent to the site; and (4) higher costs of transporting the dredged materials by special truck caused by the lack of water access to the site. Finally, the city of Hammond had passed a resolution opposing the disposal of dredged materials from the IHC at this or any other Hammond site.

The primary drawbacks to the use of the J-Pit for sediment disposal are additional disposal costs per cubic yard due to the long truck haul distance and lack of a water access route to the site and the displacement of a planned municipal refuse dump. The WMX Technologies Company (formerly Waste Management) had applied for a permit to create a municipal landfill at the J-Pit and had expended significant funds on design. Finally, the city of Gary had passed a resolution opposing the use of this site for dredged material disposal.

Based on the results of the third phase of plan formulation, the District Engineer concluded that the preferred alternative was to construct and operate a dredged material CDF at the ECI site in East Chicago, Indiana. This action meets the Federal Standard as the most cost-effective alternative which is consistent with sound engineering practices and applicable environmental requirements.

The preferred alternative also included the use of a clamshell dredge with a closed-bucket or environmental-bucket. This type of dredging equipment was selected because it can operate

with a high production rate, can remove fine-grained sediments and debris, and is able to work in close quarters and around bridges. In addition, this type of equipment can remove sediments with a minimal amount of water which is highly desirable in connection with use of the proposed CDF. Environmental controls which could be used include the use of an oil boom and sorbents around the dredge and possibly silt curtains in the immediate dredging area.

There is no overriding reason or requirement to exceed the Federal Standard and undertake some additional type of sediment treatment process at a much greater cost than the proposed action. Due to the developmental nature of sediment treatment technologies, there are no alternatives to confined disposal that are available "Off the Shelf". Most of the technologies reviewed do not treat organic and inorganic contaminants in one treatment process, wherein the problem with application of a technology to contaminated sediments lies. A single technology that will completely treat all the contaminants present in the Indiana Harbor sediments does not exist at this time. A series of treatment processes to remove/degrade the contaminants would be needed to convert dredged materials to clean sand and silt. The technologies that do exist can modify or destroy one or more contaminants, but at the same time they produce discharges that may need further treatment, or that are more difficult to deal with than the original contaminated sediment material. To date, sediment treatment technologies have not been applied on a scale as large as the maintenance dredging proposed at Indiana Harbor. Significant time and funds would have to be expended for further development before these technologies could be applied on this scale.

Draft Report/EIS

A draft letter report and DEIS were completed on this third phase of plan formulation and submitted to the North Central Division for review in January 1989. Based on review comments received, the Chicago District undertook additional investigations of the status of the ECI property, the site of a former oil refinery which is in bankruptcy proceedings. When completing the draft letter report and DEIS, it was the Chicago District's understanding that an environmental clean-up of the ECI site had been completed in response to an order by the bankruptcy court judge. Additional investigation in 1990, including further discussions with the U.S. EPA and the State of Indiana, indicated that the oil refinery structures on the site had been removed above the ground surface. However, there were facilities below ground level which had not been removed, including two structures which come under the regulatory authority of the Resources Conservation and Recovery Act (RCRA). Therefore, the ECI site has open RCRA status. This information led to the fourth phase of plan formulation, which concentrated on refining and optimizing the proposed CDF at the ECI site given the RCRA status of the site.

FOURTH PHASE: 1991-1995

The fourth phase of plan formulation included the following:

- A detailed analysis of sedimentation rates and patterns in the IHC leading to a refined estimate of dredging quantities and three alternative dredging plans.

- An investigation of the RCRA status of the ECI site and the requirements for RCRA closure and corrective actions.

- A further analysis and optimization of a CDF at the ECI site in view of its present RCRA status.

- A draft Comprehensive Management Plan and Environmental Impact Statement (CMP/EIS) report were distributed on 30 Oct 1995 for a five-month agency and public review period. Public information sessions and public meetings where held on 28 November 1995 and 10 January 1996 to provide additional information and obtain comments for public record and response.

- An analysis of a generic "clean" upland site for location of a CDF incorporating the current U.S. EPA/State of Indiana requirements for constructing a CDF at such a site.

- A detailed economic analysis of the existing and projected waterborne commerce at IHC, a detailed estimate of the potential commercial navigation and incidental environmental benefits, and a benefit-cost analysis of CDF's at the ECI site and at a generic clean upland site.

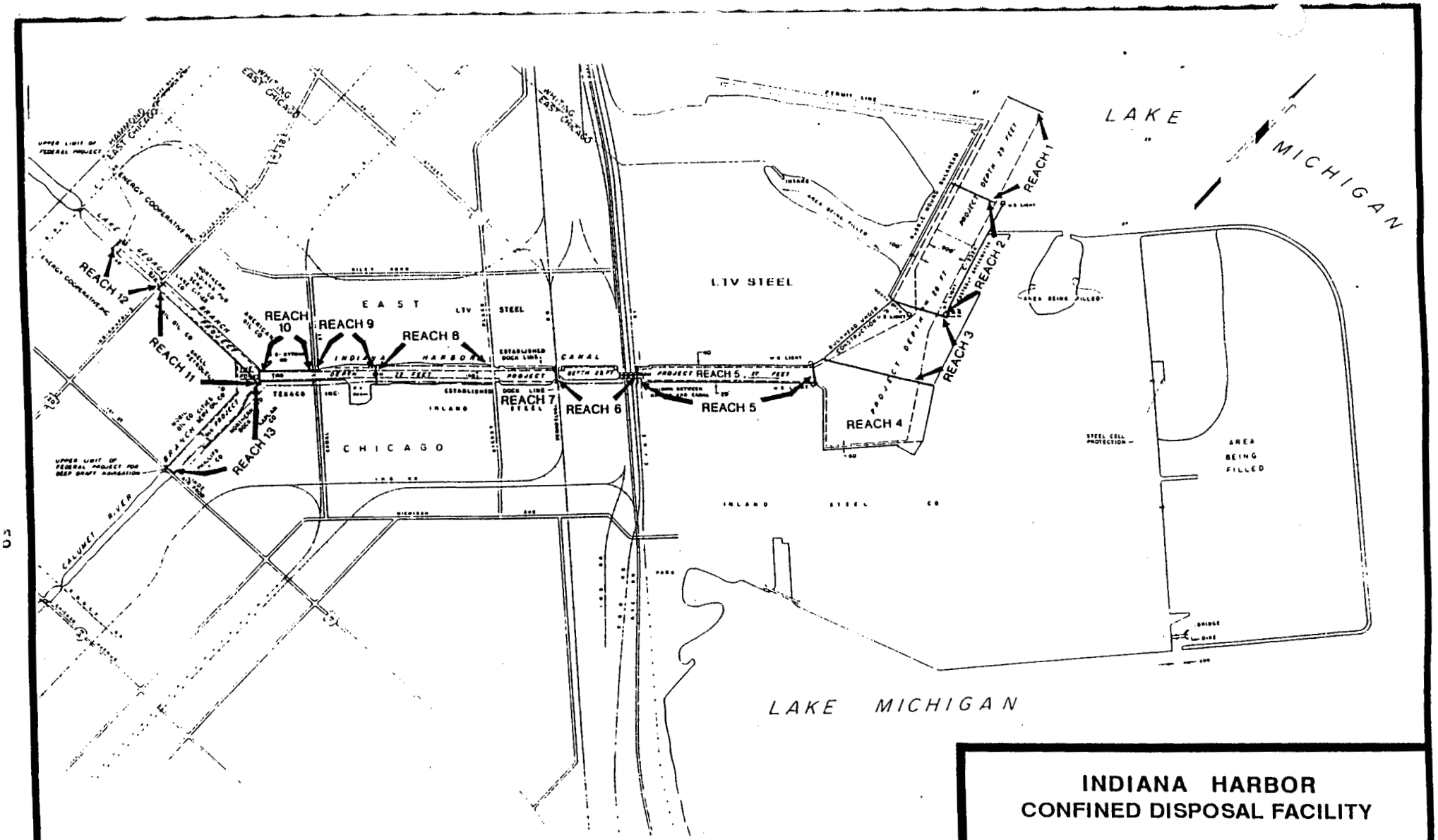
- A further analysis of an alternative implementing two treatment technologies to deal with both organic and heavy-metal contaminants in the dredged materials.

The items listed above are discussed in detail in the following paragraphs.

Sedimentation Analysis

An investigation of sedimentation rates and patterns within the IHC was completed to provide estimates of long-term navigation controlling depths for the economic analysis and estimated annual maintenance dredging quantities. The IHC was divided into 13 reaches as shown on Figure 13 to facilitate this investigation which included the following activities:

- An analysis of historic sounding data, dredging records, Lake Michigan water levels, and major storm events to develop a perspective on both long-term and short-term sedimentation rates.



PROJECT DEPTHS AND SOUNDINGS ARE REFERRED TO LOW WATER DATUM 576.8 FEET ABOVE MEAN WATER LEVEL AT FATHER POINT, QUEBEC, I G L D (1955) (INTERNATIONAL GREAT LAKES DATUM)

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

SEDIMENTATION ANALYSIS
CHANNEL REACHES

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993

- A preliminary sedimentation analysis to estimate the impact of channel depths within the IHC on sedimentation rates.

- Construction of a computer model to simulate the dredging process. The model incorporates the sedimentation rates developed in the previous two activities, the dredging volumes, and bank sloughing.

- Development of the future "without project" channel conditions during the period of analysis and for three alternative maintenance dredging conditions utilizing the dredging simulation model.

The dredging simulation model was initially used to develop "without project" (without maintenance dredging) average annual sedimentation volumes and corresponding channel depths for each of the 13 reaches for the period 1998 to 2031. The results of the simulation are summarized in Appendix Q - Sedimentation Investigation and Dredging Plans. These controlling channel depths were used to develop the "without project" waterborne commerce transportation costs used in the economic analysis.

The dredging simulation model was subsequently used to develop three alternative maintenance dredging plans for the period 1998 to 2031. The first plan consists of dredging the harbor and canal to authorized depths from the entrance in Lake Michigan to the E.J. & E. Railroad bridge (Reaches 1 through 5), plus the PCB hotspot along the north bank of Reach 6. This plan is identified as Alternative 1 - Partial Federal Channel Dredging. The second plan consists of dredging the entire Federal navigation project to authorized depths from the entrance to the upstream project limits on the Lake George and Calumet River Branches (Reaches 1 through 13). This plan is identified as Alternative 2 - Complete Federal Channel Dredging. The third plan includes the complete Federal channel dredging of Alternative 2, plus additional dredging provided for in a 1993 Consent Decree between the U.S. EPA and the Inland Steel Company. This plan is identified as Alternative 3 - Cooperative Dredging Program. All three plans include dredging in appropriate non-Federal dock/berthing areas to provide depths commensurate with the adjacent Federal channel depths.

The dredging simulation model was also used to develop: (1) estimates of the quantities of dredged materials within the authorized Federal channel to project depth, plus an average of one-half foot overdepth; (2) quantities that would slough into the Federal channel from the dock/berthing and other areas outside of the authorized channel lines when the Federal channel is dredged; and (3) the residual quantities of sediment in the berthing and other areas outside of the authorized channel lines after sloughage occurred. These quantities were identified for specific channel reaches/berthing areas to facilitate the development of alternative project cost sharing options requested in a May 21, 1993 memorandum from the Acting ASA (CW) to the Director of Civil Works. Table 7 summarizes the estimated dredge material quantities by channel reach for the three dredging alternatives.

Table 7 Estimated Dredge Material Quantities by Channel Reach for Alternative Dredging Plans, Thousands of Cubic Yards

Channel Reach		Alternative 1			Alternative 2			Alternative 3		
Number	Description	1998-2012	2013-2031	Total	1998-2003	2004-2029	Total	1998-2005	2006-2029	Total
1	Outer Harbor Approach Channel	371	344	715	170	364	534	164	342	506
2	Outer Harbor Approach Channel	638	420	1058	396	455	851	393	432	825
3	Anchorage & Maneuver Basin	234	249	483	93	276	369	90	255	345
4	Anchorage & Maneuver Basin	837	423	1,260	564	507	1,071	505	409	914
5	Canal Entrance Channel	105	141	246	15	167	182	31	153	184
6	Inner Harbor Canal	0	0	0	0	55	55	4	37	41
7	Inner Harbor Canal	0	0	0	0	45	45	2	42	44
8	Inner Harbor Canal	0	0	0	0	357	357	84	192	276
9	Inner Harbor Canal	0	0	0	0	195	195	62	143	205
10	Lake George Branch	0	0	0	0	44	44	9	38	47
11	Lake George Branch	0	0	0	0	86	86	4	86	90
12	Lake George Branch	0	0	0	0	71	71	0	73	73
13	Calumet River Branch, Lower Reach	0	0	0	0	216	216	0	206	206
R03	Inland Steel Hopper & Stone Docks	92	78	170	43	88	131	42	86	128
R04	Inland Steel Dock No. 4 and Adjacent Dockfaces[1]	132	59	191[2]	92	71	163[2]	253	117	370[2]
R05	Inland Steel Dock No. 2	28	13	41	20	19	39	22	15	37
L05	LTV Steel Ore Dock	44	23	67	29	26	55	32	24	56
R06	Inland Steel Consent Decree Dockface	0	0	0	0	0	0	5	3	8
L06	PCB Hot Spot	10	7	17	0	13	13	10	5	15
R07	Inland Steel Dock No. 3	0	0	0	0	11	11	2	9	11
R08	Inland Steel Consent Decree Dockface	0	0	0	0	0	0	79	33	112
L11	Amoco Oil Company Dock	0	0	0	0	8	8	4	3	7
U13	Calumet River Branch, PCB Hot Spot	0	0	0	0	180	180	132	42	174
		2,491	1,757	4,248	1,422	3,253	4,675	1,929	2,745	4,674

1/ Includes both berthing areas and Consent Decree dockfaces.
2/ Includes berthing area dredging only.
3/ Includes both berthing area and Consent Decree dockface dredging.

Alternative 1 - Partial Federal Channel Dredging

Alternative 1 consists of dredging the Federal navigation channel from the entrance in Lake Michigan to the E.J. & E. Railroad bridge (Reaches 1 through 5). These reaches of channel would be dredged to project depth, plus an average of one-half foot overdepth. The wedge-shaped berthing area along the Inland Steel Company hopper and stone docks in the southern 300 feet of Reach 2 and the northern 1,200 feet of Reach 3 would be dredged to -28 feet LWD, plus an average of one-half foot overdepth, as shown on Figure 14. The Inland Steel and LTV Steel docks on either side of the canal in Reach 5 would also be dredged to -27 feet LWD, plus an average of one-half foot overdepth. In addition, the PCB hot spot located along the northeast bank of Reach 6 would also be dredged to a depth of -22 feet LWD in about the fifth year of dredging.

Alternative 2 - Complete Federal Channel Dredging

Alternative 2 consists of dredging the entire Federal navigation project to authorized depths, plus an average of one-half foot overdepth, from the entrance in Lake Michigan to the upstream project limits on the Lake George and Calumet River Branches (Reaches 1 through 13). Priority would be given to dredging the PCB hot spots in Reaches 6 and 13 in about the fifth year of dredging operations. Dredging in the berthing areas in Reaches 1 through 5 would be the same as in Alternative 1. In addition, the berthing area along the Inland Steel plant 3 blast furnace dock in Reach 7 and the American Oil Company dock in the downstream 1,400 feet of Reach 11 would be dredged to -22 feet LWD, plus an average of one-half foot overdepth.

Alternative 3 - Cooperative Dredging Program

In October 1990, the U.S. EPA filed a Complaint in the U.S. District Court for Northern Indiana alleging that the Inland Steel Company had violated the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the Resource Conservation and Recovery Act (RCRA), and the Clean Air Act (CAA) at its Indiana Harbor Works in East Chicago, Indiana. Inland denied and continues to deny the violations alleged in the Complaint. The U.S. EPA and Inland subsequently agreed that settlement of this issue without protracted litigation was in the public interest and therefore entered into a Consent Decree to resolve the claims in the Complaint. The Consent Decree was lodged with the U.S. District Court for Northern Indiana by the U.S. Attorney on March 8, 1993. On June 1, 1993, the U.S. Attorney made a motion for entry of the Consent Decree with the U.S. District Court judge. The judge entered the order in July 1993.

Among other items in the Decree, Inland agreed to spend $19 million to perform a sediment characterization study ($1.5 million) and complete selected sediment remediation activities ($17.5 million) in the IHC in the vicinity of the Indiana Harbor Works. More specifically, the remediation activities are to take

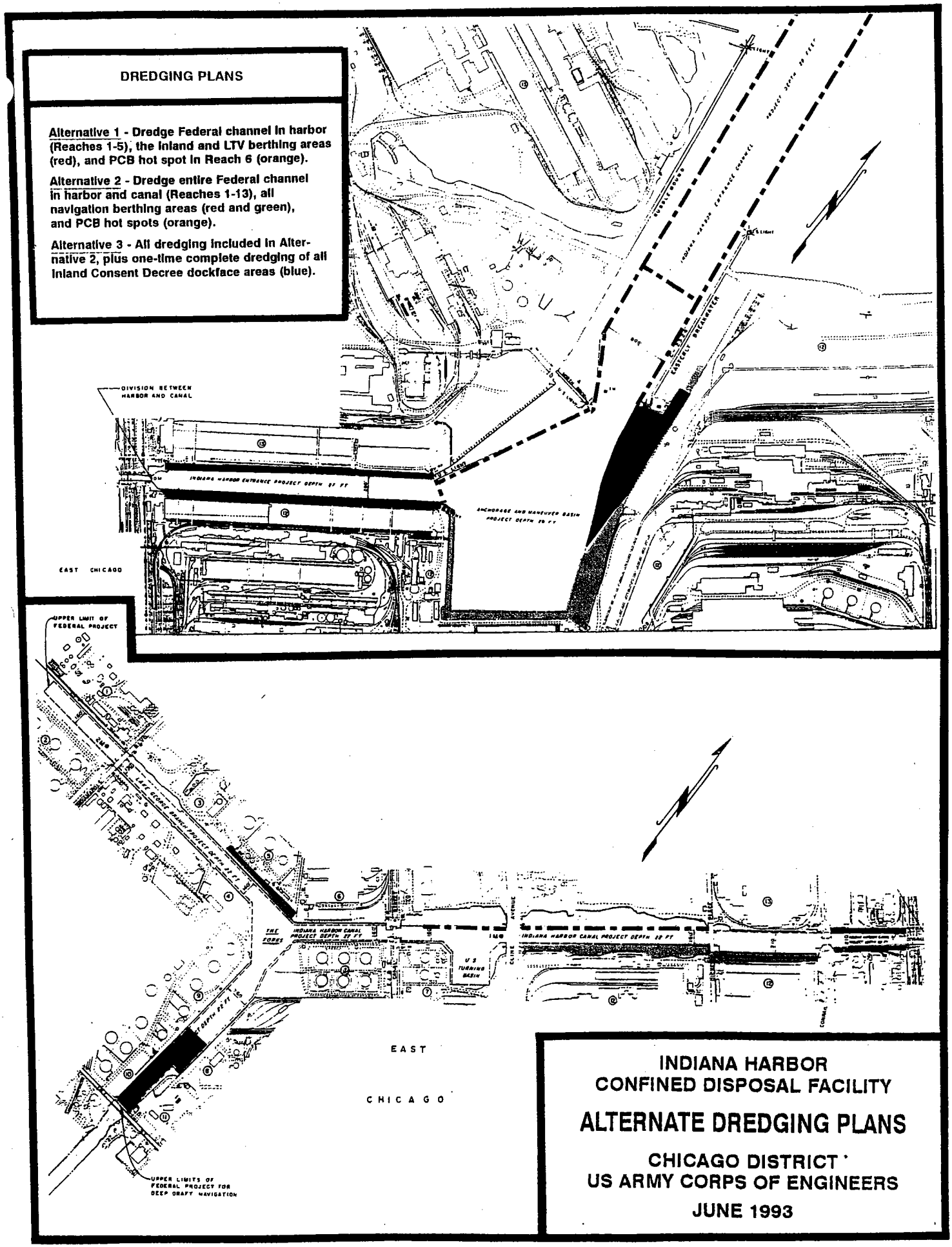

DREDGING PLANS
Alternative 1 - Dredge Federal channel in harbor (Reaches 1-5), the Inland and LTV berthing areas (red), and PCB hot spot in Reach 6 (orange).
Alternative 2 - Dredge entire Federal channel in harbor and canal (Reaches 1-13), all navigation berthing areas (red and green), and PCB hot spots (orange).
Alternative 3 - All dredging included in Alternative 2, plus one-time complete dredging of all Inland Consent Decree dockface areas (blue).
DIVISION BETWEEN HARBOR AND CANAL
EAST CHICAGO
UPPER LIMIT OF FEDERAL PROJECT
EAST
CHICAGO
UPPER LIMITS OF FEDERAL PROJECT FOR DEEP DRAFT NAVIGATION
INDIANA HARBOR CONFINED DISPOSAL FACILITY
ALTERNATE DREDGING PLANS
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993

Figure 14

place within Inland's half of the harbor and canal (centerline of Federal channel to Inland's dockfaces) from the entrance of the harbor upstream to Cline Avenue. The actual scope and specific location of the remediation activities will depend upon the results of the sediment characterization study, which is yet to be accomplished. In addition, the Consent Decree indicates that no part of the $19 million may be spent on other actions in the Decree which Inland has agreed to perform relating to CWA, SDWA, RCRA, and CAA compliance programs, or any action which represents a sound business practice to Inland, i.e., actions from which Inland, rather than the public, is likely to receive the substantial benefit.

A sound business practice action specifically identified in the Decree includes the remediation of sediments along the dockface areas of Inland's hopper and stone docks in Reaches 2 and 3, its docks in Reach 5 and its plant 3 blast furnace dock in Reach 7. The remediation along the stone and hopper dock would occur in an area 2,000 feet long and 30 feet wide extending from the dockface into the harbor. The remediation in both Reaches 5 and 7 would extend along the entire reach at a width extending from the dockface to the near edge of the Federal navigation channel.

In very preliminary discussions with the Chicago District, Inland representatives have indicated that the Company wishes to work with the U.S. Army Corps of Engineers to develop a joint coordinated dredging and dredged material disposal program that meets both the requirements of navigation and the applicable Consent Decree sediment remediation actions. In response to Inland's desires, a third dredging alternative, Cooperative Dredging Program, was investigated. This alternative was formulated with a view to maximizing commercial navigation benefits and meeting the spirit and intent of the required Consent Decree actions, while utilizing the funds made available through the Decree to reduce Federal expenditures for maintenance dredging and disposal to the maximum extent possible.

The sediment characterization study required by the Consent Decree has not yet been completed by Inland. Therefore, a tentative sediment remediation plan had to be assumed for this report. It is considered that a reasonable plan would consist of a one-time complete dredging of all Consent Decree areas between the Inland dockfaces and the Federal navigation channel, extending from the hopper dock to Cline Avenue, to depths equal to the authorized depths in the adjacent Federal channel, plus an average of one-half foot overdepth. The U.S. EPA concurred with this preliminary plan.

Alternative 3 includes the complete Federal channel dredging and the associated berthing area dredging of Alternative 2, plus a one-time complete dredging of all of the remaining Inland Steel Company dockface areas from the downstream end of the hopper dock up to, but not including, the turning basin in Reach 9. This additional dredging would occur in the northern 800 feet of Reach 2 and in Reaches 3, 4, 6, and 8. The target depths in Reaches 2,

3, and 4 would be -28 feet LWD, plus an average of one-half foot overdepth and -22 feet LWD, plus an average of one-half foot overdepth in Reaches 6 and 8.

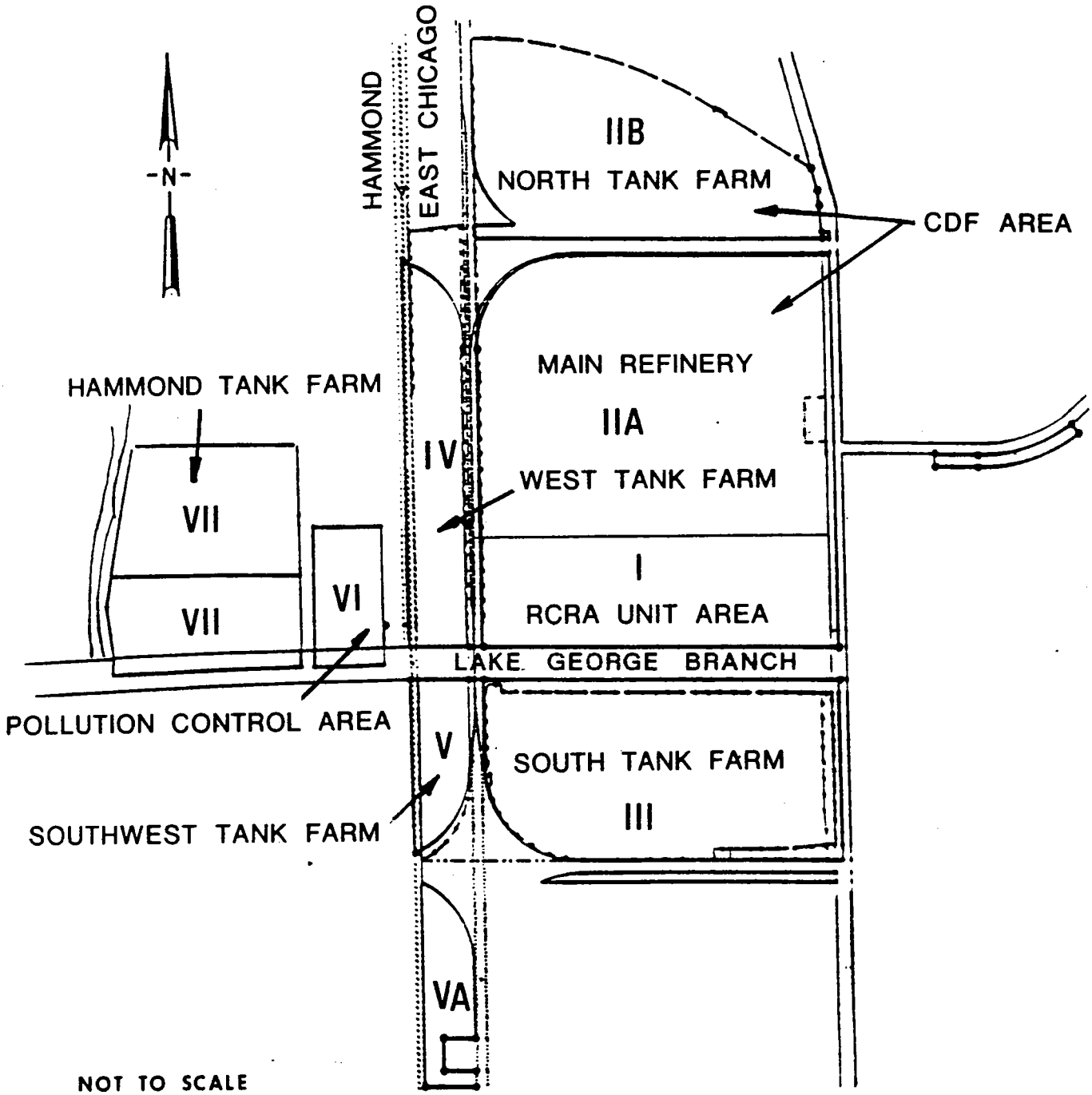
Energy Cooperative, Inc. (ECI) Site

The entire ECI site is made up of numerous separate parcels of land as shown on Figure 15. The Lake George Branch of the Indiana Harbor Canal extends east-west across the site, geographically dividing various parcels north of the canal. Many of the individual parcels are separated from each other by thin strips of land owned by different railroad companies.

The proposed dredged material CDF would be located on parcels IIA and IIB. Parcel I contains the two former underground oil refinery structures which presently have open RCRA status. Figure 16 shows the oil refinery structures on these three parcels prior to their demolition in response to the bankruptcy court order in the late 1980's. The refinery operations included the production of mineral spirits, propane, and unleaded gasoline, fuel oil, kerosene, asphalt and asphalt products, liquified petroleum gas, grease, lubricating oils, paraffin wax, phenols, and sulfur.

The ECI notified the U.S. EPA, Region 5 of hazardous waste activity on this site on July 1, 1980. The ECI subsequently submitted a Part A permit application required by RCRA regulations on November 13, 1980. The permit application indicated hazardous waste storage in tanks and treatment by incineration. The hazardous wastes listed were slop oil emulsion solids from the petroleum refining industry (K049) and API separator sludge from the petroleum industry (K051). While the ECI facility's RCRA application indicated the incinerator was intended for hazardous waste disposal, the company insists that there is no evidence that the incinerator had been used for hazardous waste treatment.

The facility had RCRA interim status for the storage and treatment of hazardous waste when ECI filed for reorganization under Chapter 11 bankruptcy in 1981. ECI later attempted to abandon the property, but the United States Bankruptcy Court, Northern District of Illinois, Eastern Division, ordered the facility to close in an environmentally sound manner and allocated funds to accomplish this task. However, the court-approved demolition of the plant did not include the closure of the hazardous waste units as required under RCRA and did not address the RCRA corrective action requirements. The court-ordered demolition activities occurred in the mid-1980's and all buildings and above ground structures were razed. The hazardous wastes identified for removal by the contractor during the court ordered closure activities were: 600 cubic yards of API separator sludge (K051); two tanks containing a total of 2,558 barrels of K051; two tanks totaling 61 barrels of slop oil emulsion solid (K049); six drums of tetraethyl lead waste; and 7,000 barrels of

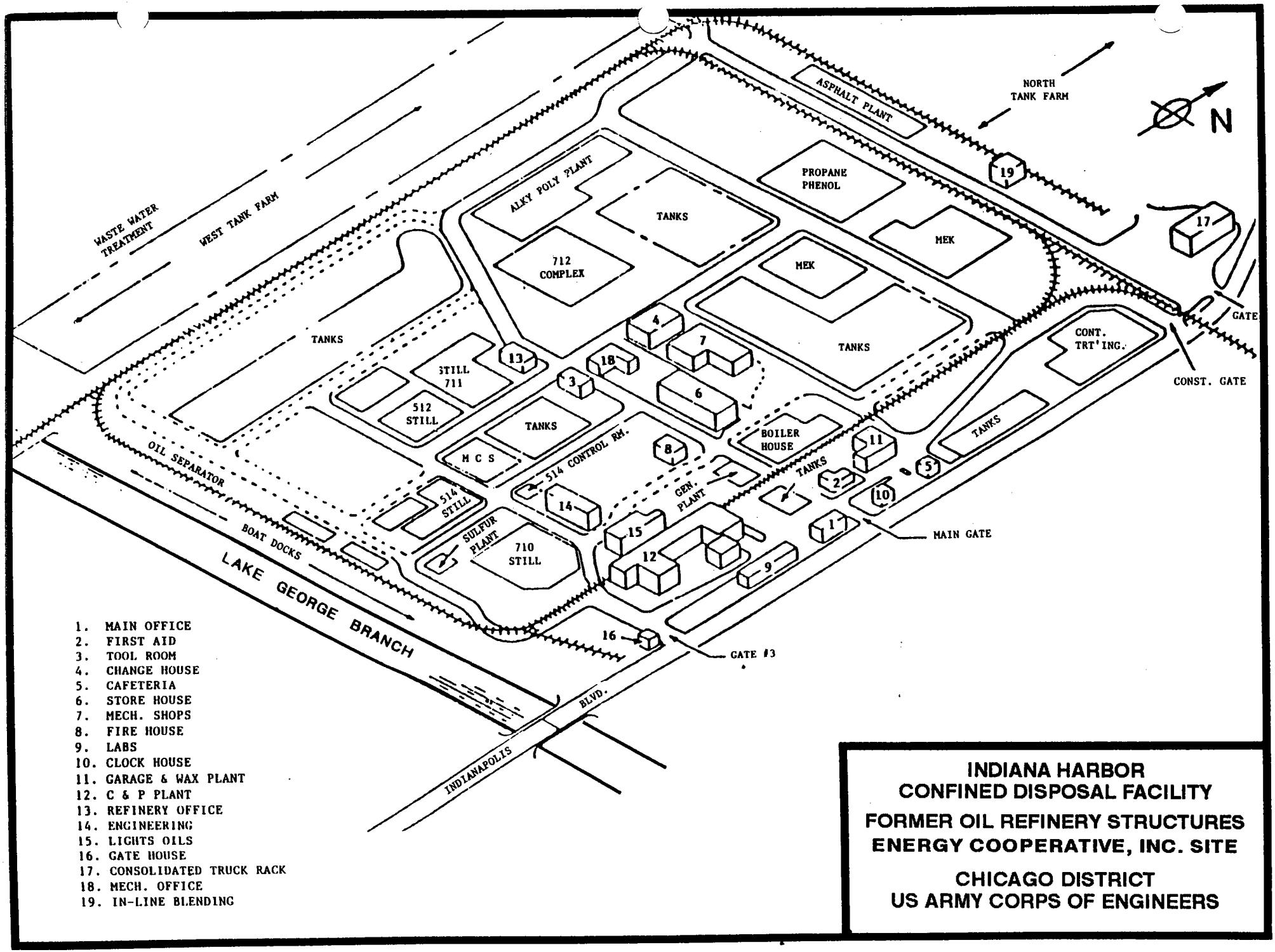


INDIANA HARBOR
CONFINED DISPOSAL FACILITY

PROPERTY PARCELS
ENERGY COOPERATIVE, INC. SITE

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993

Figure 15



INDIANA HARBOR
CONFINED DISPOSAL FACILITY

FORMER OIL REFINERY STRUCTURES
ENERGY COOPERATIVE, INC. SITE

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

waste gasoline. In addition to the tanks, storage containers, and incinerator on-site, there were several pits, sumps, and spill areas. Pumps were removed from lead pump pits and then the pits were filled. There was no testing of residuals that remained in the pits. After the above ground structures were removed, the site was graded and several inches of clean top soil were placed on the site.

In 1989, the city of East Chicago became the owner of the ECI site as payment for back taxes owed by ECI. In assuming ownership without approved corrective and closure actions in place, the City of East Chicago also assumed the liability for the site. The City did not know that the ECI site had open RCRA status when it took over ownership of the property. In 1994, the property was transferred to the Indiana Harbor and Ship Canal Waterway Management District and is currently a responsible party for the Site.

Closure/Corrective Action

The IDEM has determined that RCRA closure will be required on parcel I which contained the hazardous waste management units. Due to soil and groundwater contamination which may have come from these units, this parcel is also subject to post-closure permitting requirements. Closure/post-closure requirements focus on two main actions: (1) an in-place closure cap system, and (2) a groundwater gradient control system that will prevent contamination from leaving the site.

A closure cap would have to be constructed of materials to meet or exceed regulatory permeability requirements of 10^{-7} cm/sec. The maintenance of an adequate inward gradient within the site could be accomplished through the pumping of strategically placed wells. Contaminated groundwater could be treated on-site at a treatment plant, if needed, or storage for transportation to an off-site facility. The approach could be combined with construction of a slurry wall to reduce the amount of pumping and treatment required and to further isolate the site groundwater.

The U.S. EPA has concluded that parcels IIA and IIB require RCRA corrective action due to apparent extensive on-site surface and groundwater contamination. Based on site characterization studies, corrective action can range from excavation and proper disposal of isolated contaminants to providing an in-place cap system and a groundwater gradient control system. A complete site characterization study of parcels IIA and IIB would be very costly. In lieu of such an expensive study, the U.S. EPA has determined that a worst case corrective action approach is warranted, including construction of an in-place clay cap system and a slurry wall around the perimeter of the site, and implementation of a groundwater gradient control system. Following extensive discussions in mid-1992, the U.S. EPA and the IDEM concluded that the same actions should be taken to complete the RCRA closure of parcel I.

Figures 17 and 18 show the features of the proposed U.S. EPA/IDEM plan for RCRA closure/corrective action on parcels I, IIA and IIB under without CDF conditions. These features include:

- Clay cap/erosion control on parcels I, IIA and IIB.
- Slurry wall around perimeter of parcels, I, IIA andIIB.
- Groundwater gradient control system on parcels I, IIA and IIB.
- Pretreatment of groundwater collected from parcels I, IIA and IIB, if needed.
- Final treatment of groundwater by city of East Chicago wastewater treatment plant.

Table 8 summarizes the estimated costs of this plan which would be entirely a non-Federal responsibility. Details of the estimated costs are provided in Appendix K, Cost Estimates.

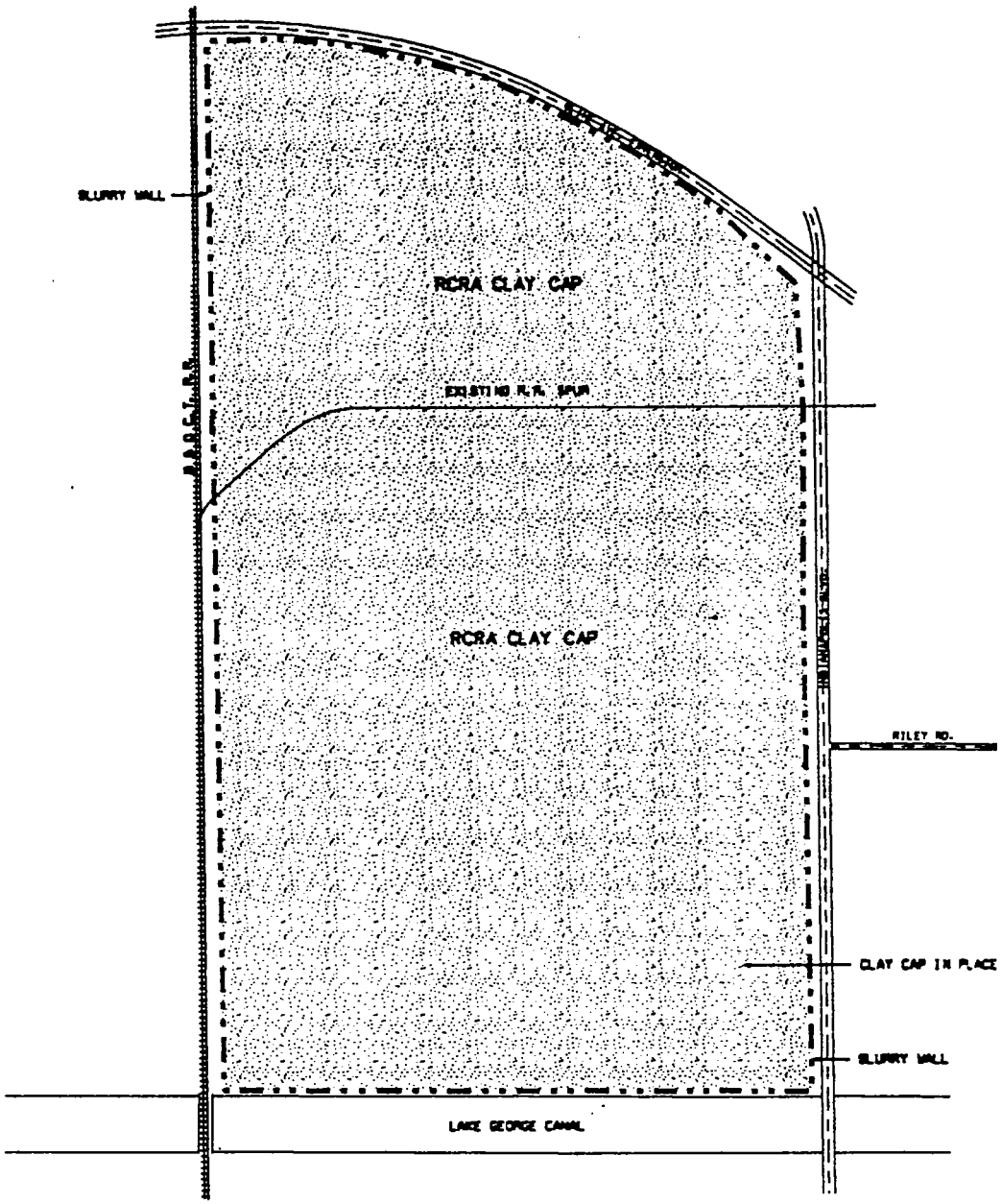
Table 8 Estimated Costs, RCRA Closure/Correction Features, ECI Site Parcels I, IIA and IIB

Item	Estimated Cost [1/]
First Cost	
Slurry Wall	$ 6,595,000
Clay Cap	16,413,000
Hydraulic Gradient Control System	1,291,000
Water Treatment System	1,613,000
Erosion Control	10,793,000
Total	36,705,000
Annual Costs	
Gradient Control/Monitoring	
Pumping	2,800
Monitoring ECI discharge	50,000
Groundwater Monitoring	165,000
Water Treatment	22,000
Mowing	3,800
Total	243,600

[1/] October 1993 price levels.

Optimization of ECI Site CDF

Very extensive discussions were undertaken by the U.S. EPA, Region 5; the IDEM; and the U.S. Army Corps of Engineers, Chicago District, in early to mid-1992 in an effort to optimize a plan to combine the required RCRA closure and corrective actions with construction of a dredged material CDF on parcels IIA and IIB of the ECI site. The objective of the discussions was to develop



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SCALE IN FEET

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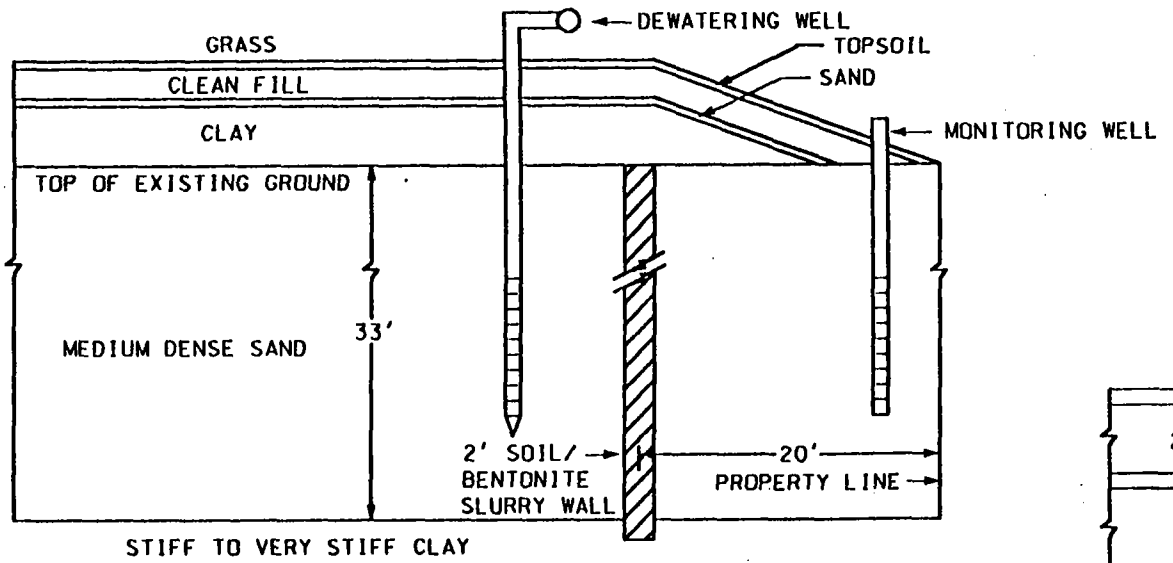
INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITHOUT CDF PROJECT
PLAN VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993

Figure 17



SECTION

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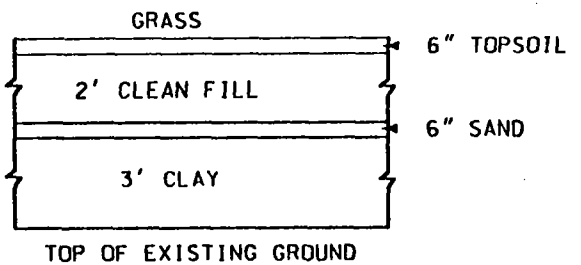

DETAIL

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INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITHOUT CDF PROJECT
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

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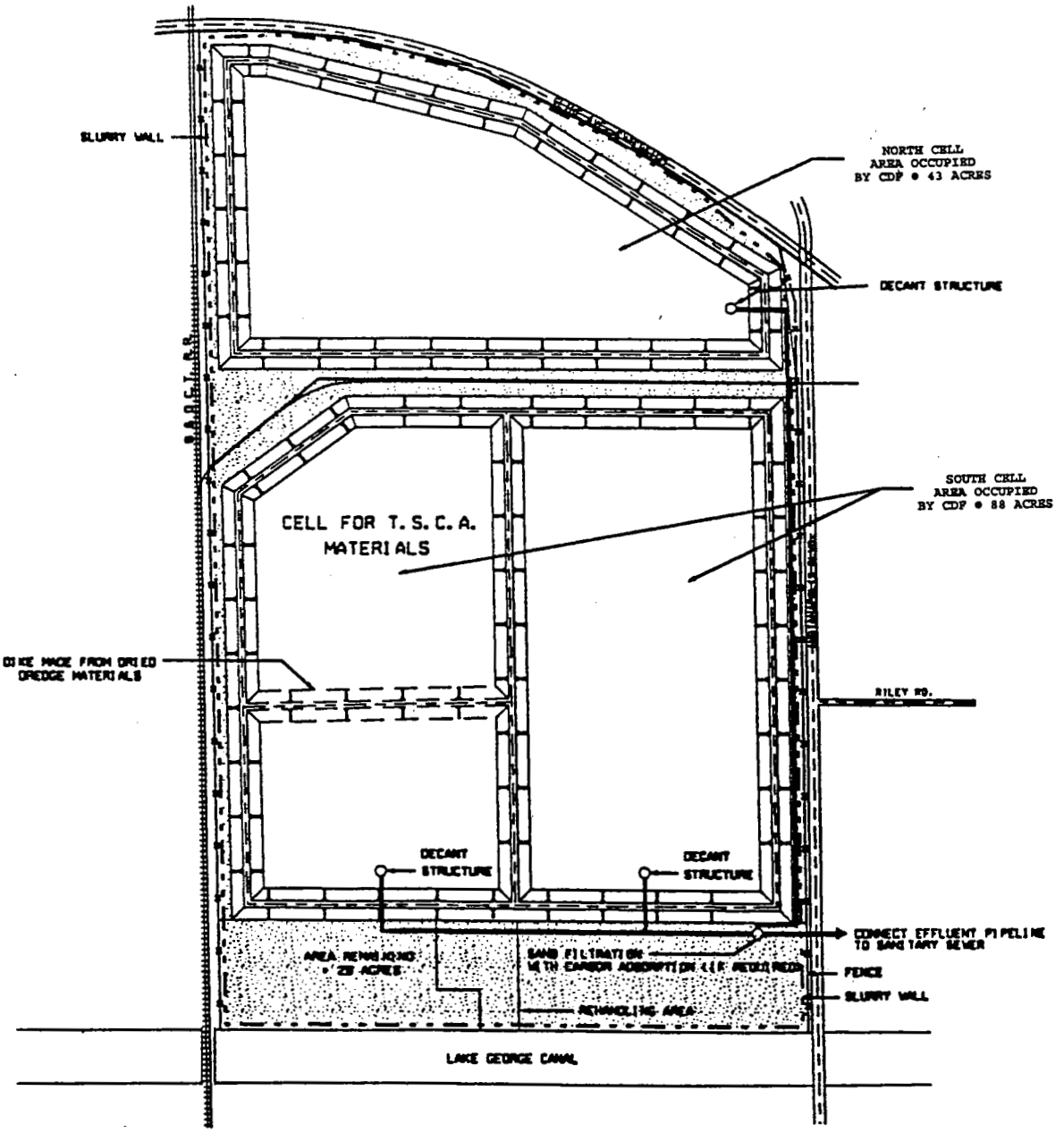
a combined plan that (1) was cost-effective and environmentally sound; (2) met regulatory requirements; and (3) resulted in significant cost savings for both Federal and non-Federal interests by undertaking a joint effort.

The U.S. EPA and the IDEM indicated that if the proposed CDF were to be constructed on a clean upland site as opposed to an existing contaminated site, such as the ECI site, a CDF "bathtub" design would be required. This design would necessitate total separation between the bottom of the CDF and the surface of the clean site and underlying groundwater. Construction of several very costly separation liners and monitoring layers would be needed, as discussed later in this report and shown on Figure 22.

Construction of the slurry wall is initially necessary to isolate parcels I, IIA, and IIB of the ECI site to satisfy RCRA closure/corrective action requirements. The U.S. EPA and the IDEM have indicated that construction of a separation barrier between the CDF and the surface of the ECI site would not be required with the slurry wall in-place. The slurry wall, tied to the underlying clay layer, can be used to isolate the ECI site from the surrounding properties, thereby eliminating the need to construct expensive separation liners at the bottom of the CDF that would be needed at a clean upland site. The U.S. EPA and the IDEM have also indicated that gradient control is necessary for RCRA closure and corrective action. This will require pumping the existing groundwater within the slurry wall, thereby creating an inward flow. In view of this requirement, the U.S. EPA and IDEM have indicated that the underlying shallow aquifer can be incorporated into the design of the CDF. Treatment of the groundwater will be undertaken if needed.

In an optimum ECI site plan, various elements required for RCRA closure/corrective action would be integral to the CDF construction and the CDF would act as the final RCRA cap for parcels IIA and IIB. The primary features of the optimum plan, shown on Figures 19 and 20 in connection with dredging Alternatives 2 and 3, include the following:

- Slurry wall around perimeter of parcels I, IIA and IIB.
- Clay cap/erosion control on parcel I.
- Groundwater gradient control system on parcels I, IIA and IIB.
- Pretreatment of groundwater collected from parcels I, IIA and IIB, if needed.
- Final treatment of groundwater by waste treatment plant.
- CDF containment dikes on parcels IIA and IIB.
- A collection system on parcels IIA and IIB to capture water drained from the dredged material.
- Pretreatment of water collected from within the CDF; if needed.



NOTE: ONLY THE TWO SOUTH CELLS WOULD BE USED IN ALTERNATIVE 1 - PARTIAL FEDERAL CHANNEL DREDGING: THE NORTH CELL WOULD NOT BE CONSTRUCTED. THE NORTH CELL PROPERTY WOULD BE CAPPED WITH CLAY TO COMPLETE RCRA CLOSURE. ALL THREE CELLS WOULD BE USED IN ALTERNATIVE 2 - COMPLETE FEDERAL CHANNEL DREDGING AND ALTERNATIVE 3 - COOPERATIVE DREDGING PROGRAM.

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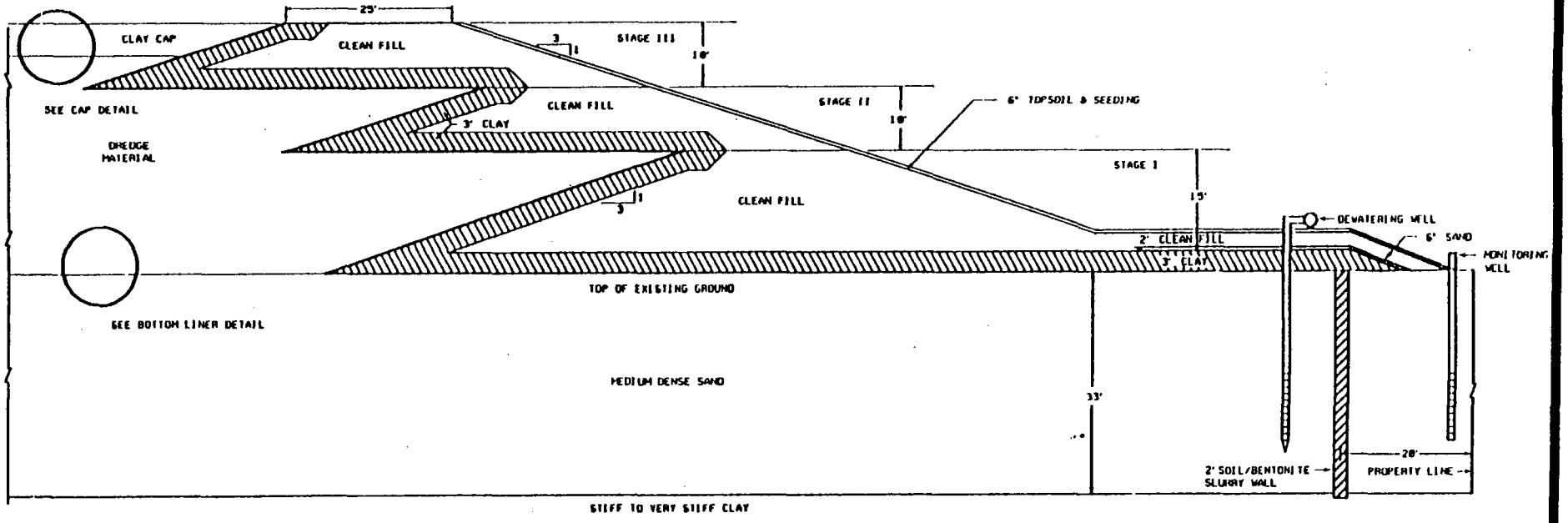
SCALE IN FEET

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITH CDF PROJECT
PLAN VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993



SECTION

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DREDGED MATERIAL

TOP OF EXISTING SOIL

BOTTOM LINER DETAIL

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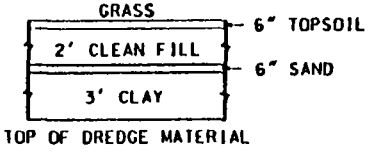


CAP DETAIL

N.T.S.

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITH CDF PROJECT
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993

- Final treatment of water collected from within the CDF by City of East Chicago waste treatment plant, if needed.

- Final clay cap to close CDF on parcels IIA and IIB.

- CDF serves as the final RCRA cap for parcels IIA and IIB.

The proposed CDF design will address the RCRA closure and corrective action requirements associated with the underlying sections of parcels I, IIA and IIB of the ECI site and comply with the TSCA requirements for the disposal of PCB contaminated sediments. The overlapping functions of the joint use RCRA closure/corrective action measures and the CDF features, such as the slurry wall, gradient control system and the CDF cap, will significantly reduce costs, resulting in notable economic saving to both the Federal government and the private sector.

In dredging Alternative 1 - Partial Federal Channel Dredging, a RCRA clay cap would replace the CDF on parcel IIB. The CDF would be constructed on parcel IIA only.

Tables 9 and 10 summarize the estimated first costs and O&M costs of the alternative combined RCRA closure/corrective action and CDF plans respectively. The costs have been separated to illustrate the potential cost savings. Details of the estimated costs are provided in Appendix K - Cost Estimates. The

Generic Clean Upland CDF Site

The alternative to using an existing contaminated upland site, such as the ECI site, for construction of a CDF is to develop a CDF on a clean upland site. There are no such sites located adjacent to or in the immediate vicinity of the IHC. They are located inland as identified in the earlier stages of plan formulation.

In discussions with the U.S. EPA and the IDEM in 1992, these agencies indicated that if the proposed CDF were to be constructed on a clean upland site, a CDF "bathtub" design would be needed. This would require total separation between the bottom of the CDF and the surface of the clean site and underlying groundwater. Construction of several very costly separation liners and monitoring layers would be needed.

Figure 21 shows the plan for construction of a CDF at a generic clean upland site which would be comparable in size, capacity, and operation to a CDF at the ECI site. Figure 22 shows a section through the CDF illustrating the separation liners and monitoring layers. The estimated first costs and O&M costs of this plan are summarized in Tables 9 and 10, respectively.

Table 9 Estimated First Costs for Channel Dredging, Confined Disposal Facility and RCRA Features at ECI Site and Generic Clean Upland Site [1/] [2/]

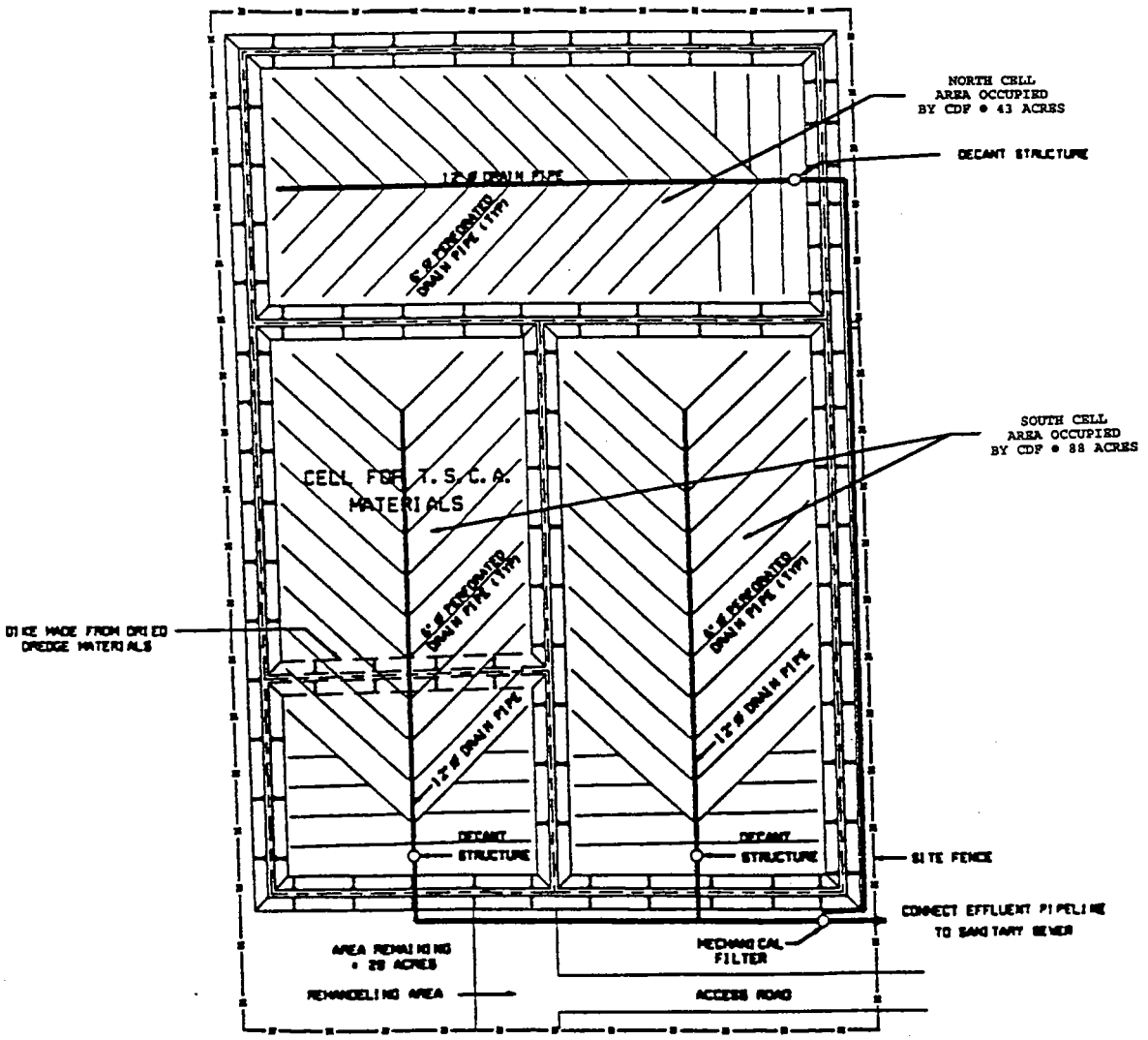
Item	ECI Site: Dredging Alternative 1	ECI Site: Dredging Alternative 2 & 3	Clean Upland Site
Dredging	$64,911,000	$71,361,000	$103,881,000
Confined Disposal Facility Features			
Dike Systems	13,616,000	17,125,000	23,553,000
Seal Dike Base	2,388,000	4,203,000	-
Perimeter Site Finishing	575,000	1,007,000	257,000
Earth Cap	8,040,000	11,229,000	11,190,000
CDF Drainage System	32,000	32,000	-
Water Treatment System	1,423,000	1,442,000	1,266,000
CDF Separation & Monitoring	-	-	22,404,000
Perimeter Fencing and Gates	-	-	222,000
Lands	-	-	6,900,000
Subtotal, CDF Features	26,074,000	35,038,000	65,792,000
Total, Dredging/CDF Features	90,985,000	106,399,000	169,673,000
RCRA Closure/Corrective Action			
Slurry Wall	6,595,000	6,595,000	6,595,000
Clay Cap	6,104,000	-	16,413,000
Seal Peripheral Areas	-	2,822,000	-
Hydraulic Gradient Control	1,291,000	1,291,000	1,291,000
Water Treatment System	474,000	455,000	1,613,000
Erosion Control	-	-	10,793,000
Perimeter Site Finishing	4,013,000	1,258,000	-
Subtotal, RCRA Features	18,477,000	12,421,000	36,705,000 [3/]
Total, Dredging/CDF & RCRA Features	109,462,000	118,820,000	206,378,000

1/ October 1993 price levels.
2/ Dredging Alternative 1,4.25 million cubic yards; Dredging Alternatives 2 & 3 and Clean Upland Site, 4.67 million cubic yards.
3/ RCRA closure/corrective action features located at ECI site.

Table 10 Estimated O&M Costs, Confined Disposal Facility and RCRA Features[1/]

Item	ECI Site: Dredging Alternative 1	ECI Site: Dredging Alternative 2 & 3	Clean Upland Site
Confined Disposal Facility Features			
Dredge Material Management	$213,200	$213,200	$213,200
Gradient Control Water Monitoring			
Pumping	1,100	1,200	2,800
Monitoring ECI Site Discharge	20,000	21,500	27,500
Groundwater Monitoring	82,500	82,500	82,500
Monitoring CDF Discharge	55,000	55,000	55,000
Water Treatment	16,500	16,700	22,000
Mowing	2,500	3,400	3,800
Subtotal, CDF Features	390,800	393,500	406,800
RCRA Closure/Corrective Actions			
Gradient Control Water Monitoring			
Pumping	1,700	1,600	2,800
Monitoring ECI Site Discharge	30,000	28,500	50,000
Groundwater Monitoring	82,500	82,500	165,000
Water Treatment	5,500	5,300	22,000
Mowing	1,300	400	3,800
Subtotal, RCRA Features	121,000	118,300	243,600[2/]
Total, CDF & RCRA Features	511,800	511,800	650,400

1/ October 1993 price levels.
2/ RCRA closure/corrective action features at ECI site.



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SCALE IN FEET

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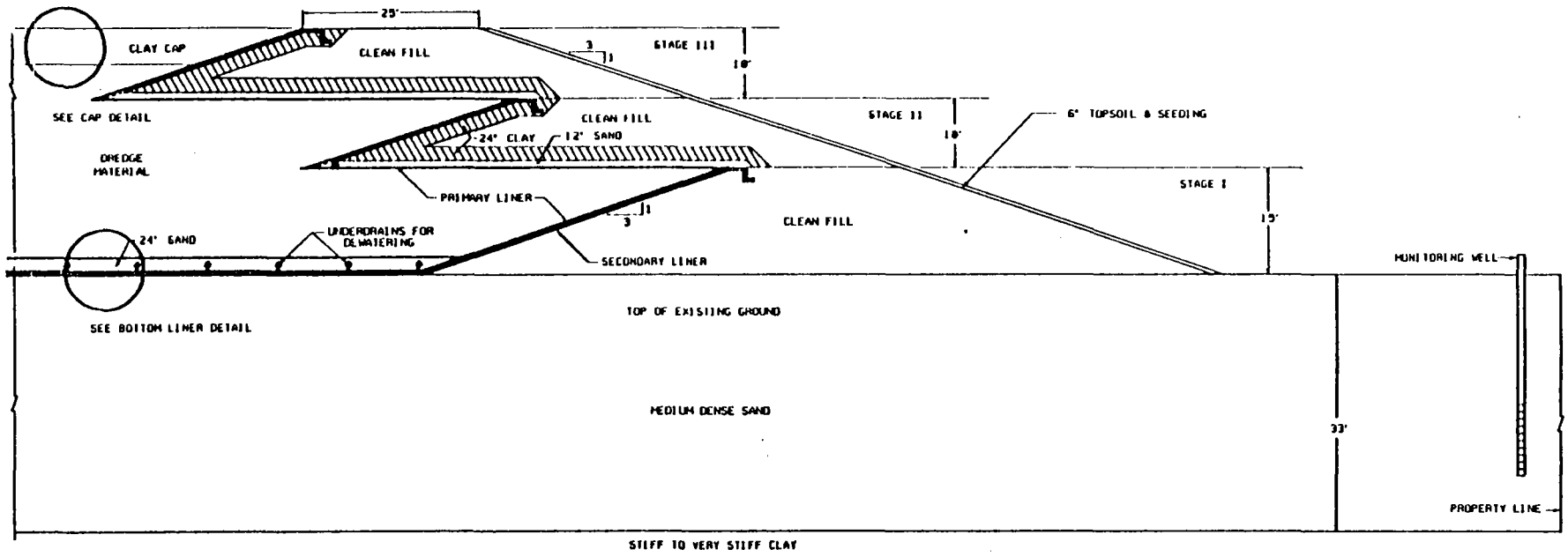
INDIANA HARBOR
CONFINED DISPOSAL FACILITY

GENERIC CLEAN UPLAND CDF SITE
PLAN VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993



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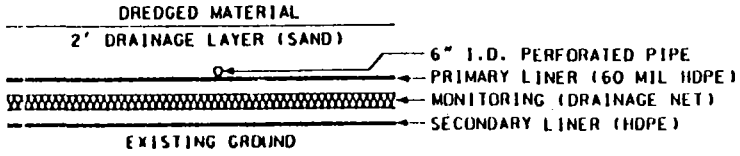

BOTTOM LINER DETAIL

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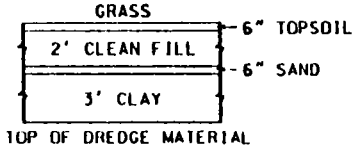

CAP DETAIL

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INDIANA HARBOR
CONFINED DISPOSAL FACILITY

GENERIC CLEAN UPLAND CDF SITE
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993

Figure 22

Economic Analysis

Following completion of the third phase of plan formulation in 1990, the North Central Division instructed the Chicago District to complete a detailed economic analysis of continued maintenance dredging at IHC (IHC). In response to this guidance, the District subsequently completed an extensive study of the existing and projected waterborne commerce, navigation fleet composition and navigation problems at the IHC. In addition, a detailed benefit-cost analysis was completed for alternative dredging plans and confined disposal facilities at the ECI site and at an alternative clean upland site. The details of these studies and analyses are presented in Appendix B, Economic Analysis.

Deep-Draft Navigation Benefits

Table 11 summarizes the results of the economic analysis. The information in the table confirms that it is far more cost-effective to implement a CDF at the ECI site compared to using an alternative clean upland site. Alternative 3 has the greatest net benefits. In Alternatives 2 and 3, the maintained channels upstream of the E. J. & E. Railroad bridge (Reaches 6-13) act as a sediment trap or settling area. This reduces the quantity of sediment moving into and settling out in the downstream channel reaches (Reaches 1-5) where the intense navigation activity occurs. Adequate navigation depths in the downstream reaches will be more easily maintained for longer periods of time under Alternatives 2 and 3 than under Alternative 1 producing greater navigation benefits. The dredging process under Alternatives 2 and 3 will also interfere less with downstream navigation because much more of the actual dredging will occur in the upstream reaches than under Alternative 1. However, no benefits were claimed for the less interference.

Environmental Benefits

An estimated 100,000 to 200,000 CY of polluted sediments are discharged annually from the IHC into Lake Michigan. The sediments contain metals, PAH's and PCB's. The adverse impacts of the discharge can be seen in the movement of the sediments in the nearshore zone for a distance of more than 5 miles from the harbor entrance, potentially affecting water supply intakes and sport fishing and recreation areas.

The proposed maintenance dredging and trapping of sediment at the IHC would reduce the volume of polluted sediments discharged into Lake Michigan by an estimated 50 to 70 percent. This would result in improvements in water quality and in the quality and quantity of fish in the IHC area. A contingent value analysis was undertaken to estimate the incidental NED environmental benefits attributable to the improvement in water quality

Table 11 Summary of Costs and Benefits
($ millions)

Item	Alternative 1 Partial Dredging	Alternative 2 Complete Dredging	Alternative 3 Cooperative Dredging	Clean Upland Site
Average Annual Costs	$ 3.517	$ 4.360	$ 4.495	$ 8.227
Average Annual Benefits				
Commercial Navigation	$11.692	$17.240	$17.739	$17.240
Environmental (Incidental)	$ 2.296	$ 2.296	$ 2.296	$ 2.296
Totals	$13.988	$19.536	$20.035	$19.536
Net Navigation Benefits	$ 8.175	$12.880	$13.244	$ 9.013
Benefit-Cost Ratios				
Commercial Navigation Only	3.3	4.0	3.9	2.1
Navigation & Environmental	4.0	4.5	4.5	2.4

and fisheries. The attachment to Appendix B, Economic Analysis, describes in detail the contingent value analysis that was completed. The analysis estimated the NED environmental benefits at approximately $2.3 million. Table 11 provides a comparison of the total project benefits and costs, including both navigation and incidental environmental benefits.

Incremental Analysis

Three incremental benefit-cost analyses were completed to support project formulation. First, an incremental analysis of maintenance dredging in 1-foot channel depth increments based on the impacts to commercial navigation in Reaches 1 through 5 was completed as summarized in Table 12. The analysis indicated that net commercial navigation benefits continued to increase beyond the authorized project depth for all three dredging alternatives investigated. A second incremental analysis of adding each successive upstream reach (Reaches 6 through 13) to the downstream reaches was completed, based on modified dredging plans with no allowance for overdepth dredging for Alternatives 2 and 3. This analysis was completed in two steps: (1) initially based on the benefits to commercial navigation in Reaches 1 through 5, as shown in Table 13; and, (2) based on adding the navigation benefits which would accrue in Reaches 6 through 11 to the benefits which would accrue in Reaches 1 through 5, as shown in Table 14. The information in Table 13 shows that maintenance dredging throughout the authorized Federal navigation project is incrementally justified on a reach by reach basis even if no navigation benefits in Reaches 6 through 13 are considered. This reflects the beneficial impact of the sediment trap effect of Reaches 6 through 13 on commercial navigation in Reaches 1 through 5. Table 14 indicates that adding the navigation benefits in Reaches 6 through 11 increases the economic justification of dredging in those reaches. However, the upstream benefits are actually realized only when dredging of Reach 11 is added to dredging the downstream Reaches 1 through 10. This is because the benefits would accrue to shipments from the Amoco Oil Company docks located in Reach 11.

ECI Site Cost Savings

Construction Costs

A comparison of the costs in Tables 8 and 9 indicates that both the United States and non-Federal interests will realize significant cost savings if the CDF is constructed at the ECI site, rather than undertaking individual actions at separate sites, i.e., building the CDF at an alternate clean upland site and completing RCRA closure/corrective action at the ECI site. In a combined Federal/non-Federal effort at the ECI site, the non-Federal first costs for implementing the RCRA closure/corrective measures would range between $12.4 million

Table 12 Benefit–Cost Analysis of Incremental Channel Depths 1/

	Alternative 1– Partial Dredging				
Elevation (Channel Depth)	Project –1.5 2/ (28.5 ft.)	Project –1 (28 ft.)	Project (27 ft.)	Project +1 (26 ft.)	Project +2 (25 ft.)
Average Annual Benefits	$12,089,210	$12,002,493	$11,691,856	$10,039,868	$8,252,778
Average Annual Costs	$3,703,126	$3,704,686	$3,456,240	$3,125,042	$2,549,145
Benefit to Cost Ratio	3.26	3.24	3.38	3.21	3.24
Average Annual Net Benefits	$8,386,084	$8,297,807	$8,235,616	$6,914,826	$5,703,633

	Alternative 2– Complete Dredging				
Elevation (Channel Depth)	Project –2 (29 ft.)	Project –1 (28 ft.)	Project (27 ft.)	Project +1 (26 ft.)	Project +2 (25 ft.)
Average Annual Benefits	$15,042,465	$14,369,714	$13,526,616	$11,249,078	$10,113,362
Average Annual Costs	$4,976,976	$4,854,490	$4,288,197	$3,764,464	$3,169,779
Benefit to Cost Ratio	3.02	2.96	3.15	2.99	3.19
Average Annual Net Benefits	$10,065,489	$9,515,224	$9,238,419	$7,484,614	$6,943,583

	Alternative 3– Cooperative Dredging				
Elevation (Channel Depth)	Project –2 (29 ft.)	Project –1 (28 ft.)	Project (27 ft.)	Project +1 (26 ft.)	Project +2 (25 ft.)
Average Annual Benefits	$14,707,576	$13,933,201	$13,052,883	$10,698,705	$9,447,091
Average Annual Costs	$4,985,146	$4,780,798	$4,422,320	$3,822,737	$3,433,325
Benefit to Cost Ratio	2.95	2.91	2.95	2.80	2.75
Average Annual Net Benefits	$9,722,430	$9,152,403	$8,630,563	$6,875,968	$6,013,766

1/ Costs in table should be used only for comparison purposes.
2/ Alternative 1 could not be dredged to project depth minus 2 feet, without the sediment trap in Reaches 6–13; Reaches 1–5 fill in too quickly.

Table 13 Incremental Benefit–Cost Analysis of Adding Successive Channel Reaches Based on Navigation Benefits in Reaches 1 through 5

	Reaches 1–5	Reaches 1–6	Reaches 1–7	Reaches 1–8	Reaches 1–9	Reaches 1–10	Reaches 1–11	Reaches 1–12	Reaches 1–13
Average Annual Benefits*	$9,377,641	$10,002,525	$10,508,164	$11,997,033	$12,410,649	$12,479,326	$12,746,477	$12,811,609	$13,197,357
Average Annual Costs**	$3,393,939	$3,461,228	$3,534,344	$3,738,266	$3,872,251	$3,916,861	$4,028,227	$4,090,407	$4,256,000
Benefit to Cost Ratio	2.76	2.89	2.97	3.21	3.21	3.19	3.16	3.13	3.10
Net Benefits	$5,983,702	$6,541,297	$6,973,820	$8,258,767	$8,538,398	$8,562,465	$8,718,250	$8,721,202	**$8,941,357**

Increment	Reach 5 to 6	Reach 6 to 7	Reach 7 to 8	Reach 8 to 9	Reach 9 to 10	Reach 10 to 11	Reach 11 to 12	Reach 12 to 13
Change in Benefits	$624,884	$505,639	$1,488,869	$413,616	$68,677	$267,151	$65,132	$385,748
Change in Costs	$67,288	$73,116	$203,922	$133,985	$44,610	$111,366	$62,180	$165,593
Incremental Benefit to Cost Ratio	9.29	6.92	7.30	3.09	1.54	2.40	1.05	2.33
Incremental Net Benefits	$557,596	$432,523	$1,284,947	$279,631	$24,067	$155,785	$2,952	$220,155

Benefits accrue to Reaches 1–5 only, incremental benefits are derived from sediment trap efficiency.

Table 14 Incremental Benefit–Cost Analysis of Adding Successive Channel Reaches Based on Total Navigation Benefits

	Reaches 1–5	Reaches 1–6	Reaches 1–7	Reaches 1–8	Reaches 1–9	Reaches 1–10	Reaches 1–11	Reaches 1–12	Reaches 1–13
Average Annual Benefits*	$9,377,641	$10,002,525	$10,508,164	$11,997,033	$12,410,649	$12,479,326	$16,259,418	$16,324,550	$16,710,298
Average Annual Costs**	$3,393,939	$3,461,228	$3,534,344	$3,738,266	$3,872,251	$3,916,861	$4,028,227	$4,090,407	$4,256,000
Benefit to Cost Ratio	2.76	2.89	2.97	3.21	3.21	3.19	4.04	3.99	3.93
Net Benefits	$5,983,702	$6,541,297	$6,973,820	$8,258,767	$8,538,398	$8,562,465	$12,231,191	$12,234,143	**$12,454,298**

Increment	Reach 5 to 6	Reach 6 to 7	Reach 7 to 8	Reach 8 to 9	Reach 9 to 10	Reach 10 to 11	Reach 11 to 12	Reach 12 to 13
Change in Benefits	$624,884	$505,639	$1,488,869	$413,616	$68,677	$3,780,092	$65,132	$385,748
Change in Costs	$67,288	$73,116	$203,922	$133,985	$44,610	$111,366	$62,180	$165,593
Incremental Benefit to Cost Ratio	9.29	6.92	7.30	3.09	1.54	33.94	1.05	2.33
Incremental Net Benefits	$557,596	$432,523	$1,284,947	$279,631	$24,067	$3,668,726	$2,952	$220,155

*Benefits are determined using a non–optimized alternative 2 dredging plan with no overdepth dredging. Benefits for Reaches 1–11 include navigation benefits which would accrue to reaches 6–11 due to shipments of asphalts and fuel oils from Amoco docks.
**Costs and sedimentation rates are adjusted by a CDF surface area factor and should only be used for comparison purposes.

(dredging Alternatives 2 and 3) and $18.5 (Alternative 1). The CDF construction cost would be $35.0 million. The estimated cost savings to non-Federal interests would range between $18.2 and $24.3 million compared to the cost of the required closure/ corrective measures without the CDF ($36.7 M). The estimated Federal cost savings associated with construction of a CDF at the ECI site versus CDF construction at an alternate clean upland site is $30.8 million ($65.8 M - $ 35.0 M).

Trucking Costs

Use of a clean upland site versus use of the ECI site would require expending on-the-order of an additional $7.00 per cubic yard to transport the dredged material by truck from the IHC to the clean site. Therefore, the cost of disposal operations would increase by more than $33 million for transportation of 4.67 million CY of dredged material, the estimated capacity of an ECI site CDF.

Sediment Treatment Technology Plan

The Chicago District, U.S. Army Corps of Engineers, and the U.S. EPA, Region 5, have continued to review and study sediment treatment technologies in the early 1990's. An evaluation of the use of treatment technologies in connection with dredged materials is provided in Appendix G, Application of Advanced Treatment Technologies to Contaminated Sediments. In addition, the U.S. EPA Assessment and Remediation of Contaminated Sediments (ARCS) Program has completed a 5-year study relating to the control and removal of toxic pollutants in the Great Lakes, with emphasis on the removal of toxic pollutants from bottom sediments. Demonstration projects were included in the ARCS program.

When dealing with large volumes of dredged materials, treatment technologies cannot be used without a disposal facility (CDF). Some form of CDF would be required for temporary storage, dewatering, and disposal of residual materials. Of the treatment technologies evaluated and demonstrated by the ARCS program, no single technology was found to be effective on all contaminants. Typically, technologies are designed to handle either the organic contaminants, such as PCB's or PAH's, or the heavy metal contaminants. The sediment within the IHC is heavily contaminated with both organic and heavy metal contaminants and therefore it is unlikely that any single treatment technology can adequately treat those sediments.

A conceptual plan of applying treatment technologies in the disposal of dredged materials from the IHC is illustrated in Figure 23. The treatment plan includes a solvent extraction process to treat the PCB's and PAH's followed by stabilization/solidification to immobilize the heavy metals. The effectiveness of these processes has been evaluated by the Chicago District as described in Appendix G and the U.S. EPA ARCS program. The two treatment technologies were evaluated in pilot-scale demonstrations for the ARCS program.

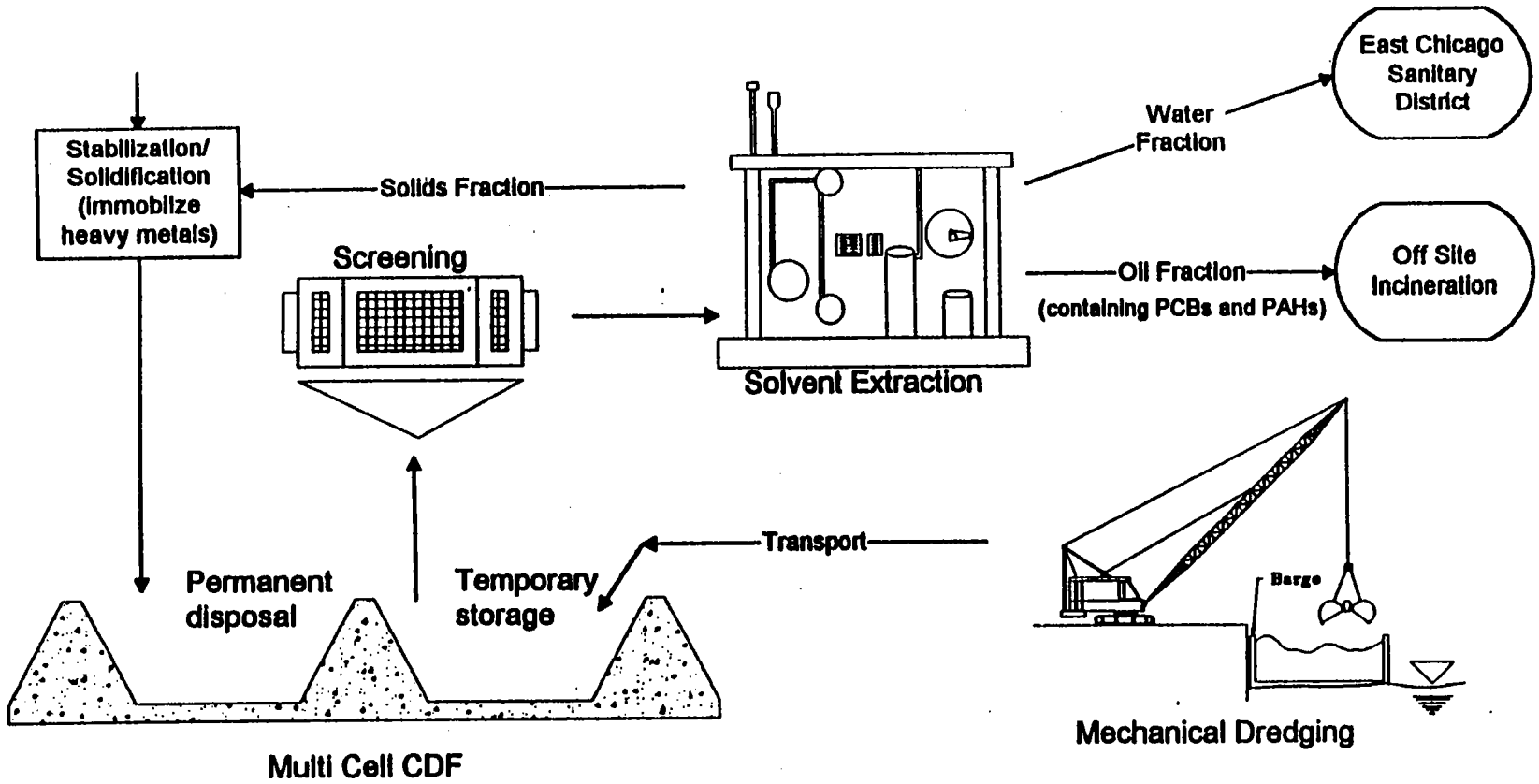
Treating sediment is a complex operation. Solvent and admixtures must be added during the treatment process and an oil fraction stream must be treated off-site. The total cost to treat and dispose of 4.67 million CY of dredged materials from IHC is summarized in Table 15. The alternative treatment technology costs in Table 5 were updated to 1994 prices to calculate the treatment costs in Table 15. Table 15 shows that treatment by solvent extraction and solidification, with addition of disposal, costs $466 per CY, compared to $25 per CY for direct CDF disposal without treatment. Treating the sediment increases the cost to 18 to 20 times that of direct disposal. The ARCS program came to the similar conclusion that all the evaluated treatment technologies cost more than traditional confined disposal.

The addition of treatment prior to disposal would not eliminate environmental impacts. Treatment applications have many of the same impacts associated with confined disposal. In addition, some impacts may be created by different treatment technologies. Even though environmental impacts from treatment of dredged sediments have not been fully assessed in any studies to date, some impacts can be described qualitatively.

Many treatment technologies require extensive rehandling of the sediments after dewatering to prepare the sediment for treatment. These activities may increase the contaminant loss from wind blown dust and volatilization of organic compounds, such as PCBs and PAHs, during rehandling.

Both the solvent extraction and solidification treatment technologies use chemicals during the treatment process. Removal of organic contaminants requires a solvent and immobilization of heavy metals requires admixtures. Some chemicals may be lost to the environment during processing or handling. The associated impact will depend on the amount and nature of the chemical used.

All treatment technologies will produce a residue which must be disposed. The physical and chemical nature of this residue will vary with the process. The long-term stability of these residues has not been thoroughly researched. The effectiveness of stabilization/solidification treatment has been mixed because some metals become less leachable, while others appear to increase in leachability when immobilized. The impacts from stabilization/solidification residue are not fully known at this time.



INDIANA HARBOR
CONFINED DISPOSAL FACILITY

CONCEPTUAL ADVANCED TREATMENT
TECHNOLOGIES PLAN

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993

Figure 22

Table 15 Estimated First Costs of Application of Sediment Treatment Technologies at Indiana Harbor and Canal

Item	Dredging Quantity, Million CY	Unit Price, $/CY	Estimated Cost, $ Million
RCRA/CDF Construction and Dredging	4.674[1/]	22.75[2/]	$ 119
Solvent Extraction	4.674	302.00	$1,410
Stabilization	4.674	139.00	$ 650
Total Estimated Cost			$2,179

1/ Estimated quantity for Alternatives 2 & 3 shown in Table 7.
2/ Total cost for Alternatives 2 & 3 in Table 9 divided by 4.674 million CY.
3/ Costs from Table 5 updated to February 1994 price levels.

The residue produced after applying treatment technologies would require confined disposal. Therefore, the short-term impacts of treatment alternatives include the same impacts associated with direct disposal to a CDF without treatment. Impacts from rehandling and use of processing chemicals would be additional and dependent upon the treatment alternative. The long-term impacts of the disposal of the residue are undetermined.

Treatment of the IHC sediments is not required under Federal law and treatment is appropriate only when found to be the least costly alternative consistent with engineering and environmental requirements. The underlying reason for considering treatment of contaminated sediments is to improve the environmental performance of their disposal. This might be done either through the destruction and removal of contaminants of concern or by altering the material to make their disposal more efficient. To date, the treatment technologies discussed above have not been applied on the large scale required for the proposed maintenance dredging of the IHC. Significant time and funds would have to be expended for further development before these technologies could be applied on this scale.

The only alternative that currently meets the requirements of the U.S. Army Corps of Engineers' policy, the Federal Standard, is a CDF. A CDF satisfies the applicable environmental regulations, is sound from an engineering standpoint, and has economic demands that are appropriate for an operations and maintenance activity. The development of new technologies and

the refinement and economizing of existing ones are occurring now in both the private and public sectors. As work continues in the cleanup of Superfund and RCRA sites, the efficiencies and capabilities of these technologies may become more fully developed. If in the future these technologies are shown to be effective both from the standpoint of treatment and cost, they could be considered for implementation in future dredged material disposal operations at IHC.

Tentatively Selected Plan

Based on a detailed maximization of net benefits analysis of alternative dredging and dredged material disposal plans, maintenance dredging of the entire IHC to authorized project depths with disposal of the dredged materials in a CDF, constructed on the ECI site in East Chicago, Indiana, is the tentatively selected plan. This plan meets the definition of the Federal Standard as the most cost-effective alternative consistent with sound engineering practices and meeting the environmental standards established by the Section 404 (b)(1), Public Law 92-500, evaluation process. There is no overriding reason or requirement to exceed the Federal Standard and undertake some type of additional sediment treatment process at a much greater cost than the selected action.

The tentatively selected plan includes construction of a CDF on a portion of the ECI property, the site of a former petroleum refinery which currently has open RCRA status. Use of this site for the CDF is contingent upon the construction of specific RCRA closure and corrective action features. These RCRA features would be integral to the CDF construction. The CDF would act as the final RCRA cap for that portion of the ECI site upon which the CDF is constructed.

The plan further provides for maintenance dredging of polluted channel sediments, except for the presumptively hazardous sediments in the outer harbor, by closed-bucket or environmental bucket-mechanical dredging equipment with disposal of the dredged material in the CDF. Dredging would be undertaken throughout the IHC Federal navigation project to authorized project depths and widths. Dredging would also be completed in the appropriate berthing areas outside of the authorized channel limits at non-Federal expense to provide depths commensurate with those in the Federal channel. Space in the proposed CDF could also be allocated to accommodate dredged materials from the Inland Steel Company Consent Decree sediment remediation activities and other similar activities which might be required by the U.S. EPA or IDEM along the IHC. Use of the proposed CDF would be limited to disposal of dredged materials from the IHC/GCR. It is not intended to be used for disposal of dredged materials from other harbors or waterways in Indiana or other Great Lakes states.

Confined Disposal Facility

RCRA Closure/Corrective Features. The tentatively selected plan, which was released in October 1995, is shown on Figures 19 and 20. The selected plan developed in Phase Five for the RCRA closure/ corrective action features is shown on Figures 24 and 25. Parcel I of the ECI site previously housed the RCRA hazardous waste units. These structures were razed along with the rest of the above ground structures, but were never closed in conformance with the RCRA regulations. Proposals for the closure of RCRA hazardous waste units in the State of Indiana must be approved by the IDEM. Due to the ubiquitous nature of the on-site contamination on this parcel, IDEM determined that closure in-place would be most appropriate for the area which previously housed the hazardous waste units. The in-situ closure design for parcel I would include a slurry wall, a gradient control system consisting of groundwater extraction wells, which would maintain ground- water flow into this portion of the CDF, and an overlying 3-foot compacted clay cap with a hydraulic conductivity of 10-7 cm/s. The compacted clay cap would be placed on the existing surface and would overlie parcel I. The slurry wall would extend approximately 33 feet from the ground surface into an underlying clay till unit. The U.S. EPA has determined that construction of these components would also address the corrective action requirements for parcel I. These RCRA closure and corrective action components have been incorporated into the proposed CDF design. Once constructed, parcel I would be subject to the RCRA post-closure care and permitting requirements applicable to hazardous waste units for maintenance and monitoring. The post-closure care requirements under RCRA would be integrated into the maintenance and monitoring requirements for the CDF.

The CDF will also overlie ECI site parcels IIA and IIB. Unlike Parcel I, these parcels never housed hazardous waste units and are not subject to the RCRA closure requirements. However, these parcels are subject to the RCRA corrective action requirements, which address releases associated with waste handling practices to the environment. The implementation of corrective action within the State of Indiana is currently the responsibility of the U.S. EPA. Given the apparent widespread contamination of these parcels, the U.S. EPA determined that an acceptable corrective action condition for these parcels would be similar to the proposed corrective action outlined above for parcel I. This would consist of a perimeter slurry wall with a hydraulic conductivity of 10^{-7} cm/s tied into the underlying clay unit, and a groundwater removal system consisting of groundwater extraction wells placed within the interior of the slurry wall. The final cap for this site would be accomplished at the same time as final closure of the CDF. The corrective action components for parcels IIA and IIB would be incorporated into the CDF design and connected to the closure/corrective action components for parcel I. The corrective action maintenance and monitoring requirements for these parcels would be integrated into the maintenance and monitoring requirements of the CDF.

The features to create an inward hydraulic gradient and provide for pretreatment of groundwater collected within the slurry walls, if needed, would include installation of wells with appropriate pumps to provide for gradient control. The wells would be located around the perimeters of parcels I, IIA and IIB. Contaminated groundwater collected in connection with the gradient control system would be discharged to the City of East Chicago wastewater treatment plant for final treat. A pre-treatment facility would be installed on the ECI site to provide initial groundwater treatment, if needed, in order to meet City of East Chicago pre-treatment standards prior to discharging to its wastewater treatment plant.

Dredged Material Disposal Facility. The CDF would be constructed on parcels IIA and IIB, as shown on Figure 19. The two parcels are currently separated by a single track railroad spur. The CDF would occupy 88 of the 115 acres of parcel IIA, located south of the track, and 43 of the 53 acres of parcel IIB, located north of the track. The CDF would be constructed as three separate cells, two in parcel IIA on the southern part of the site and one in parcel IIB on the northern part of the site. The west cell on parcel IIA would be divided to create an isolated subcell for the disposal of PCB contaminated sediments. The proposed CDF design incorporates those elements necessary for U.S. EPA Regional Administrator approval of the subcell as an alternate disposal method for PCB contaminated sediments. These include a slurry wall with a hydraulic conductivity of 10^{-7} around the perimeter of parcels I, IIA and IIB that ties into the underlying clay unit; a groundwater gradient control system; on-site treatment of groundwater collected from parcels IIA and IIB, if needed; segregation of PCB contaminated sediments from non-PCB sediments and capping of parcels IIA and IIB with three feet of clay, six inches of sand, two feet of clean fill and six inches of seeded topsoil. TSCA maintenance and monitoring requirements will be integrated into the maintenance and monitoring requirements for the CDF.

Figure 20 shows a cross-section through the CDF. The CDF dikes would be constructed in three stages in incremental lifts of 15, 10 and 13 feet, respectively. The first stage earthen dikes would be constructed using off-site clean fill materials. The second and third stage dikes would be constructed of a combin-ation of off-site materials and dried dredged materials beginning approximately 8 and 16 years after initial dike construction begins. The dikes would be constructed on top of a 3-foot layer of compacted clay tied into the slurry wall. The interior sideslopes of the dikes would be lined with a 3-foot layer of compacted clay tied into the bottom clay layer. On-site materials would be used to construct the initial 10-foot lift of the center cross dike separating the two cells of parcel IIA. Dried dredged material would be used to continue subsequent construction of the cross dike. The interior dikes to create the separate TSCA material cell would be constructed from dried dredged material after two complete dredging cycles.

The final 6-feet of the third stage lift would consist of clay, sand, clean fill and seeded topsoil. The clay would seal the CDF and provide for the RCRA capping of parcels IIA and IIB. The sand would provide for drainage of precipitation off of the CDF. The exterior sideslopes of the dikes would also be covered with topsoil, seeded, and landscaped as the dikes are constructed to control erosion and enhance their visual appearance. An overall landscaping plan will be developed during the detailed design phase in connection with preparation of the design memorandum. In developing the plan, vegetation will have to be selected and arranged to limit its attractiveness to wildlife and birds in terms of cover and food sources provided.

The recommended CDF would have a capacity of approximately 4.67 million cubic yards (CY). The initial 15-foot lift would have a capacity of approximately 1.9 million CY. Construction of the second lift of 10-feet would increase the CDF capacity to 3.3 million CY.

Construction and operation of the CDF will require an on-site treatment plant to provide initial treatment of the precipitation runoff within the CDF and groundwater collected from the gradient control system in order to meet City of East Chicago pre-treatment standards prior to discharging to its wastewater treatment plant. Further study will be required to determine the extent of treatment of the CDF runoff.

Dredging Operations

Dredging would be performed using a closed bucket mechanical dredge. The dredged material would be loaded onto barges or scows which would be then moved to the disposal area. Next, dredged material would be loaded into trucks at the CDF rehandling area (Figure 19). The trucks would then transport the dredged material to the CDF by use of haul roads placed around the site and on top of the dikes. Alternate methods of transport, such as use of a conveyor system or pumping through pipes, may be considered during the detailed design phase.

Dredged material would be placed in the CDF in lifts of approximately 3 feet. Such limited lifts would promote greater efficiency of natural drying processes and greatly enhance potential gains in CDF capacity. To allow for natural drying, not more than one 3-foot lift would be placed on top of the previous lift in each cell. Lifts would continue to be placed until 3 to 4 feet of freeboard remained, at which time the containment dikes would be raised. An estimate of anticipated dredging requirements for the period of analysis is given in Table 7.

Each cell would be graded towards a dewatering sump to avoid ponding of water. Placement would begin at the high end of each cell and continue towards the sump. The first placement of dredged material is expected to be "windrowed" on the bottom of the CDF. Windrows are long parallel piles with space in between for vehicle access. Dump trucks would drive into the CDF and place the dredge material on the bottom in rows 3 to 4 feet high.

Subsequent lifts would be windrowed if possible or dumped from the edge and mechanically distributed.

During the first year of CDF construction, the southwest lobe dikes would be constructed. In the second year, dredged material would be placed in the southwest lobe while the dikes were being constructed in the southeast and north lobes. Dredged material would be placed in the southeast and north lobes during the third year, while the existing dredged material in the southwest lobe was managed to promote drying and consolidation. Placement of dredged material would then be alternated between the southwest lobe one year and the southeast and north lobes the following year over the next 7 years. No dredging would be undertaken in the following year. Dredging and disposal would be subsequently completed on a 4-year cycle until the three lobes were filled to capacity, which would occur between the years 2028 and 2030, and then capped with clay. This cycle would consist of rotating the disposal on an annual basis between the three lobes followed by 1-year of no dredging in the fourth year. The cell for the TSCA materials would be constructed prior to the year 2004, and filled with PCB dredged materials from Reaches 6 and 13.

Operations and Maintenance

Slurry Wall. Maintenance of the slurry wall is not expected to be required. Based on current knowledge of the contaminants and the stratigraphy at the ECI site, it is not anticipated that there will be either chemical or physical stability problems with the slurry wall. Prior to construction, additional investigations will be undertaken to document the compatibility of the slurry wall materials with the soils and contaminants at the ECI site. Warranty of the barrier wall construction work will be a function of the contract under which the work is done and up to a contracting party to seek a warranty.

Gradient Control. It is estimated that removal of 21 million gallons of groundwater from within the slurry wall would be required to provide an initial 2-foot drawdown and establish the inward gradient. This could be accomplished over a 1-year period. It is further estimated that well pumpage averaging 700 gallons per day of groundwater seeping through the slurry wall would be required to maintain the inward gradient. This maintenance pumping would be required during the filling of the CDF and the subsequent 30-year RCRA post-closure monitoring period. An estimated 16 to 17 million gallons would be removed during this period.

Infiltration into the groundwater within the slurry wall will occur due to precipitation. It is estimated that infil-tration will average on-the-order of 36,000 gallons per day per CDF cell

prior to placement of dredged material. Once a 3-foot layer of dredged material is in-place, infiltration will be significantly reduced, to an estimated 430 gallons per day per CDF lobe. Total infiltration over the life of the project is estimated at about 134 million gallons. This volume of ground-water will have to be removed from within the slurry wall to maintain the inward gradient. Precipitation runoff within the CDF during the period of filling is expected to range between 360 and 390 million gallons.

Dredged Material Management. Substantial effort will be required to manage the dredged material within the CDF to promote drying and consolidation. It is proposed to use the dewatering by progressive trenching method as outlined in EM 1110-2-5027, "Confined Disposal of Dredged Material". A combination of perimeter dragline trenching operations and parallel interior trenching would be used. A detailed management plan will be developed in the design memorandum phase.

Monitoring Activities. Various monitoring activities will have to be undertaken in connection with the dredging and disposal operations, including a 30-year RCRA post-closure monitoring in connection with the operation of the CDF. Appendix N, Monitoring Plan, outlines the required monitoring activities.

Health and Safety Program

Monitoring Program. The sediment to be dredged contains chemical compounds in concentrations which could be harmful to workers either through skin contact or inhalation of released vapors or dusts. Therefore, an appropriate project safety and health program will be established and implemented. This program will be based upon the analysis of environmental data collected in the project area which should include:

- Representative sampling and chemical analysis of the sediment prior to the start of construction so that worker-protection alternatives may be studied and developed.

- High-volume air sampling conducted at various locations throughout the project area to determine "work zones", as well as to measure the effect of operations on the surrounding community.

- Personal air monitoring to identify work assignments which pose the highest risk to worker health and safety. In addition, the results of personal air monitoring will indicate the level of protection required for any particular task on the site, or at which times levels of protection must be tightened or may be relaxed.

Appendix S, Safety and Health, discusses the safety and health issues to be considered in planning the proposed Indiana Harbor and Canal dredging projects.

Personal Protective Equipment (PPE). It is considered that at least Level C dress-out (e.g., protective coveralls, gloves and a face respirator) would be required during the initial stages of the project for all workers involved in sediment dredging, hauling, dumping, and processing operations. Acceptable air quality monitoring results could lead to the relaxation of respirator requirements. However, chemical resistant suit requirements would not be relaxed for those workers subject to contact with the sediment. A very limited probability exists that Level B dress-out (e.g., self-contained breathing apparatus) may be required at some time during the project.

Decontamination. All workers who enter a "hot" zone must be decontaminated prior to exiting the site. Decontamination is carried out by teams who are wearing PPE at a level equal to that of the site worker they are assisting. Decontamination team members become contaminated during the course of their duties and must decontaminate themselves prior to entry into lesser contaminated areas. Attachment 6 of Appendix S illustrates typical decontamination schemes and provides a list of equipment needed to support the decontamination process.

As with personnel, all tools, vehicles, and other equipment entering a contaminated area must be decontaminated prior to being released into non-contaminated areas. Therefore, cost considerations must be made for decontamination of equipment and replacement costs for items which cannot be adequately decontaminated.

Cost Estimating. The estimates of project costs contained in this report reflect the impacts of using personal protective equipment, the need for worker and equipment decontamination, and the associated reduction in worker productivity.

Selected Issues

The following paragraphs discuss several selected issues of significant interest relating to the tentatively selected plan. These issues include: (1) investigation of alternate construction materials; (2) the submittal of an application for approval of an alternate method of disposal of TSCA materials; (3) the impacts of dredging, including a discussion of the need to dredge the PCB hot spots; (4) an assessment of the health risks

posed by inhalation of potential airborne contaminants released from the proposed CDF; and (5) minimizing adverse impacts on wildlife due to operation of the CDF.

Alternative Construction Materials

During the detailed project design phase the use of alternate construction materials will be investigated in an effort to reduce overall project costs consistent with sound environmental practices. These investigations will consider a vertical wall barrier construction technique using a flexible, chemical resistant, impermeable high density polyethylene (HDPE) membrane as an alternative to using the slurry wall. A preliminary cost analysis indicates that the cost of HDPE membrane construction is comparable to slurry wall construction.

The use of coal combustion by-products (CCB) such as fly ash produced at coal fired generating stations will be investigated as a potential construction material for the CDF dikes. CCB have been used throughout the United States for numerous State Department of Transportation (DOT) and Corps of Engineers' projects. In Northwest Indiana, the Indiana DOT has used CCB as an embankment material for a project on U.S. Route 12 in East Chicago and has approved the use of CCB as an embankment for a project on the Indiana Toll Road to be undertaken in 1995. CCB have also been by the City of Portage for its Samuelson Road project.

TSCA Application

The CDF would be designed to meet the TSCA regulatory requirements for the disposal of sediments containing PCBs in concentrations of 50 ppm or greater. The U.S. EPA Region 5 PCB Control Section has concurred with this plan. An application will be submitted to the Regional Administrator, U.S. EPA Region 2, for approval of the ECI CDF as an alternate method for disposal of TSCA material under the authority of 40 CFR §761.60 (a)(5). The application will contain detailed technical, environmental and economic information proving that disposal in an incinerator or chemical waste landfill is not reasonable and appropriate, and that the alternate disposal method will provide adequate protection to health and the environment. Additional information necessary for the evaluation of the alternate disposal method such as a traffic plan, waste acceptance and handling plan, surface water handling plan, air monitoring plan, worker protection plan, sampling and monitoring plan, site security plan and TSCA records maintenance and reporting plan will be part of the application. The alternate disposal application will be submitted two years prior to construction of the TSCA cell. An application will not be submitted at this time since the TSCA cell will not be constructed until about year 2004 and a TSCA alternative disposal approval expires five years from the date it is signed. Once approved, the facility may apply for renewal after expiration.

Dredging Impacts

Available dredging technologies, their feasibility and environmental controls have been considered using a number of criteria, including: (1) quantity and character of sediments to be removed; (2) site restrictions and distance to disposal area; (3) compatibility with disposal operations; (4) availability of equipment; and (5) cost.

The recommended dredging method is by a manufactured closed-bucket or environmental-bucket clamshell. This method can work at high production rates, removes both fine-grained sediment and debris, is able to work in close quarters and around bridges, and requires equipment readily available on the Great Lakes. This method is especially suited to use with an upland CDF, since mechanical dredging can deliver sediments with a minimal amount of water. The less water associated with the sediments, the less water that has to be collected and removed from the disposal site. The closed-bucket or environmental-bucket is designed to reduce sediment resuspension. Environmental controls to be used around the dredging operation could include the use of oil booms and adsorbents to contain and remove any surface oil film and possibly silt curtains.

The impacts of maintenance dredging on sediment and water quality and aquatic life are described in Appendix H, Dredging Technologies and Impacts. Unavoidable adverse impacts include: (1) short-term, localized increases in suspended solids turbidity, and dissolved pollutants (most significantly ammonia); and (2) reductions in dissolved oxygen. However, resuspension caused by dredging is minimal when compared to the resuspension which presently occurs due to storm events and ship traffic. Research shows that resuspended sediment will generally settle out within 500 to 800 feet of the dredge. The skill of the operator of the dredge and the care taken by the operator during the dredging process are major factors in the extent of resuspended solids and turbidity generated.

Water quality impacts from dredging may result in short-term, localized adverse impacts on aquatic biota. Benthic organisms currently inhabiting bottom sediment will be removed. However, most of these adverse impacts will be minimized by the use of proper environmental controls (closed-bucket, oil boom, and adsorbents).

Dredging will remove in-place sediment down to navigation depth, thus exposing the underlying sediment. Sediment sampling results show that the contaminant concentration within the IHC does not indicate any significant change with depth, except for PCB levels in two reaches, Reaches 6 and 13. The sediment in these two reaches are TSCA-regulated because the PCB concentrations are greater than or equal to 50 ppm. Experience in dredging and confined disposal of TSCA-material is limited, therefore, leaving the material in-place was considered. However, dredging is likely to impact the nature of the exposed

sediment by causing physical movement of sediment due to sloughage. To prevent the potential migration to Lake Michigan, a systematic approach has been established to remove the TSCA-regulated sediment. After dredging, the exposed sediments will exert a higher oxygen demand and expose benthic organisms recolonizing the area to higher levels of PCB contamination. These impacts will be short-lived due to the rapid sedimentation in the channel which should cover the exposed sediments with more than 2-inches of "new" sediments within one year. This expected sedimentation rate is based on an analysis of historical sounding data.

The proposed dredging will have highly significant, long-term, beneficial impacts on the environmental quality of the Indiana Harbor and Canal and adjacent Lake Michigan. Dredging will remove one million CY of existing, and 3 to 4 million CY of future, contaminated sediments from the aquatic ecosystem. Maintenance dredging will prevent the release of between 50,000 and 100,000 CY of sediment containing hundreds of thousands of pounds of sediment pollutants to Lake Michigan annually. The magnitude of these benefits to the lake environment are difficult to measure. However, it is clear that these benefits outweigh the unavoidable adverse impacts caused by the dredging.

Inhalation Risk Analysis

The U.S. EPA completed a risk analysis to assess the human health risks posed by potential air emissions from the proposed CDF (see Appendix T for risk analysis). The analysis was designed to quantify the potential air emissions of pollutants from the CDF and to obtain the annual average concentration of pollutants at specific receptors, including a high school located south of the proposed CDF site. The risk analysis is provided in Appendix T, U.S. EPA Inhalation Risk Analysis.

Air Emission Loadings. Volatilization and wind-borne particulate matter are two potential contaminant loss pathways from exposed sediment or soil. Volatilization is the process whereby a compound, semi-volatile (SVOC) or volatile organic compound (VOC), passes into the air from a solid or liquid surface. As the exposed sediment or soil surface dries, particles from the surface can be picked up and blown by the wind. The particulate matter which is entrapped by the wind is referred to as fugitive dust. Contaminants adhering to the fugitive dust from the CDF would be metals, SVOC's, and VOC's. The potential CDF volatile and particulate emissions were compared to loadings obtained from the Toxic Release Inventory (TRI) database and air pollution studies from southeast and southwest Chicago. Since the TRI database and air pollution studies have air emission sources similar to the northwest Indiana area, the data are considered representative of northwest Indiana. The modeled loadings from the CDF did not significantly impact the existing loadings from the other reported emission sources.

The magnitude of the two loss pathways was investigated by comparing the expected emissions from the ECI site with and without CDF conditions. Each alternative has two emission sources. The "without" condition includes emissions from the ECI site and the existing bottom sediment from the IHC. The emission sources under the "with" CDF condition include the operating CDF and the IHC surficial sediment exposed after dredging or newly deposited material.

The IHC bottom sediment is an air emission source that is common to both the "with" and "without" CDF conditions. The contaminant concentration in the sediment was assumed to be similar whether the sediment is existing, newly exposed after dredging, or recently deposited. Therefore, the air emission loadings from the bottom sediment would be approximately the same for both conditions. It should be emphasized that as remedial activities remove existing contaminated sediment sources, the "with" CDF condition would provide for less contaminated surficial sediment to eventually be deposited into the IHC in the long-term.

The major potential sources of loadings to the air under the "without" and "with" CDF conditions would be the ECI site and the operating CDF, respectively. The U.S. EPA air risk analysis made some preliminary estimates that were based on initial assumptions and as a result should be used for comparative purposes only (see Appendix T, Section III for results of the loadings estimation). The emissions estimations predict that the emissions from the CDF operation are slightly higher than emissions from the ECI site. Considering the limited chemical data and the screening-level emissions estimates in the air risk analysis, it is not possible to predict whether the "without" or the "with" condition would be a larger source of air emissions.

Total Losses. The above discussion only referred to atmospheric losses from volatilization and particulate matter. To complete the analysis of the environmental impact, the water quality effect on Lake Michigan from resuspension and migration of the contaminated sediment from the IHC should be included with the loadings estimated in the risk analysis. Most of the IHC has reached a steady-state condition, which means that the sediment depositing on the bottom equals the sediment being scoured/transported by water movement and currents, ship traffic, or storm events. The result is that the annual loading of sediment to the IHC is equal to the annual sediment loading to Lake Michigan. Approximately 150,000 CY of contaminated sediment will be transported into Lake Michigan under the "without" CDF condition.

By dredging and maintaining the navigation channel, the canal would act as a sediment trap and reduce the loadings to the lake by 50 to 70 percent. Dredging would cause the resuspension of bottom sediments. Although resuspension is a contaminant transport mechanism, the sediment resuspended from dredging would settle out within 500 to 800 feet of the dredge. The impacts from dredging are unavoidable but are localized, short-term, and can be reduced by the use of a closed bucket clamshell. The amount of material resuspended during dredging and transported to Lake Michigan would be insignificant as compared to resuspension caused by storm events and ship traffic.

Table 16 incorporates the losses from sediment migration to Lake Michigan with the volatile and particulate emissions derived in the risk analysis. The sediment loadings, especially from metals, increase the total contaminant losses significantly. The estimated losses under the "without" CDF condition are almost twice as high compared to the "with" CDF condition.

Table 16 Total Loadings, Pounds per Year

	Without CDF Condition 2/			Without CDF Condition 2/		
Parameter	ECI Site (1)	IHC IN-Place Sediment (2)	Sediment Migration to Lake (3)	CDF Operation (4)	IHC In-Place Sediment (5)	Sediment Migration to Lake (6)
PM 1/	3,400	N/A 1/	N/A	5,400	N/A	N/A
Benzene	840	150	1,300	4,400	150	530
Tokuene	710	170	1,500	4,000	170	610
Ethylbenzene	1,700	24	240	500	24	95
Xylenes	4,700	280	2,700	6,400	280	1,100
PCBs	4.9	6.6	360	19.9	6.6	150
Arsenic	0.17	N/A	6,600	0.4	N/A	2,600
Chromium	0.07	N/A	67,000	3.8	N/A	27,000
Subtotal	11,000	630	80,000	21,000	630	32,000
Total			91,600			53,600

1/ Units are lbs/yr; PM = Particulate matter; N/A - not applicable.
2/ Emissions from Columns (1) and (4) are due to volatile and particulate matter losses. Columns (2) and (5) are due to volatile losses, and Columns(3) and (6) are due to resuspension.

Risk Analysis. The risk analysis estimates cumulative cancer and non-cancer risk due to inhalation of air emissions from the CDF operation (see Appendix T, Section III, for the results of the risk analy-sis). Using modeled contaminant concentrations and unit risk factors, a 30-year exposure cancer risk was calculated for the CDF emission to the area. The modeled air concentrations and result-in risks were compared to recent monitored concentrations and resulting risks. The results of a U.S. EPA air study conducted in southeast Chicago in 1989 were used for the monitored concentrations. The risk analysis is intended to be conservative and protective, and thus probably overestimates the actual risk. The results of the cancer risk analysis show that the additional risk from the CDF (2.3×10^{-6}) does not to exceed the risk from the existing air quality in the area (3.1×10^{-4}).

The non-cancer risk analysis used known reference concentrations for two vola-tile compounds potentially emitted by the CDF to calculate hazard quotients (HQs). The HQ is a ratio of the modeled air concentration to the reference concentration. Both HQs were below 1.0, indicating that it is likely that there is no appreciable risk of non-cancer effects due to a 70-year inhalation exposure to these compounds.

The U.S. EPA risk analysis was limited to air emissions of volatiles, semi-volatiles, and particulates from the CDF because it was assumed that this was the major contaminant loss pathway from the CDF. Other potential pathways of contaminant loss can occur during dredging/disposal operations that were not included in the analysis. They were omitted because results in a report from the U.S. Army Corps of Engineers, Chicago District, estimating loadings from a conceptual dredging operation confirmed that emissions from these other pathways are smaller than the air emissions calculated in the U.S. EPA risk analysis. This report was prepared for the Assessment and Remediation of Contaminated Sediments (ARCS) program. The relative losses from resuspension during dredging, volatilization during dredging and rehandling, volatilization during CDF operation, and seepage from the CDF were compared. It was shown that the volatile losses during CDF operation were significantly higher than the other loss pathways combined. Therefore, these losses would not affect the results of the U.S. EPA risk analysis discussed above.

Controls. During CDF disposal or rehandling operations, air monitoring would be initiated to measure the significance of volatile and particulate contaminant losses leaving the CDF site. Air monitoring equipment such as high volume samplers would be located at the perimeter of the site. Monitoring data would be evaluated to determine if sediment management practices should be altered or amended. Wind fences, covering the sediment, or operational modifications are examples of common control measures that could be considered.

At this time, the minimum requirement for workers directly in contact with sediment would be Level C personal protective equipment. Personal air monitors would be worn on site to identify work assignments which pose the highest risk to worker health and safety. Further discussion of the air monitoring plan is included in Appendix N, Monitoring Plan.

Wildlife Impacts

Exposed, drying sediments at the CDF site might attract foraging terrestrial wildlife such as gulls, waterfowl, shorebirds and small mammals. If no action were to be taken, the site might create an attractive nuisance that could allow contaminants to be passed up the food chain. Therefore, it is proposed to implement the following plan of action with regard to use of the selected CDF site by birds and mammals once dredged materials are deposited on the site:

- Make a final assessment of the degree of the potential hazard to wildlife posed by the types and levels of pollutants in the dredged materials.

- Complete a one-year baseline survey of bird and small mammal use of the selected site and surrounding area before dredged material deposition begins. This survey should include about 3 to 4 one-day bird censuses per month, classifying birds by species, numbers, habitat and activity so that the annual cycle of bird use can be monitored. Small mammals would be monitored by snap trapping in the various habitats for four consecutive nights, once in summer and once in winter.

- Depending on the degree of potential hazard to wildlife and the types and numbers of birds and mammals observed during the one-year baseline study, a plan of action would be developed to keep wildlife from feeding in the CDF as dredge material is deposited (Wildlife Exclusion Plan [WEP]). This WEP could include such strategies as the minimization of standing water at the site; the seasonal timing of dredged disposal; the use of cover materials (e.g., ConCover), chemical repellents, and scare devices; and the use of bird harassment patrols such as used at airports.

- Once the dredged material disposal begins, monitoring of the site would continue as before for one year with special attention paid to wildlife activity on the dredgings. If wildlife activity at the site reached critical levels, determined from the potential hazard assessment and the baseline survey of wildlife use of the CDF site, the WEP would be implemented at the appropriate level of intensity.

General Conformity Determination/Odors

In accordance with the 1990 amendments to the Clean Air Act(CAA) [42 United States Code 7401 et seq.] a General Conformity Determination was completed on the project for Ozone (precursor-volatile organic compounds-VOCs) and PM-10 (particulate matter less than 10 microns). In addition, an odor analysis was completed to address the potential for odors to emanate from the dredging/disposal operation. A summary of the results are

provided below, a complete discussion of the determination is provided as Appendix V, General Conformity Determination and Odor Analysis.

The dredging operation will consist of dredging (or removal) of the bottom sediments, transporting the sediments to the CDF, rehandling the sediments and long-term disposal into the CDF. Long-term disposal within the CDF is the only locale that produces any considerable VOC losses. A conservative estimate of VOC losses is 7.8 tons/yr. This is below the de minimus threshold of 25 tons/yr. In order to maximize potential losses, a flux rate based on a 3 months (90 days) averaging time t(1), which would represent a dredging/disposal operation, was also calculated. It was assumed for this condition that there was continuous loss for 8 months at the 90-day flux rate. This provided an estimated annual VOC loss of 10.1 tons/yr, still well below the threshold value. Information from the Indiana Department of Environmental Management (IDEM) shows a VOC emission inventory (1990) for this area of about 200 tons/summer day. The estimated VOC emissions from the proposed project (7.8 tons/yr) are below the 10 percent threshold, and therefore, the proposed Federal actions is not considered to be a "regionally significant" activity for ozone.

The ECI site is located in northwest Indiana which is a moderate non-attainment area for PM-10, therefore, the PM-10 emissions from the project cannot exceed 100 tons/year. With a conservative maximum estimate of 46 tons/year, the particulate emissions do not exceed the annual limit. The IDEM reported that the PM-10 inventory (1990) for this area is 16,611 tons/yr. The PM-10 estimate for the proposed project is less than 10 percent of the annual inventory, excluding the project as a regionally significant activity.

In order to address the potential for odors to emanate from the dredging/disposal operation, an odor analysis was completed. A literature review was conducted to determine odor thresholds in air, and/or background air concentrations for the chemical compounds modeled in the VOC analysis. Several compounds were identified from the available information, these included Benzene; m,p-Xylenes; Naphthalene; o-Xylene; Styrene; and Toluene.

The flux rates from the CDF sediment locale were input a dispersion model to estimate the chemical concentration in the air from VOCs being released from the sediment. The U.S. EPA's SCREEN model, developed by the Office of Air Quality Planning and Standards, was used to complete the dispersion modeling. For all conditions analyzed the emission source was assumed to be level with the ground surface. This is a conservative assumption which maximizes the modeled chemical air concentrations since the CDF will be surrounded by a dike which effectively raises the emission source above the ground surface. First of all, onsite modeled air concentration of the aforementioned compounds, to which workers directly involved in managing the sediment within the CDF could be exposed, were estimated. In all cases, these

concentrations were substantially below the Occupational Safety and Health Administration's (OSHA) Permissible Exposure Limit (PEL).

The modeled maximum chemical concentration in the air away from the emission source was determined to occur at a distance of approximately 20 meters (m) from the CDF exposed sediment source. The receptor for this calculation was assumed to be at a vertical height of 1.6 m (5.3 ft). However, the odor thresholds are not exceeded for any of the chemical compounds within this 20 m distance. In addition, the dredged material within the CDF is surrounded by a dike and access area which, at a minimum, would provide a space of 30 m to the fence line. Finally, the analysis showed that the ground level (worst case) chemical air concentration for the compounds discussed could not be distinguished from "background" conditions at a distance of 100 m from the CDF exposed sediment source.

Apportionment of CDF Costs

In a May 21, 1993 memorandum for the Director of Civil Works, the Acting ASA(CW) directed the U.S. Army Corps of Engineers prepare cost-sharing options for development of the ECI site disposal area. The Acting ASA(CW) guidance is quoted in the following paragraph.

The Acting ASA(CW)'s specific guidance regarding cost sharing options follows:

"My memorandum of October 15, 1992, indicated our intention to make the costs of preparing disposal areas at all projects where not precluded by law or agreement a 100 percent local responsibility starting with the Fiscal Year 1995 Budget. The Corps Chief Counsel has responded to that proposal and his response is under review by the Army General Counsel. In addition, Section 216 of the Water Resources Development Act of 1992 requires a study of the need to change law or policy with respect to dredged material disposal areas for construction and maintenance of harbors. Pending comletion of those activities, and recognizing that this may be a unique opportunity to reduce the cost of maintenance, I am willing to consider a Federal contribution toward development of the disposal site. However, in anticipation of the Army General Counsel opinion mentioned above, the District should develop of the site as a local cost; cost sharing on a proportionate use basis, development at full Federal cost with a use charge for non-project use to recover a portion of the development cost; and a benefit sharing proposal based on the savings to each respective partner." In these initial options, the cost of implementation of the RCRA Closure/Corrective features was considered to be the responsibility of non-Federal interests.

The District Engineer developed the four cost-sharing options in the draft CMP Report, dated June 1993. The options were subsequently discussed at the September 1993 Feasibility Review Conference. Based on these discussions, the Acting ASA(CW) selected the benefit sharing option as the basis for sharing the

cost of implementing the RCRA closure/corrective measures, as well as constructing the CDF.

The benefit sharing option is based on apportioning the total cost of constructing the RCRA closure/corrective features and the CDF on the basis of the savings realized by both Federal and non-Federal interests through jointly using the ECI site rather than each interest using the site for its individual purpose.

The benefit sharing option was discussed in detail in the draft Comprehensive Management Plan and Environmental Impact Statement which was distributed for agency and public review on October 30, 1995. This option resulted in the following apportionment of the RCRA/CDF costs for the tentatively selected plan: Federal, $16.1 million and non-Federal, $31.3 million.

Draft CMP/EIS

A draft Comprehensive Management Plan and Environmental Impact Statement (CMP/EIS) report were distributed on October 30, 1995 for a five-month agency and public review period. Public information sessions and public meetings where held on 28 November 1995 and 10 January 1996 to provide additional information. A public hearing was held on March 20, 1996 to obtain comments for public record. The draft CMP contained all of the previous information in this report through the previous paragraph on project price escalation. In addition, the draft CMP contained a draft of the last three sections of this report on Plan Implementation, Summary and Conclusion, and Recommendations.

Copies of the draft CMP/EIS were mailed to over 100 Federal, state and local agencies; libraries; environmental, industrial and navigation interests; local interest groups; and individuals. In addition, a brochure summarizing the proposed project was sent to approximately 700 other interested parties. The letter accompanying the brochure identified 15 public libraries and other locations where the CMP/EIS were on file and available for public review. The agency and public review period extended from October 30, 1995 to April 1, 1996.

On October 30, 1995, a press/media event was held in East Chicago, Indiana to announce the release of the draft CMP and the draft EIS which had been prepared jointly by the U.S. EPA, Region V, and the Corps of Engineers, Chicago District. The U.S. EPA Administrator and the Chicago District Engineer both stated that the project is critical to improving navigation and to the cleanup of Indiana Harbor and Canal.

On the afternoons of November 28, 1995 and January 10, 1996, public information sessions were held in East Chicago, Indiana to discuss project formulation and technical issues and to respond to questions on an informal basis. Written handout information was available in both Spanish and English. Approximately 75 people attended these sessions, representing the general public; the Indiana Congressional delegation; local, state and Federal agencies; schools; environmental groups; industry; and the media.

On the evenings of November 28, 1995 and January 10, 1996 public meetings were held at the East Chicago Central High School. Visual slide presentations were made to provide information on project formulation, alternatives investigated, potential project impacts, estimated costs and benefits, and proposed apportionment of costs between Federal and non-Federal interests. Following these presentations, individuals attending the meetings were given an opportunity to present both oral and written statements, followed by a period of questions and answers. Approximately 50 people attended these meetings to express both support and concerns about the proposed project. In general, the questions reflected concerns about health and safety issues and property values. Public comments made at the January 10 meeting were recorded as public record for the EIS review process.

FIFTH PHASE: 1996-1998

During the fifth phase of plan formulation the Tentatively Selected Plan, described on pages 89-95, was adjusted and refined leading to selection of the Recommended Plan. The fifth phase included the following work items:

- All written comments on the draft CMP/EIS received by April 1, 1996 and comments made at the January 10, 1996 public meeting were addressed in written responses.

- The dredging simulation model analysis was rerun based on new sounding data obtained in 1995 to update and further refine the dredging quantity estimate.

- The U.S. Department of the Interior, Fish and Wildlife Service prepared a Biological Opinion pursuant to Section 7 of the Endangered Species Act of 1973. In addition, the Fish and Wildlife Service issued a Fish and Wildlife Coordination Act Report which was received on September 16, 1996.

- Indiana Harbor sediment samples were collected and sent to the Corps of Engineers', Waterway Experiment Station for testing of geotechnical properties and measurement of the release of volatiles from the sediment.

- Coordination meetings were held with U.S. Environmental Protection Agency (U.S. EPA), Indiana Department of Environmental Management (IDEM), and the East Chicago Sanitary District (ECSD) to clarify issues of leachate treatment, TSCA and RCRA requirements, disposal of on-site excavated materials and interior dike construction.

- An analysis was completed which showed that moving the CSX Railroad spur, which passes through the ECI site, to the north edge of the ECI site will reduce construction costs and increase CDF capacity.

- The layout and design cross-section of the CDF dikes were revised using the additional information from sediment tests and moving the railroad spur.

- The project cost estimate was revised to reflect the above actions and inflated to October 1997 price levels. In addition, the estimate was entered into the Micro-Computer Aided Cost Estimating System (M-CACES).

- The economic analysis was revised using the updated cost estimate, the results of the 1995 hydrographic sounding data and the current Federal interest rate.

- The cost sharing for CDF construction was revised to reflect legislation contained in the Water Resources Development Act of 1996.

Each of the above ten work items are discussed in detail in the following paragraphs on pages 107 through 111.

Draft CMP/EIS Comments and Responses

Written comments on the draft CMP/EIS were received from 25 individuals; local, state and Federal agencies; environmental groups and individual interests. Some of the comments were hand-written notes while others were substantial reports written by experts in their field. In general, questions focused on sedimentation data, the proposed dredging method, re-exposure of contaminates, public input during design and construction and cost apportionment. Written responses to all comments are provided in Attachment 1, CMP/DEIS Comments and Responses, to the Final Environmental Impact Statement (FEIS).

Approximately 22 people made comments for the public record at the public hearing on the evening of March 20, 1996. In general, comments made at the public hearing reflected concerns about health and safety issues, property values and the role of the East Chicago Waterway District in project implementation. A transcript of the meeting and responses to the comments received are included in Attachment 1, CMP/DEIS Comments and Responses, to the Final Environmental Impact Statement.

Dredging Simulation Model

New hydrographic soundings were completed in 1965 throughout the Indiana Harbor and Canal Federal navigation channel and in the adjacent berthing and dockface areas outside of the Federal channel. The soundings taken in the berthing and dockface areas are more detailed and extensive than those which were available for the fourth phase of plan formulation to develop the original estimated dredge material quantities by channel reach, as shown in Table 7.

The dredging simulation model was rerun in August 1996 using the 1995 hydrographic soundings to update and further refine the dredging quantity estimate. Appendix Q, Sedimentation Investigation and Dredging Plans, was supplemented to reflect the new hydrographic sounding data and the associated results of the dredging simulation model run. The appendix describes the conduct and results of the dredging analysis and simulation within the Indiana Harbor and Canal. From this analysis estimated dredging quantities were recomputed for each reach of the Indiana Harbor and Canal, as shown in the addendum to Appendix Q.

The gross dredging quantities did not significantly change compared to previous estimates. However, the new hydrographic survey data did show a redistribution of sediments from the Federal channel to the private berthing areas and dockfaces. This information confirms the view that the harbor and canal are in a steady state, i.e., sediment that is washed downstream into the harbor equals the sediment washed into Lake Michigan. This also shows that ships are plowing through and scouring out sediments from the center of the canal, which are then deposited along dockfaces.

Fish and Wildlife Service Coordination

Biological Opinion

The U.S. Department of the Interior, Fish and Wildlife Service issued a Biological Opinion (see Appendix A, Coordination Letters) indicating that the project is not likely to jeopardize the continued existence of the peregrine falcon. However, their impact analysis indicated the potential of an increased in short-term adverse impact on nesting falcons along the Indiana Harbor Canal.

The issues of concern include the release of additional oil to the water column due to dredging and the sublethal and acute toxicity impacts of this oil on the falcons, the operation of the confined disposal facility, the design and management of the Wildlife Exclusion Plan and disturbances to nesting during dredging.

The Fish and Wildlife Service has prepared an incidental take statement pursuant to Section 7(b)(4) of Act. Further discussions between the Fish and Wildlife Service and the Corps of Engineers, Chicago District concerning the mandatory terms and conditions contained in the incidental take statement will be required.

Coordination Act Report

The U.S. Fish and Wildlife Service issued a Fish and Wildlife Coordination Act Report dated September 16, 1996 (See Appendix A, Coordination Letters). Selected information from this report has been incorporated into the Final Environmental Impact Statement which accompanies this Comprehensive Management Plan Report. The complete Fish and Wildlife Coordination Act Report is on file in the Corps of Engineers Chicago District, Planning Division.

Sediment Testing

Additional sediment samples were taken in late 1996 and sent the Corps of Engineers', Waterway Experiment Station to obtain data on consolidation, compression and volatile emissions of Indiana Harbor and Canal sediments. This information was used to predict CDF dike settlement and evaluate liner integrity during consolidation and to complete design of the dikes and haul roads.

Tests results indicated that the settlement of dredged materials to be placed within the CDF will be significant. The conceptual design in the draft CMP/EIS showed the second and third stages of the embankment would be constructed over the previously placed sediment. Construction of stages two and three over the highly compressible sediments would result in cracking and breaching of the clay liner on the base and sideslopes. Therefore, the design section for the CDF dikes was modified to a centerline construction, as shown in Figure 25.

Data from the volatile emissions tests will be used to rerun the inhalation risk model during the detailed design phase to refine the estimated inhalation risks from Indiana Harbor sediment during dredging and disposal operations.

Coordination Meetings

Numerous meetings were held with the U. S. EPA and the IDEM to clarify issues concerning leachate treatment, TSCA and RCRA requirements, disposal of on-site excavated materials and interior dike construction. During these meetings it was agreed that material excavated on site would remain on site to be disposed of in the CDF and not taken to a hazardous waste land fill. It was also agreed that after the underground cut off wall is in-place, interior dike walls could be built with on-site material rather than trucked-in materials.

During meetings with the East Chicago Sanitary District (ECSD), it was decided that leachate from the ECI site would not be sent to the ECSD waste water treatment facility but would be treated in an on-site treatment plant. The effluent would be discharged to the canal. The project cost estimate was adjusted to reflect these changes.

Meetings will continue to be held to discuss the requirements for permitting for disposal of TSCA sediments, RCRA closure and NPDES discharge. These permits will be requested upon completion of the design analysis.

CSX Railroad Spur Relocation

Currently a CSX Railroad spur, which services the LTV Steel Company, crosses the site from east to west and separates ECI site parcel IIA from parcel IIB. An evaluation was completed of feasibility of relocating this track to the north edge of parcel IIB. The evaluation showed that there would be a substantial increase in CDF capacity and cost savings due to relocating the rail spur. Relocating the spur will delete the requirement for one of the two dikes which would run parallel to the spur, as shown in Figure 19, and the requirement for grouting under the rail spur. The project cost estimate was adjusted to reflect this change. The revised dike layout is shown in Figure 24.

Dike Layout/Section Revision

Due to the additional capacity in the CDF created by moving the rail spur, there is no requirement for the stage III dike construction, shown in Figure 20. Therefore, the dike section was redesigned for two stage construction. The revised section is shown in Figure 25. In addition, the layout for the dikes was changed to reflect relocation of the rail spur and the redesigned dike section. The revised layout is shown in Figure 25. Due to these changes there is a substantial reduction in material required to build the dikes and these savings are reflected in the current project estimate.

Revised Project Cost Estimate

The current project cost estimate reflects all of the above changes. In addition, the estimate was updated to October 1997 price levels. The estimate was developed using the Micro-Computer Aided Cost Estimating System (M-CACES). The M-CACES estimate is contained in Appendix K, Cost Estimates and summarized in Table 18.

Revised Economic Analysis

The revised cost estimate was used to re-evaluate the average annual costs for the modified Alternative 3, Cooperative Dredging Plan. The re-evaluation shows the average annual cost for dredging, CDF construction, operation and maintenance and interest during construction to be $ 6,848,000. Comparing the revised average annual cost with average annual benefits, $14,333,000, based on October 1997 price levels, shows that the modified Alternative 3 has a benefit-cost ratio of 2.1, as shown on Table 20.

Water Resources Development Act of 1996 (WRDA 96)

Section 201 of WRDA 96 provides that dredged material disposal facilities associated with the construction, operation and maintenance of Federal navigation projects shall be considered general navigation features and cost shared in accordance with Title I of WRDA 86. Under WRDA 96 Section 101(a) cost sharing, the non-Federal sponsor would pay during construction 25 percent of the cost of disposal facility for a project with depths

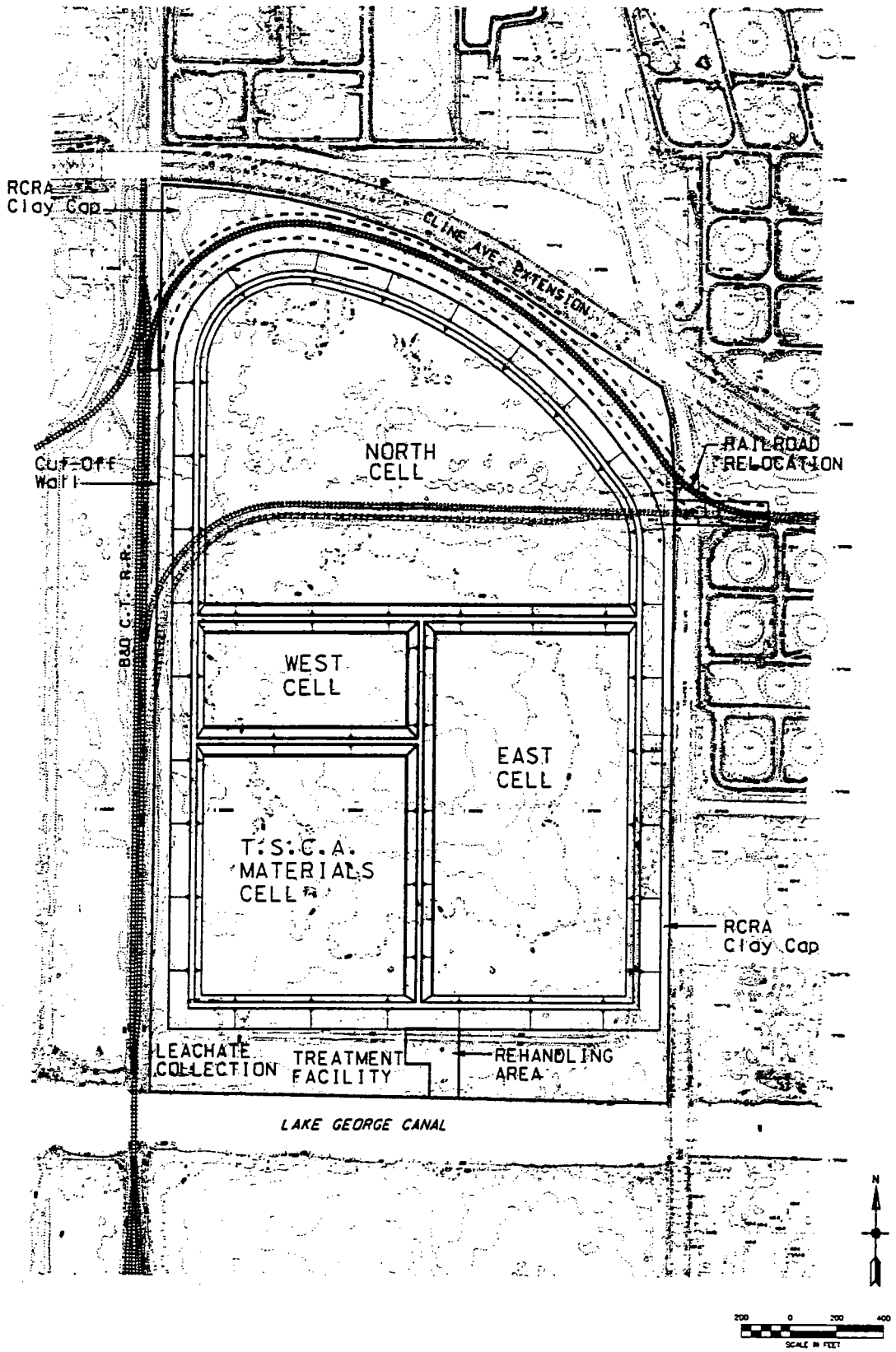
greater than 20 feet but not greater 45 feet. The non-Federal sponsor must also provide the lands, easements, rights-of-way and relocations necessary for the disposal facility. The non-Federal sponsor would also have to pay an additional 10 percent of the cost of the disposal facility over a period of not to exceed 30 years but with the value of lands, easements, rights-of-way and relocations credited against this additional 10 percent payment.

The Federal share of the costs of operation and maintenance of the disposal facility shall be determined in accordance with section 101(b) of WRDA 96. Under section 101(b), the Federal share of the operation and maintenance costs are 100 percent except for disposal facilities for projects in excess of 45 feet where the non-Federal sponsor will share in 50 percent of the incremental operation and maintenance costs. Further, the Federal share of construction of dredged material disposal facilities associated with the operation and maintenance of Federal harbor projects, Federal dredged material disposal facility operation and maintenance costs, and the Federal costs of dredging and disposal of contaminated sediments that are in or that affect the maintenance of a Federal navigation channel, are eligible operation and maintenance costs under section 210 of WRDA 96 and are paid from the Harbor Maintenance Trust Fund.

Section 217 of WRDA 96 addresses dredged material disposal facility partnerships. This section allows the Corps of Engineers to provide additional capacity at a dredged material disposal facility if the non-Federal interest pays the costs of the additional capacity during construction. It also provides that any dredged material disposal facility managed by the Corps of Engineers may be used by a non-Federal interest if such use will not reduce the availability of the facility for project purposes and that fees be imposed to recover capital, operation and maintenance costs associated with such use. The provisions of sections 201 and 217 of WRDA 96 described above are applied later in this report.

SELECTED PLAN

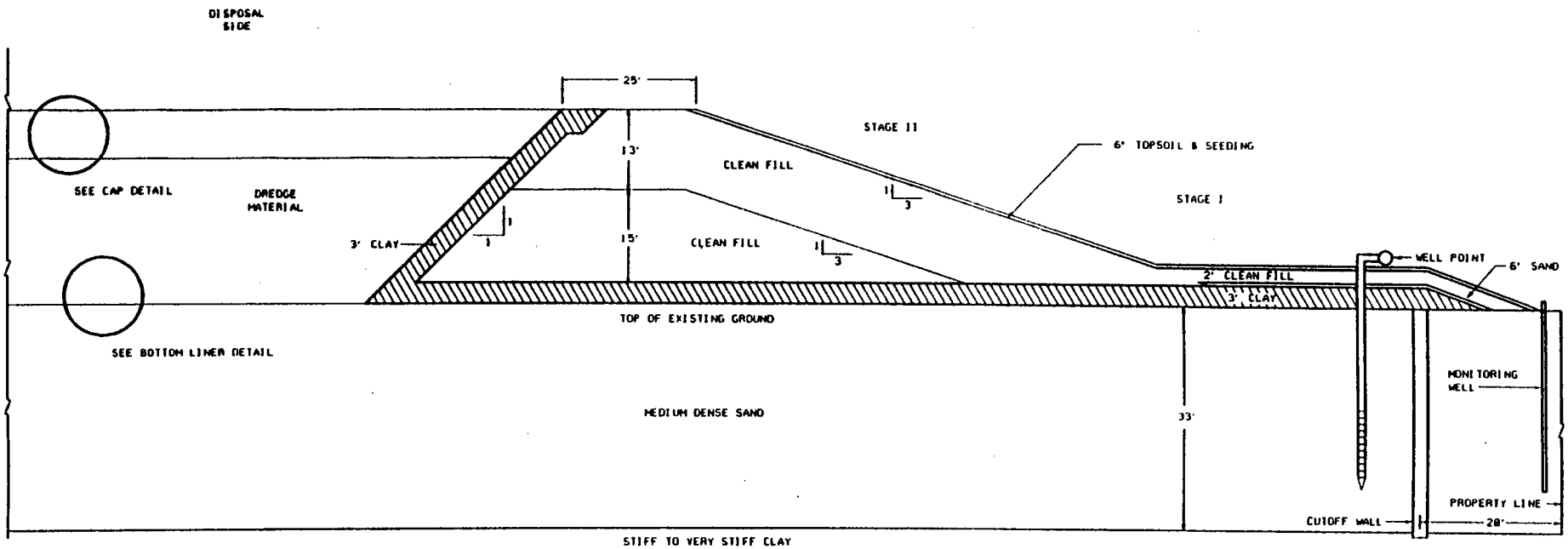
Based on a detailed maximization of net benefits analysis of alternative dredging and dredged material disposal plans, maintenance dredging of the entire IHC to authorized project depths with disposal of the dredged materials in a CDF, constructed on the ECI site in East Chicago, Indiana, is the selected plan. This plan meets the definition of the Federal Standard as the most cost-effective alternative consistent with sound engineering practices and meeting the environmental standards established by the Section 404 (b)(1), Public Law 92-500, evaluation process. There is no overriding reason or requirement to exceed the Federal Standard and undertake some type of additional sediment treatment process at a much greater cost than the selected action.



INDIANA HARBOR
CONFINED DISPOSAL FACILITY
ECI SITE CDF

SELECTED/RECOMMENDED PLAN
PLAN VIEW

Chicago District
U.S. Army Corps of Engineers
JULY 1997



SECTION

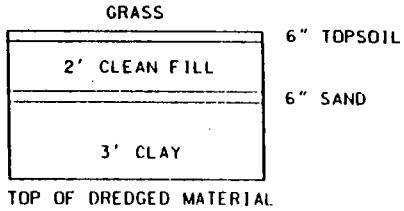
N.T.S.

DREDGED MATERIAL

TOP OF EXISTING SOIL

BOTTOM LINER DETAIL

N.T.S.



CAP DETAIL

N.T.S.

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE CDF
SELECTED/RECOMMENDED PLAN
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JULY 1997

PLAN DESCRIPTION

The selected plan is Alternative 3, Cooperative Dredging Plan, modified in the fifth phase of plan formulation, as described in the previous section of this report. The plan includes construction of a CDF on a portion of the ECI property, the site of a former petroleum refinery which currently has open RCRA status. Use of this site for the CDF is contingent upon the construction of specific RCRA closure and corrective action features. These RCRA features would be integral to the CDF construction. The CDF would act as the final RCRA cap for that portion of the ECI site upon which the CDF is constructed.

The plan further provides for maintenance dredging of polluted channel sediments, except for the presumptively hazardous sediments in the outer harbor, by closed-bucket or environmental bucket-mechanical dredging equipment with disposal of the dredged material in the CDF. Dredging would be undertaken throughout the IHC Federal navigation project to authorized project depths and widths. Dredging would also be completed in the appropriate berthing areas outside of the authorized channel limits at non-Federal expense to provide depths commensurate with those in the Federal channel. Space in the proposed CDF could also be allocated to accommodate dredged materials from the Inland Steel Company Consent Decree sediment remediation activities and other similar activities which might be required by the U.S. EPA or IDEM along the IHC. Use of the proposed CDF would be limited to disposal of dredged materials from the IHC/GCR. It is not intended to be used for disposal of dredged materials from other harbors or waterways in Indiana or other Great Lakes states.

Confined Disposal Facility

RCRA-Related CDF Features

The tentatively selected plan, which was identified in the October 1995 draft CMP/EIS, is shown in Figures 19 and 20. The selected plan, which is a modification of the tentatively selected plan, is shown in Figures 24 and 25. Parcel I of the ECI site previously housed the RCRA hazardous waste units. These structures were razed along with the rest of the above ground structures, but were never closed in conformance with the RCRA regulations. Proposals for the closure of RCRA hazardous waste units in the State of Indiana must be approved by the IDEM. Due to the ubiquitous nature of the on-site contamination on this parcel, IDEM determined that closure in-place would be most appropriate for the area which previously housed the hazardous waste units. The in-situ closure design for parcel I would include a slurry wall, a gradient control system consisting of groundwater extraction wells, which would maintain groundwater flow into this portion of the CDF, and an overlying 3-foot compacted clay cap with a hydraulic conductivity of 10-7 cm/s. The compacted clay cap would be placed on the existing surface and would overlie parcel I. The slurry wall would extend approximately 33 feet from the ground surface into an underlying clay till unit. The U.S. EPA has determined that construction of these components would also address the corrective action requirements for parcel I. These RCRA closure and corrective

action components have been incorporated into the proposed CDF design. Once constructed, parcel I would be subject to the RCRA post-closure care and permitting requirements applicable to hazardous waste units for maintenance and monitoring. The post-closure care requirements under RCRA would be integrated into the maintenance and monitoring requirements for the CDF.

The CDF will also overlie ECI site parcels IIA and IIB. Unlike Parcel I, these parcels never housed hazardous waste units and are not subject to the RCRA closure requirements. However, these parcels are subject to the RCRA corrective action requirements, which address releases associated with waste handling practices to the environment. The implementation of corrective action within the State of Indiana is currently the responsibility of the U.S. EPA. Given the apparent widespread contamination of these parcels, the U.S. EPA determined that an acceptable corrective action condition for these parcels would be similar to the proposed corrective action outlined above for parcel I. This would consist of a perimeter slurry wall with a hydraulic conductivity of 10^{-7} cm/s tied into the underlying clay unit, and a groundwater removal system consisting of groundwater extraction wells placed within the interior of the slurry wall. The final cap for this site would be accomplished at the same time as final closure of the CDF. The corrective action components for parcels IIA and IIB would be incorporated into the CDF design and connected to the closure/corrective action components for parcel I. The corrective action maintenance and monitoring requirements for these parcels would be integrated into the maintenance and monitoring requirements of the CDF.

The features to create an inward hydraulic gradient and provide for treatment of groundwater collected within the slurry walls would include installation of wells with appropriate pumps to provide for gradient control. The wells would be located around the perimeters of parcels I, IIA and IIB. Contaminated groundwater collected in connection with the gradient control system would be discharged to the canal after treatment at an on-site treatment plant.

CDF Features

The CDF would be constructed on parcels IIA and IIB, as shown on Figure 24. The two parcels are currently separated by a single track railroad spur. The CDF would occupy 88 of the 115 acres of parcel IIA, located south of the track, and 43 of the 53 acres of parcel IIB, located north of the track. The CDF would be constructed as three separate cells, two in the southern portion of the site and one in the northern portion. The west cell in the southern portion of the site would be divided to create an isolated subcell for the disposal of TSCA level PCB contaminated sediments. The proposed CDF design incorporates those elements necessary for U.S. EPA Regional Administrator approval of the subcell as an alternate disposal method for PCB contaminated sediments. These include a slurry wall with a hydraulic conductivity of 10^{-7} around the perimeter of parcels I, IIA and IIB that ties into the underlying clay unit; a groundwater gradient control system; on-site treatment of groundwater

collected from parcels I, IIA, and IIB, segregation of PCB contaminated sediments from non-PCB sediments and capping of parcels IIA and IIB with three feet of clay, six inches of sand, two feet of clean fill and six inches of seeded topsoil. TSCA maintenance and monitoring requirements will be integrated into the maintenance and monitoring requirements for the CDF.

Figure 25 shows a cross-section through the CDF. The CDF dikes would be constructed in two stages in incremental lifts of 15, and 13 feet, respectively. The first stage earthen dikes would be constructed using off-site clean fill materials. The second stage dikes would be constructed of off-site materials beginning approximately 9 years after initial dike construction. The dikes would be constructed on top of a 3-foot layer of compacted clay tied into the slurry wall. The interior sideslopes of the dikes would be lined with a 3-foot layer of compacted clay tied into the bottom clay layer. On-site materials would be used to construct the initial 10-foot lift of the center cross dike separating the two cells of parcel IIA. Dried dredged material would be used to continue subsequent construction of the cross dike. The interior dikes to create the separate TSCA material cell would be constructed from dried dredged material after two complete dredging cycles.

The final 6 feet of the second stage lift would consist of clay, sand, clean fill and seeded topsoil. The clay would seal the CDF and provide for the RCRA capping of parcels IIA and IIB. The sand would provide for drainage of precipitation off of the CDF. The exterior sideslopes of the dikes would also be covered with topsoil, seeded, and landscaped as the dikes are constructed to control erosion and enhance their visual appearance. An overall landscaping plan will be developed during the detailed design phase in connection with preparation of the design memorandum. In developing the plan, vegetation will be selected and arranged to limit its attractiveness to wildlife and birds in terms of cover and food sources provided.

The recommended CDF would have a capacity of approximately 4.68 million CY. The initial 15-foot lift would have a capacity of approximately 2.5 million CY. Construction of the second lift of 13-feet would increase the CDF capacity to 4.68 million CY.

Construction and operation of the CDF will require an on-site treatment plant to provide treatment of the precipitation runoff within the CDF and groundwater collected from the gradient control system. Further study will be required to determine the extent of treatment of the CDF runoff.

Dredging Operations

Dredging would be performed using a closed bucket mechanical dredge. The dredged material would be loaded onto barges or scows which would be then moved to the disposal area. Next, dredged material would be loaded into trucks at the CDF rehandling area (Figure 24). The trucks would then transport the dredged material to the CDF by use of haul roads placed around the site and on top of the dikes. Alternate methods of transport, such as use of a conveyor system or pumping through pipes,

may be considered during the detailed design phase.

Dredged material would be placed in the CDF in lifts of approximately 3 feet. Such limited lifts would promote greater efficiency of natural drying processes and greatly enhance potential gains in CDF capacity. To allow for natural drying, not more than one 3-foot lift would be placed on top of the previous lift in each cell. Lifts would continue to be placed until 3 to 4 feet of freeboard remained, at which time the containment dikes would be raised. An estimate of anticipated dredging requirements for the period of analysis is given in Table 17.

Each cell would be graded towards a dewatering sump to avoid ponding of water. Placement would begin at the high end of each cell and continue towards the sump. The first placement of dredged material is expected to be "windrowed" on the bottom of the CDF. Windrows are long parallel piles with space in between for vehicle access. Dump trucks would drive into the CDF and place the dredge material on the bottom in rows 3 to 4 feet high. Subsequent lifts would be windrowed if possible or dumped from the edge and mechanically distributed.

During the first year of CDF construction, the southwest cell dikes would be completed. In the second year, dredged material would be placed in the southwest cell while the dikes were being constructed in the southeast and north cells. Dredged material would be placed in the southeast and north cells during the third year, while the existing dredged material in the southwest cell was managed to promote drying and consolidation. Placement of dredged material would then be alternated between the southwest cell one year and the southeast and north cells the following year over the next 7 years. No dredging would be undertaken in the following year. Dredging and disposal would be subsequently completed on a 4-year cycle until the three cells were filled to capacity, which would occur about year 2030, and then capped with clay. This cycle would consist of rotating the disposal on an annual basis between the three cells followed by 1 year of no dredging in the fourth year. The cell for the TSCA materials would be constructed prior to the year 2005, and filled with PCB dredged materials from Reaches 6 and 13.

Operations and Maintenance

Slurry Wall

Maintenance of the slurry wall is not expected to be required. Based on current knowledge of the contaminants and the stratigraphy at the ECI site, it is not anticipated that there will be either chemical or physical stability problems with the slurry wall. Prior to construction, additional investigations will be undertaken to document the compatibility of the slurry wall materials with the soils and contaminants at the ECI site.

Table 17 Estimated Dredge Material Quantities by Channel Reach for the Selected Plan, Thousands of Cubic Yards[3/]

Channel Reach No.	Channel Reach Description	Years 2000-2010	Years 2011-2030	Total
1	Outer Harbor Approach Channel	49	370	419
2	Outer Harbor Approach Channel	377	387	764
3	Anchorage & Maneuver Basin	102	223	325
4	Anchorage & Maneuver Basin	505	380	885
5	Canal Entrance Channel	9	149	158
6	Inner Harbor Channel	0	16	16
7	Inner Harbor Channel	5	22	27
8	Inner Harbor Channel	117	111	228
9	Inner Harbor Channel	115	82	197
10	Lake George Branch	10	20	30
11	Lake George Branch	46	47	93
12	Lake George Branch	74	35	109
13	Calumet River Branch, Lower Reach	180	42	222
R03	Inland Steel Hopper & Stone Docks	57	117	174
R04	Inland Steel Dock No. 4 & Adjacent Dockface[1/]	417	105	522[2/]
R05	Inland Steel Dock No. 2	11	15	26
L05	LTV Steel Ore Dock	26	24	50
R06	Inland Steel Consent Decree Dockface	7	3	10
L06	PCB Hot Spot	14	5	19
R07	Inland Steel Dock No. 3	8	7	15
R08	Inland Steel Consent Decree Dockface	139	20	159
L11	Amoco Oil Company Dock	5	2	7
U13	Calumet River Branch, PCB Hot Spot	172	48	220
Totals		2,445	2,230	4,675

1/ Includes both berthing areas and Consent Decree dockfaces.
2/ Includes both Berthing areas and Consent Decree dredging.
3/ Source: Appendix Q, Sedimentation Investigation and Dredging Plans.

Warranty of the barrier wall construction work will be a function of the contract under which the work is done and up to a contracting party to seek a warranty.

Gradient Control

It is estimated that removal of 21 million gallons of groundwater from within the slurry wall would be required to provide an initial 2-foot drawdown and establish the inward gradient. This could be accomplished over a 1-year period. It is further estimated that well pumpage averaging 700 gallons per day of groundwater seeping through the slurry wall would be

required to maintain the inward gradient. This maintenance pumping would be required during the filling of the CDF and the subsequent 30-year RCRA post-closure monitoring period. An estimated 16 to 17 million gallons would be removed during this period.

Infiltration into the groundwater within the slurry wall will occur due to precipitation. It is estimated that infil-tration will average on-the-order of 36,000 gallons per day per CDF cell prior to placement of dredged material. Once a 3-foot layer of dredged material is in-place, infiltration will be significantly reduced, to an estimated 430 gallons per day per CDF lobe. Total infiltration over the life of the project is estimated at about 134 million gallons. This volume of ground-water will have to be removed from within the slurry wall to maintain the inward gradient. Precipitation runoff within the CDF during the period of filling is expected to range between 360 and 390 million gallons.

Dredged Material Management. Substantial effort will be required to manage the dredged material within the CDF to promote drying and consolidation. It is proposed to use the dewatering by progressive trenching method as outlined in EM 1110-2-5027, "Confined Disposal of Dredged Material". A combination of perimeter dragline trenching operations and parallel interior trenching would be used. A detailed management plan will be developed in the design memorandum phase.

Monitoring Activities. Various monitoring activities will have to be undertaken in connection with the dredging and disposal operations, including a 30-year RCRA post-closure monitoring in connection with the operation of the CDF. Appendix N, Monitoring Plan, outlines the required monitoring activities.

Health and Safety Program

Monitoring Program. The sediment to be dredged contains chemical compounds in concentrations which could be harmful to workers either through skin contact or inhalation of released vapors or dusts. Therefore, an appropriate project safety and health program will be established and implemented. This program will be based upon the analysis of environmental data collected in the project area which should include:

- Representative sampling and chemical analysis of the sediment prior to the start of construction so that worker-protection alternatives may be studied and developed.

- High-volume air sampling conducted at various locations throughout the project area to determine "work zones", as well as to measure the effect of operations on the surrounding community.

- Personal air monitoring to identify work assignments which pose the highest risk to worker health and safety. In

addition, the results of personal air monitoring will indicate the level of protection required for any particular task on the site, or at which times levels of protection must be tightened or may be relaxed.

Appendix S, Safety and Health, discusses the safety and health issues to be considered in planning the proposed Indiana Harbor and Canal dredging projects.

Personal Protective Equipment (PPE)

It is considered that at least Level C dress-out (e.g., protective coveralls, gloves and a face respirator) would be required during the initial stages of the project for all workers involved in sediment dredging, hauling, dumping, and processing operations. Acceptable air quality monitoring results could lead to the relaxation of respirator requirements. However, chemical resistant suit requirements would not be relaxed for those workers subject to contact with the sediment. A very limited probability exists that Level B dress-out (e.g., self-contained breathing apparatus) may be required at some time during the project.

Decontamination

All workers who enter a "hot" zone must be decontaminated prior to exiting the site. Decontamination is carried out by teams who are wearing PPE at a level equal to that of the site worker they are assisting. Decontamination team members become contaminated during the course of their duties and must decontaminate themselves prior to entry into lesser contaminated areas. Attachment 6 of Appendix S illustrates typical decontamination schemes and provides a list of equipment needed to support the decontamination process.

As with personnel, all tools, vehicles, and other equipment entering a contaminated area must be decontaminated prior to being released into non-contaminated areas. Therefore, cost considerations must be made for decontamination of equipment and replacement costs for items which cannot be adequately decontaminated.

Cost Estimating

The estimates of project costs contained in this report reflect the impacts of using personal protective equipment, the need for worker and equipment decontamination, and the associated reduction in worker productivity.

SUMMARY OF COSTS AND BENEFITS

First Costs

Table 18 summarizes the estimated first costs of the selected plan based on a detailed M-CACES estimate contained in Appendix K, Cost Estimates. The costs in Table 18 reflect October 1997 price levels.

Table 18 Estimated First Cost, Selected Plan[1/]

Item	Estimated Cost
Dredging	
Federal Channel, 3,693,000 CY 2/	$61,368,000
Non-Federal Berthing/Dockfaces, 982,000 CY 2/	16,318,000
Subtotal, Dredging	77,686,000
Confined Disposal Facility Features	
Dike Systems	14,785,000
Seal Dike Base	2,835,000
Earth Cap	18,666,000
CDF Surface Drainage System	103,000
Water Treatment System (76%)	6,936,000
Subtotal, CDF Features	43,325,000
Total, Dredging/CDF Features	121,011,000[3/]
RCRA-Related CDF Features	
Slurry Wall	$ 3,978,000
Seal Peripheral Areas & Erosion Control	6,094,000
Hydraulic Gradient Control	1,260,000
Water Treatment System (24%)	2,190,000
Subtotal, RCRA Features	13,522,000
CSX Railroad Spur Relocation4/	1,348,000
Subtotal, RCRA Related CDF Features & Relocations	14,870,000[5/]
Lands and Damages3/	43,000
Total Cost	135,924,000[3/]

1/ October 1997 price levels.
2/ See Tables 17 and 23.
3/ See Table K-11, Appendix K, Cost Estimates.
4/ Cost of CSX R.R. spur relocation is included under the slurry wall cost estimate in Table K-10, Appendix K, Cost Estimates. Spur relocation would occur prior to, or concurrent with, the slurry wall construction.
5/ See Table K-10, Appendix K, Cost Estimates.

Annual O&M Costs

Table 19 summarizes the estimated annual operation and maintenance (O&M) and post CDF closure costs for the selected plan.

Table 19 Summary of Estimated Annual Pre-and Post-CDF Closure O&M Selected Plan[1/]

Item	Amount[2/]
Pre-CDF Closure	
Water Treatment System	$ 1,801,300
Gradient Control	
Pumping	1,300
Sample Collection	4,600
Analytical Testing	40,000
Groundwater Monitoring	
Sample Collection	14,000
Analytical Testing	183,200
CDF Surface Water Collection	
Pumping	6,700
Sample Collection	6,200
Analytical Testing	52,600
Erosion Control Repair, Mowing	4,200
Dredged Material Management	205,800
Air Monitoring Plan Implementation	33,300
Totals	2,353,200
Post-CDF Closure	
Water Treatment System	111,000
Gradient Control System	
Pumping	700
Treatment Surcharge	2,000
Sample Collection	2,300
Analytical Testing	20,000
Groundwater Monitoring	
Sample Collection	7,000
Analytical Testing	91,600
Erosion Control Repair, Mowing	2,100
Totals	236,700

1/ October 1997 price levels.
2/ Source: Tables K-12 and K-13, Appendix K, Cost Estimates.

Comparison of Costs and Benefits

Table 20 summarizes the comparison of annual costs and annual benefits for the selected plan. The overall economic analysis which was completed for this report is contained in Appendix B, Economic Analysis and is summarized earlier in the report on pages 80 to 82. The data in Table 19 shown that the selected plan is economically justified by a wide margin.

Table 19 shows that there are estimated annual post-CDF closure O&M costs of $236,700. These costs are primarily associated with the operating and monitoring requirements of the RCRA-related CDF features. According to Appendix B, Economic Analyses, page 12, under the without project condition, the navigation channel would be 5 feet shallower than the authorized project depth by year 2029. Under the with project condition, the navigation channel is near authorized depth in most reaches. It would take a number of years for sediment in the channel to build-up again assuming no maintenance dredging once the CDF is filled. At the end of 50 years the channel depth would be two to three feet less than authorized depth as indicated in Table Q-25, Appendix Q, Sedimentation Investigation and Dredging Plans.

Benefits would accrue to navigation for some period of time after the CDF is closed due to the dredging and confinement of sediments during 33-year construction period. The results of the sedimentation model analysis for project years 35 to 60 could be incorporated into the benefit analysis and the O&M costs after CDF closure compared to the continuing benefit stream from the closed facility and net benefits and average annual benefits tabulated for years 35 to 60. It is likely that the benefits after closure substantially out weigh the annual O&M costs. Since the economic benefits after closure are not needed for project justification, these benefits and the corresponding O&M costs have not been included in the economic analysis.

PLAN IMPLEMENTATION

AUTHORIZED LOCAL COOPERATION REQUIREMENTS

There were only two previous applicable requirements of local cooperation in connection with the continued operation and maintenance of the Federal navigation project at the Indiana Harbor and Canal (IHC). These items of local cooperation were authorized by the River and Harbor Act of July 14, 1960. They require local interests to hold and save the United States free from damages due to maintenance of the authorized improvements, and provide and maintain depths in berthing areas adjacent to iron ore and stone docks commensurate with the depths provided in the project area. There were no requirements in previous legislation regarding the Federal navigation project at the IHC for local interests to provide lands, easements, and rights-of-way or containment dikes for dredged materials from the IHC.

Table 20 Comparison of Costs and Benefits, Selected Plan

Item	Amount
Construction Costs	
Dredging[1/]	$ 77,686,000
Confined Disposal Facility[1/]	43,325,000
RCRA-Related CDF Features[1/2/]	13,522,000
Lands and Relocation[1/]	1,391,000
Subtotal	135,924,000
Interest during Construction[3/]	3,480,000
Total Investment	139,404,000
Annual Costs	
Interest and Amortization[3/]	$ 4,981,000
O&M Pre-CDF Closure[3/]	1,867,000
Total Annual Costs	6,848,000
Annual Commercial Navigation Benefits[4/]	$ 14,333,000
Net Benefits	$ 7,485,000
Benefit-Cost Ratio	2.1

1/ From Table 18.
2/ Costs of RCRA-Related CDF Features were added to the economic analysis in September 1998 after the ASA(CW) Memorandum, dated September 17, 1998, determined that the RCRA actions are considered to be dredged material disposal activities associated with the CDF which is a general navigation facility (GNF).
3/ From Table B-39A, Appendix B, Economic Analysis. Based on October 1997 prices, a project life of 34 years, a 7.125 percent interest rate and the construction sequence shown on Table K-15 Appendix K, Cost Estimates.
4/ From Table B-36A, Appendix B, Economic Analysis.

LANDS, EASEMENTS, RIGHTS-OF-WAY, AND RELOCATIONS

The ECI site is presently owned by the East Chicago Waterway Management District, the local project sponsor. The sponsor will be responsible for providing all lands and accomplishing all relocations required for construction of the CDF and performance of the dredging operations. This responsibility includes acquiring any real property interests needed and providing authorization for entry to the United States.

APPORTIONMENT OF COSTS

Section 201 of the Water Resources Development Act of 1996 (WRDA 96) provided legislation as a basis for cost sharing on CDF construction, as discussed in a previous section of this report titled, Water Resources Development Act of 1996, beginning on page 110. The the CDF cost sharing provisions of WRDA 96 require that a non-Federal project sponsor contribute 25 percent of the cost of the CDF during construction and an additional 10 percent of the cost of the CDF over a period not to exceed 30 years, but with the value of lands, easements, rights-of-way and relocations credited against this additional 10 percent payment.

In a September 17, 1998 memorandum for the Director of Civil Works, the Assistant Secretary of the Army for Civil Works [ASA(CW)] provided guidance on the cost sharing that should be applied to the confined disposal facility at the ECI site. This guidance, which supersedes the previous guidance provided by the ASA(CW) on May 21, 1993 (see page 104), is as follows:

"... Section 201 of the Water Resources Development Act (WRDA) of 1996, established a cost sharing policy for CDFs needed for project maintenance. We have also been informed that the ECI site represents the least-cost, environmentally acceptable site for the disposal of dredged material. Accordingly, prior guidance is no longer applicable. Instead, you should treat all site development features as dredged material disposal features, including those features, such as the slurry wall and gradient pumps necessary to meet the requirements of RCRA. However, any additional response actions required for contaminants reglated under the Comprehensive Environmental Response, Compensation, and Liability Act should not be considered dredged material disposal features but should be a non-Federal responsibility."

The ASA(CW) memorandum further states:

"You should allocate the construction, operation and maintenance cost for the subject CDF between the disposal of material from the Federal channel and the disposal of other material, such as material from berthing areas. The former costs should be shared with non-Federal interests in accordance with Section 201 of WRDA 1996, while non-Federal interests should bear all of the latter costs."

The RCRA features of the CDF are treated as dredged material disposal site development features in the recommended CDF plan in accordance with the ASA(CW) guidance quoted in the previous two paragraphs. The RCRA features are integral to the design, construction, economic analysis and cost sharing of the CDF. However, the designation of the RCRA features has been retained in Tables 18 and 20 and in the M-CACES cost estimate (Appendix K, Cost Estimates) to assist the local project sponsor, the Indiana Department of Environmental Management (IDEM) and the U.S. EPA to: (1) identify the specific project features which assure RCRA closure and corrective action compliance on parcels I, IIA and IIB of the ECI site, and (2) to identify the specific RCRA action

costs that can be funded out of the trust fund established by a Federal District Court consent decree in connection with environmental claims by the U.S. EPA and the IDEM against the ECI estate. The trust fund would be a major source of revenues for the local project sponsor to meet its local cooperation cash requirements.

Table 21 summarizes the apportionment of costs between Federal and non-Federal interests of implementing the selected plan. Table 22 summarizes the allocation of the estimated volume of material to be dredged over the life of the project to the various project elements/responsible parties, i.e., Federal navigation channel/U.S. Army Corps of Engineers (Federal); berthing areas/ dock operators (non-Federal); and Consent Decree dockfaces/Inland Steel Company (non-Federal). Table 22 also shows an apportionment of the cost of dredging and CDF construction between Federal and non-Federal interests on a proportionate use basis.

As indicated on page 63 of this report under the description of Alternative 3, the Inland Steel Company entered into a Consent Decree to undertake selected sediment remediation activities totalling $17.5 million in the Indiana Harbor and Canal. The inflated present worth of the Consent Decree funding requirement is in excess of $19 million. The remediation activities are to take place within Inland's one-half of the harbor and canal (centerline of Federal channel to Inland's dockfaces) from the entrance of the harbor upstream to Cline Avenue.

Table 22 indicates that there are an estimated 567,000 CY of potential Consent Decree dredging in the Cooperative Dredging Program. This represents a one-time complete dredging of all Consent Decree areas between the Inland dockfaces and the Federal navigation channel. The total cost of completing this potential Consent Decree work under the proportionate use option is $16.4 million, pro-rated, $7.0 million for purchasing disposal space within the CDF, and $9.4 million for dredging. The $16.4 million could be funded within the present Inland Consent Decree funding requirement.

Revised Apportionment of Costs

As a result of the 60-day public and agency review of the Final CMP/EIS from October 16, 1998 through December 12, 1998, the Inland Steel Company provided the following comment in a letter dated December 17, 1998:

"Figure 14 on Page 63 overstates the area of the Ispat Inland "berthing area" in Reaches 2 and 3. The area (shown in red) is irregularly shaped and approximately 3,000 feet long and 500 feet wide, whereas the "dock face area" as defined in the Consent Decree is only 2,000 feet long and 30 feet wide. This overstatement appears to greatly increase the volume apportioned to Ispat Inland."

Table 21 Apportionment of Costs between
Federal and Non-Federal Interests for the Selected Plan

Item	General Navigation Facilities Federal	General Navigation Facilities Non-Federal	Non-Federal Berthing Areas	Non-Federal Consent Decree Areas	Totals
Dredging Costs[1]					
Federal Channels (79%)	$61.4	-	-	-	$61.4[2]
Non-Federal Channels (21%)	-	-	$6.9	$9.4	16.3[2]
CDF Costs[2]					
Construction					
Federal Channels (79%)	33.7 (75%)	11.2 (25%)	-	-	44.9
Non-Federal Channels (21%)	-	-	5.1	6.8	11.9
Lands/Relocations[4]					
Federal Project (79%)	-	1.1	-	-	1.1
Non-Federal Channels (21%)	-	-	0.1	0.2	0.3
Repayment					
10% Fed Project Construction	-4.5	4.5	-	-	-
Fed Project Lands/Relocations	1.1	-1.1	-	-	-
Subtotal, Repayment	-3.4	3.4	-	-	-
Totals, CDF Costs	30.3	15.7	5.2	7.0	58.2
Totals, Dredging and CDF	91.7	15.7	12.1	16.4	135.9

1/ Estimated Federal Channel materials is 3,693,000 CY or 79% of total; estimated non-Federal channel materials is 982,000 CY or 21% of the total.

2/ CDF costs are allocated between the Federal project and non-Federal channels in the same proportion as dredging costs (79%/21%). Total costs of $56.8 million include Table 18 costs for CDF features, $43.3 million, and costs for RCRA-Related CDF Features, $13.5 million.

3/ See Table 18.

4/ Includes Table 18 cost for CSX Railroad spur relocation, $1,348,000, and cost of land damages, $43,000.

Table 22 Apportionment of Dredging and CDF Costs for the Selected Plan - by Federal and Potential Non-Federal Users

Item	Federal Channel (GNF)	Inland Steel Berthing Area	Inland Steel Consent Decree	LTV Steel Berthing Area	Amoco Berthing Area	Total
Allocation of Dredging Material Volume, 1,000 CY[1]						
Reaches 1-13	3,473					3,473
Reach R03		139	35			174
Reach R04		159	363			522
Reach R05		26				26
Reach L05				50		50
Reach R06			10			50
Reach L06				19		19
Reach R07		15				15
Reach R08			159			159
Reach L11					7	7
Reach U13	200					200
	3,693	339	567	69	7	4,675
Apportionment Based on Proportionate Use, $ Million						
CDF Cost	46.0[2]	4.2[3/4]	7.0[3/4]	0.9[3/4]	0.1[3/4]	58.2
Dredging Cost[5]	61.4	5.6	9.4	1.2	0.1	77.7
Total Costs	107.4	9.8	16.4	2.1	0.2	135.9

1/ Based on allocation of dredge material quantities shown in Table 17.
2/ See Table 21: General Navigation Facilities, Total CDF Costs ($30.3M, Federal; $15.7M, non-Federal).
3/ Based on unit price of $12.42 per cubic yard [$12.2M ($58.2M - $46.0M)÷982K cy (339K+567K+69K+7K].
4/ $4.2M=339,000cy X $12.42/cy; $7.0M=567,000cy X $12.42/cy; 0.9M=69,000cy X $12.42; and $0.1M=7,000cy X $12.42.
5/ Based on unit price of $16.62 per cubic yard ($77.7 M ÷ 4,675 M cy).

The Inland berthing and consent decree areas in Reaches 2 and 3 were modified in response to this comment, as shown in Figure 26. In addition, the apportionment of dredging and CDF costs contained in Table 22 have been modified, as shown in Table 22A. A total of 290,000 cubic yards of dredged materials identified in Table 22 as "Inland Steel Berthing Area" materials have been reallocated to "Other Potential Users" in Table 22A. Other potential users could include non-Federal interests located along the Grand Calumet River upstream of the Indiana Harbor and Canal which may be required to dredge and dispose of contaminated sediments in the river for which they may be responsible. The 290,000 cubic yards could have been reallocated as "Inland Steel Consent Decree" materials in Table 22A. However, sufficient funds do not exist under the Inland Consent Decree funding cap to complete dredging and disposal of this volume of dredged materials. See narrative on pages 62 and 64 under the section titled Alternative 3 - Cooperative Dredging Program for discussion of the Inland Consent Decree.

Annual O&M Costs

Table 19 summarizes the estimated average annual operations and maintenance (O&M) costs for both pre-CDF closure ($2,353,200) and post-CDF closure ($236,700) conditions. As discussed on page 111, the Federal share of the CDF O&M costs is to be determined in accordance with section 101(b) of the 1986 Water Resources Development Act. Under section 101(b), the Federal government assumes 100 percent of the O&M costs associated with the general navigation facilities at Federal harbor projects which have authorized project depths of 45 feet or less. The authorized project depths at Indiana Harbor and Canal range from 22 to 29 feet. Therefore, the United States would pay 100 percent of the O&M costs associated with the CDF (general navigation facility) in accordance with provisions of section 101(b).

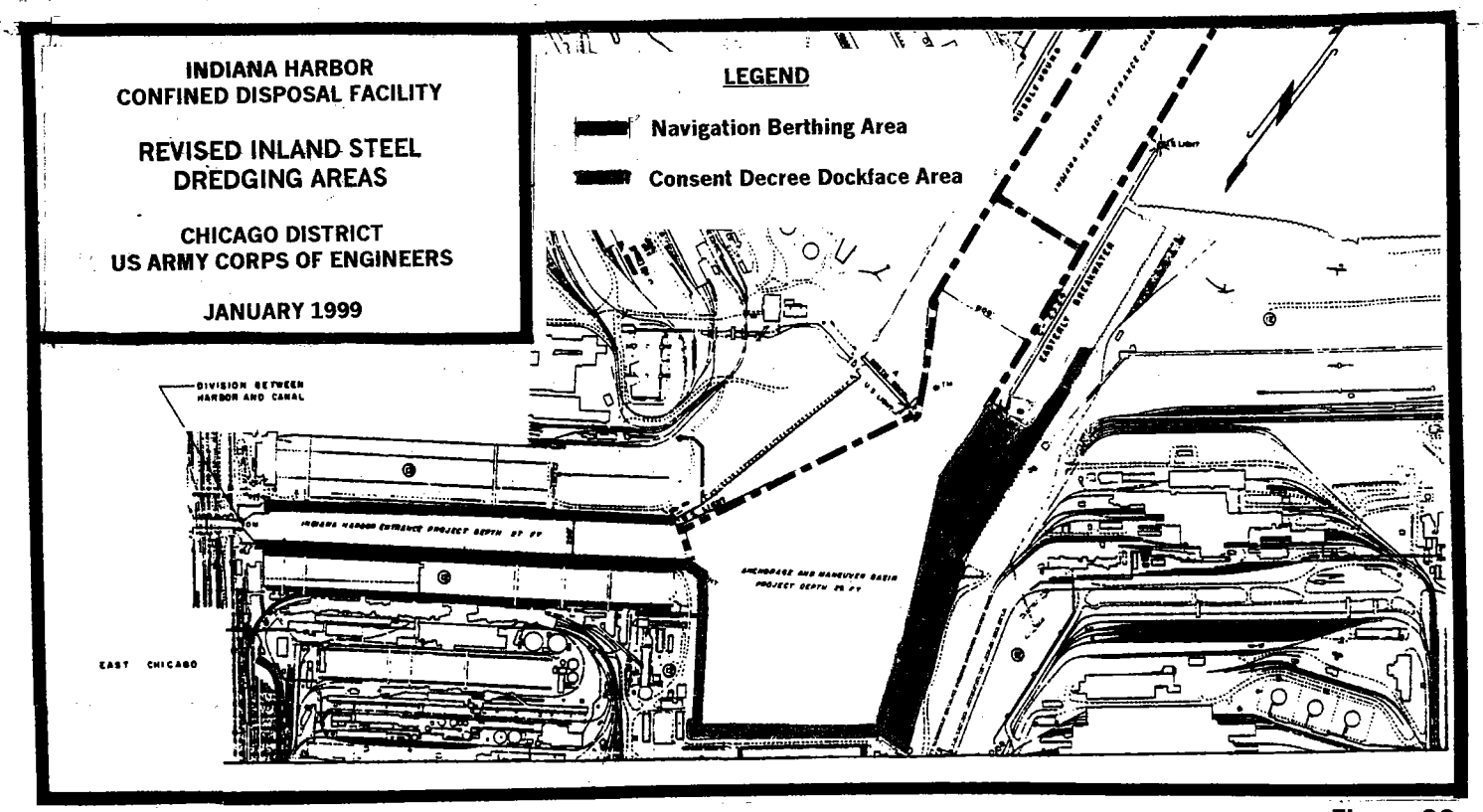


Figure 26

Table 22A Revised Apportionment of Dredging and CDF Costs for the Selected Plan - by Federal and Potential Non-Federal Users (Revised 01-08-99)

Item	Federal Channel (GNF)	Inland Steel Berthing Area	Inland Steel Consent Decree	LTV Steel Berthing Area	Amoco Berthing Area	Other Potential Users	Total
Allocation of Dredging Material Volume, 1,000 CY[1/]							
Reaches 1-13	3,473						3,473
Reach R03		8	35			131	174
Reach R04		0	363			159	522
Reach R05		26					26
Reach L05				50			50
Reach R06			10				50
Reach L06				19			19
Reach R07		15					15
Reach R08			159				159
Reach L11					7		7
Reach U13	200						200
	3,693	49	567	69	7	290	4,675
Apportionment Based on Proportionate Use, $ Million							
CDF Cost	46.0[2/]	0.6[3/4/]	7.0[3/4/]	0.9[3/4/]	0.1[3/4/]	3.6[3/4/]	58.2
Dredging Cost[5/]	61.4	0.8	9.4	1.2	0.1	4.8	77.7
Total Costs	107.4	1.4	16.4	2.1	0.2	8.4	135.9

1/ Based on allocation of dredge material quantities shown in Table 17.
2/ See Table 21: General Navigation Facilities, Total CDF Costs ($30.3M, Federal; $15.7M, non-Federal).
3/ Based on unit price of $12.42 per cubic yard [$12.2M ($58.2M - $46.0M) 982K cy (339K+567K+69K+7K].
4/ $0.6M=49,000cy X $12.42/cy; $7.0M=567,000cy X $12.42/cy; 0.9M 69,000cy X $12.42; and $0.1M=7,000cy X $12.42; and $3.6M=290,000cy x $12.42/cy.
5/ Based on unit price of $16.62 per cubic yard ($77.7 M ÷ 4,675 M cy).

The CDF O&M costs would be apportioned on the basis of the ratios of the estimated total volumes of dredged materials from the Federal channel (general navigation facility) and from non-Federal sources to the total capacity of the CDF, as shown in Table 21. These ratios are as follows: Federal, 79 percent and non-Federal, 21 percent. Therefore, the United States would pay 79 percent of the estimated annual CDF O&M costs and non-Federal interests would contribute 21 percent annually.

RCRA LIABILITY

Under existing RCRA regulations both the owner of the ECI site, presently the East Chicago Waterway Management District, and the U.S. Army Corps of Engineers would be considered operators of a RCRA facility if a CDF were constructed on the ECI site. However, in his September 17, 1998 memorandum (see pages 125-126), the Assistant Secretary of the Army for Civil Works indicated that any additional response actions (beyond the proposed ECI site development features) for containments regulated under the Comprehensive Environmental Response, Compensation, and Liability Act should not be considered dredged material disposal features but should be a non-Federal responsibility. Accordingly, provisions are to be included in the project cost sharing agreement for this project which make additional response actions a non-Federal responsibility.

While the likelihood of a significant leak of contamination from a well-designed, constructed and managed CDF is remote, the Chicago District has evaluated the worst case financial liability associated with construction of a CDF at the ECI site.

If a CDF were constructed at the ECI site and it was determined in the future that some contamination was migrating off-site through the slurry wall, the worst case mitigation requirements that would be required if the slurrywall experienced a major, widespread failure, construction of another slurry wall around the perimeter of the existing one could be undertaken as the mitigation measure at a cost of approximately $6.6 million. If the slurry wall experienced a limited failure, the point of failure would be located and isolated repairs undertaken or the inward gradient control pumpage could be increased at much less cost.

Liability Risk Analysis

The CDF slurry wall is designed to prevent the movement of contaminated material off the site through the groundwater. Potential slurry wall problems could be associated with the excavation or installation procedures, or unforeseen subsurface conditions. It is expected that any adverse impacts due to construction or installation problems would be localized and observable through the proposed monitoring well program and in increased groundwater pumping within the slurry wall. Subsurface conditions are being thoroughly analyzed in the detailed design phase.

Under the worst case conditions, it is assumed that the slurry wall would experience a major, widespread failure, requiring construction of another slurry wall around the perimeter of the existing one necessitating expenditure of an additional $3.98 million. If the slurry wall experienced a limited failure, the point of failure would be located and isolated repairs undertaken or the inward gradient control pumpage could be increased.

The probability of slurry wall failure in any given year is unknown. Therefore, for the purpose of a risk analysis a range of probabilities was considered. Monte Carlo simulation techniques were used with normally distributed probability functions having means of 0.001, 0.005, and 0.01. These probability simulations were then applied to the cost of total slurry wall replacement ($3.98 million) and to an assumed cost of $1 million for limited repairs over the 62-year life of the project (32 years CDF operation plus 30 years monitoring) to determine the potential weighted liability cost of slurry wall failure. The mean forecast values after 1,000 trials are shown in Table 23.

While the true probability of possible slurry wall failure is unknown, it is considered that the possibility of total failure would be extremely remote. Some method of developing an emergency repair fund to undertake limited repairs will be discussed with local interests during the detailed design phase.

Table 23 Weighted Liability Forecast Values for Assumed Slurry Wall Failure

Item	Failure Assumption					
	Total	Failure	($3.98M)	Limited	Failure	($1M)
Mean Probability	0.001	0.005	0.01	0.001	0.005	0.01
Net Present Value	$49,400	$246,900	$682,200	$11,496	$57,481	$114,963
Average Annual Value[1/]	$3,600	$ 17,800	$ 49,300	$ 830	$ 4,200	$ 8,300

[1/] Based on a 7-1/8 percent interest rate and project life of 62 years.

LOCAL COOPERATION REQUIREMENTS

The specific items of local cooperation which must be accomplished by non-Federal interests in connection with the tentatively selected plan are outlined in the Recommendation sectionof this report. Prior to initiation of construction, a non-Federal public agency will be required to enter into a written project cost sharing agreement with the United States, agreeing to provide the required items of local cooperation.

The Indiana General Assembly established the East Chicago Waterway Management district as of July 1, 1994. This Indiana governmental entity will be able to: (1) serve as title holder to the ECI property; (2) act as a local sponsor for any agreement with the Corps of Engineers; (3) be fiduciary for the management of any funds set up in trust to fund activities contemplated at the ECI site; and (4) undertake planning and management functions for the IHC and adjacent lands. The law defines the district itself as all the territory within one-half mile on either side of the center line of any waterway within the city, making the primary interest and jurisdiction of the district board of directors the Indiana Harbor, and Canal and its surrounding territory. The board of directors first meeting was held on July 26, 1994. The District Engineer will work with this local agency in developing and operating the ECI site CDF.

It is considered that the East Chicago Waterway Management District (ECWMD) has the authority and financial capability to be the local sponsor for this project. The ECWMD has the authority to acquire the lands, easements, and rights-of-way needed for the project. The ECWMD may request appropriation of funds by the Indiana state legislature to assist in funding the non-Federal share of the costs of constructing the general navigation facilities. In addition, the ECWMD may use funds from the ECI Trust established as a result of a Federal District Court Consent Decree settlement in connection with environmental claims filed by the U.S. EPA and the IDEM against the ECI estate. The purpose of the trust includes the preparation of the ECI site for the construction, operation and maintenance of a confined disposal facility by and consistent with the plans of the U.S. Army Corps of Engineers' project for such a facility.

The ECWMD may acquire property interests needed for the proposed project. The ECWMD also has the authority to enter into agreements with, and receive funds from, other non-Federal interests to accomplish the dredging in berthing areas and along dock faces and provide for the disposal of the dredged materials.

SUMMARY AND CONCLUSIONS

The following items summarize the general conclusions of the Comprehensive Management Plan investigations:

- The sediments in the IHC are heavily polluted and not suitable for open water disposal.

- The IHC has not been dredged since 1972 because of a lack of an environmentally and locally acceptable dredged material disposal plan.

- The IHC navigation channels need to be dredged; commercial deep-draft navigation is sustaining increased waterborne transportation costs of over $14.7 million annually.

- Over the past 23 years, an extensive analysis has been completed of alternative confined disposal facilities, sediment treatment technologies, dredging plans and dredging methods.

- Disposal of dredged materials in an upland CDF (CDF) is the most economical, environmentally compatible, and politically acceptable alternative.

- Use of the ECI site for location and operation of a CDF is far less expensive and much more environmentally acceptable than using a clean upland site.

- The ECI site presently has open RCRA status. Use of this site for construction and operation of a CDF by the U.S. Army Corps of Engineers would be contingent upon the necessary RCRA closure/corrective actions being undertaken.

- The alternative dredging plans which maximize net benefits provide for maintenance dredging of the entire Federal navigation project.

- Dredging Alternative 3 - Cooperative Dredging Program, as modified during the fifth phase of plan formulation, maximizes net benefits, provides for significant benefits to commercial navigation and accommodates both the Inland Consent Decree dredging desired by the U.S. EPA and the IDEM and dredging in commercial navigation berthing areas adjacent to the Federal channel.

- Continued maintenance dredging of the IHC is economically justified by commercial navigation benefits by a wide margin. Net benefits are estimated at $7.5 million; and the benefit-cost ratio is 2.1 to 1.0 based on October 1997 price levels.

- The U.S. EPA and the IDEM prefer a dredging plan which accommodates the Consent Decree dredging.

- The proposed CDF design will address the RCRA closure and corrective action requirements associated with the underlying sections of the ECI facility and will comply with the TSCA requirements for the disposal of PCB contaminated sediments.

RECOMMENDATIONS

In view of the results and conclusions of the Comprehensive Management Plan investigations, I recommend that the Selected Plan -Cooperative Dredging Program, as described on pages 111 to 120, be adopted and that the ECI site be approved for the development and operation of a confined disposal facility (CDF) for dredged materials at the Indiana Harbor and Canal. I further recommend that the costs of construction, lands, relocations, operations and maintenance of the CDF be allocated between the disposal of

dredged materials from the Federal navigation channel (general navigation facility) and disposal of non-Federal dredged materials, such as material from berthing areas. The costs associated with the general navigation facility should be shared with non-Federal interests in accordance with Section 201 of the Water Resources Development Act of 1996. Non-Federal interests should bear all of the costs of disposal of the non-Federal dredged materials. Prior to initiation of construction, a non-Federal public agency, legally empowered and financially capable under state law, would be required to enter into a Project Cooperation Agreement with the Secretary of the Army to provide the following items of local cooperation:

a. Provide all lands, easements, and rights-of-way, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features (including all lands, easements, and rights-of-way, and relocations necessary for dredged material disposal facilities).

b. Contribute in cash during construction, 25 percent of the cost of the confined disposal facility and pay an additional 10 percent of the cost of the disposal facility over a period not to exceed 30 years, but with the value of lands, easements, rights-of-way and relocations credited against this additional 10 percent payment.

c. Provide a pro-rated share of the operation and maintenance costs associated with the confined disposal facility over the life of the project on the basis of the estimated volume of dredged materials from non-Federal sources, presently estimated at 21 percent of the total estimated capacity of the CDF;

d. Provide, operate, maintain, repair, replace, and rehabilitate, at its own expense, the local service facilities, including adequate berthing areas at the deep-draft navigation docks with depths commensurate with the adjacent Federal project depth, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

e. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, except for damages due to the fault or negligence of the United States or its contractors;

f. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easement, or rights-of-way that the Federal Government determines to be necessary for the construction,

operation, maintenance, repair, replacement, or rehabilitation of the general navigation features. However, for lands the Government determines to be subject to the navigation servitude, only the Government shall perform such investigation unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

g. Assume complete financial resonsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features,

h. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA;

i. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army;"

j. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and right-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

k. Provide a cash contribution equal to the non-Federal cost share of the project's total historic preservation mitigation and data recovery costs attributable to commercial navigation that are in excess of 1 percent of the total amount authorized to be appropriate for commercial navigation.

l. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

m. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as will properly reflect total cost of construction of the general

navigation features, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments at 32 CFR, Section 33.20;

n. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government; and,

o. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the general navigation features for the purpose of inspection, and, if necessary, for the purpose of operating, maintaining, repairing, replacing, and rehabilitating the general navigation features.

Peter J. Rowan, P.E.
Lieutenant Colonel, U.S. Army
District Engineer

US Army Corps
of Engineers
Chicago District

INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

EPA

FINAL ENVIRONMENTAL IMPACT STATEMENT

SEPTEMBER 1998

INDIANA HARBOR AND CANAL
DREDGING AND CONFINED DISPOSAL FACILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT

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INDIANA HARBOR AND CANAL
DREDGING AND CONFINED DISPOSAL FACILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT

ABSTRACT

The responsible lead agency for the proposed project is the Chicago District, U.S. Army Corps of Engineers. The U.S. Environmental Protection Agency, Region V, is a cooperating agency.

ABSTRACT: Maintenance dredging and construction of a confined disposal facility (CDF) are proposed to accommodate the backlog of accumulated sediment and future maintenance dredging, both within the Federal navigation and along adjacent berthing areas and dockfaces, at Indiana Harbor and Canal in Lake County, Indiana. The proposed work would involve: (1) construction of a CDF at the site of a former oil refinery in East Chicago, Indiana, (2) maintenance dredging of the channel to authorized depths, (3) disposal of dredged sediments in the CDF, and (4) routine maintenance of all navigation structures. Benefits would include more efficient use of the harbor and canal for safe commercial navigation; beneficial influences on the local economy; and a reduction in the net discharge of contaminated sediments from the waterway into Lake Michigan. Dredging and CDF construction would have some temporary and long-term environmental impacts. These are discussed in detail in the main body of this Final Environmental Impact Statement (DEIS).

SEND YOUR COMMENTS TO THE DISTRICT ENGINEER WITHIN 30 DAYS OF THE DATE GIVEN ON THE PUBLIC NOTICE.

For further information, contact:
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The revisions and additions which were made in this Final EIS to information contained in the Draft EIS are summarized in the following tabulation.

EIS Page	Paragraph Changes
xi	Third, fourth & fifth paragraphs (revised)
xii	Fifth paragraph (revised)
xv	Fourth paragrph (added)
xvii	Second paragraph (revised)
5	Para. 1.2.3.6 (added)
6	Para. 1.2.3.7 (added)
17-19	Para. 2.3.3.8 (added)
31	Para. 3.3.3.5.8 (revised)
38-39	Para. 3.4.1.1.8 3.4.1.1.12 (added)
44	Para. 3.4.2.1.4 (added)
45-48	Para. 3.4.2.7 - 3.4.2.22 (added)
51	Para. 3.4.3.4 - 3.4.3.5 (added)
67	Para. 4.2.4.3.12 (added)
72	Para. 4.3.1.2.8 (added)
77	Para. 4.3.3.3. (revised); 4.3.3.4 - 4.3.3.6 (added)
81	Para. 4.5.3.6 (added)
83	Para. 4.6.2 (added)
86	Para. 6.1.3 (added)
87	Para. 6.2.2.6.2.6 (added)

SUMMARY

MAJOR CONCLUSIONS AND FINDINGS

As required by U.S. Army Corps of Engineers guidelines and regulations, all reasonable and practical alternatives have been investigated to address the need for dredging and disposal of sediments and routine structure maintenance at Indiana Harbor and Canal. Many alternative plans are examined in detail in this Draft Environmental Impact Statement.

The U.S. Environmental Protection Agency (U.S. EPA) and the Chicago District of the U.S. Army Corps of Engineers (USACE) have performed numerous physical and chemical tests on the Indiana Harbor and Canal sediments in recent years. Based on the test results, the sediments have been determined to be unsuitable for open-lake disposal or beneficial uses. A portion of the sediments have been found to contain elevated concentrations of PCBs and are regulated under the Toxic Substances Control Act or TSCA. In addition, a portion of the sediments within the navigation channel were determined by the U.S. EPA and the Indiana Department of Environmental Management (IDEM) to be "presumptively hazardous" and subject to the provisions of the Resource Conservation and Recovery Act (RCRA). These sediments are located in the southwest corner of the anchorage and maneuver basin in the outer harbor as shown on EIS Plate 2. The USACE and the U.S. EPA have different national policies regarding the application of RCRA to dredged material. It is USACE policy that dredged material is not a solid waste, and its disposal is, therefore, not subject to the provisions of RCRA. In contrast, it is U.S. EPA policy that dredge material could require handling as a solid waste or potentially as a hazardous waste subject to the provisions of RCRA. Due to the presumed contamination in these sediments, because of elevated levels of benzene, they will not be dredged by the USACE as part of the Federal navigation project. These materials will have to be addressed by non-Federal interests as part of site-specific remedial activities which will be undertaken in the berthing/dock areas adjacent to the Federal channel. If these sediments are dredged they may require treatment in accordance with the standards under Subtitle C of the Resource Conservation and Recovery Act prior to land disposal.

A disposal facility for the dredged material does not exist. Consequently, authorized channel depths are not being maintained. Due to the high level of siltation, portions of the harbor and canal are severely restricted for navigation by deep-draft vessels. In addition, the contaminated sediments are migrating out of the harbor and canal and settling in nearshore areas of Lake Michigan.

Selected Plan

The selected plan includes construction of a confined disposal facility (CDF) on a portion of the Energy Cooperative, Inc. (ECI) property located in East Chicago, Indiana. This is the site of a former petroleum refinery, which began operations early this century. Over the years the petroleum refining activities at the ECI site resulted in extensive contamination of on-site soils and groundwater. The site acquired interim status under RCRA in 1980 and housed several RCRA hazardous waste units. Under a court order, all of the structures on the ECI site were razed in the mid-1980's, and the site was graded and covered with top soil. This surface work did not result in the proper closure of the hazardous waste units in accordance with the requirements of RCRA. In addition, because the ECI facility was still seeking a hazardous waste permit after November 8, 1984, the facility is also subject to the RCRA corrective action. RCRA corrective action requires remediation as necessary to protect human health and the environment of all releases of hazardous wastes and hazardous constituents. The RCRA closure and corrective action requirements associated with the affected portions of the site have been integrated into the proposed CDF design.

Beyond providing an accommodation for the backlog of accumulated sediments and future dredgings in the Federal navigation channel and in the adjacent berthing and dock areas, the proposed plan will fulfill several acute environmental needs.

Dredging will remove approximately 4.68 million CY of contaminated sediments from the ambient environment in Northwest Indiana and will partially mitigate the currently unrestrained migration of these materials into the near shore areas of Lake Michigan. The proposed CDF design will address the RCRA closure and corrective action requirements associated with the underlying sections at the ECI site and comply with the TSCA requirements for the disposal of PCB contaminated sediments (PCB concentration of 50 ppm or greater but less than 500 ppm). The overlapping functions of the joint use RCRA closure/corrective action measures and the CDF features, such as the slurry wall, gradient control system and CDF cap, will significantly reduce costs, resulting in notable economic saving to both the Federal government and the private sector.

The plan further provides for maintenance dredging of polluted channel sediments by closed-bucket or environmental-bucket mechanical dredging equipment with disposal of the dredged material in the CDF. Dredging would be undertaken throughout the IHC Federal navigation project to authorized project depths and widths. Dredging would also be completed in the appropriate berthing areas outside of the authorized channel limits at non-Federal expense to provide depths commensurate with those in the Federal channel. Space in the proposed CDF could also be allocated to accommodate dredged materials from the Inland Steel Company Consent Decree sediment remediation activities and other similar activities which might be required by the U.S. EPA or IDEM along the IHC.

Confined Disposal Facility

Dredged Material Disposal Facility. The CDF will be constructed on parcels IIA and IIB, as shown on EIS Plate 18. The two parcels are currently separated by a single track railroad spur which will be relocated to the north edge of the site. The CDF will occupy 83 of the 115 acres of parcel IIA, located south of the existing track, and 43 of the 53 acres of parcel IIB, located north of the track. The CDF will be constructed as three separate cells, two in the southern portion of the site and one in the northern portion. The west cell, in the southern portion of the site, will be divided to create an isolated subcell for the disposal of PCB contaminated sediments. The proposed CDF design incorporates those elements necessary for U.S. EPA Regional Administrator approval of the subcell as an alternate disposal method for PCB contaminated sediments.

EIS Plate 19 shows a cross-section through the CDF. The CDF dikes would be constructed in two stages in incremental lifts of 15, and 13 feet, respectively. The first stage earthen dikes would be constructed using off-site clean fill materials. The second stage dikes would be constructed of off-site materials beginning approximately 9 years after initial dike construction begins. The dikes would be constructed on top of a 3-foot layer of compacted clay tied into the slurry wall. The interior sideslopes of the dikes would be lined with a 3-foot layer of compacted clay tied into the bottom clay layer. On-site materials would be used to construct the initial 10-foot lift of the center cross dike separating the two cells of parcel IIA. Dried dredged material would be used to continue subsequent construction of the cross dike. The interior dikes to create the separate TSCA material cell will be constructed from dried dredged material after two complete dredging cycles.

The final 6 feet of the second stage lift would consist of clay, sand, clean fill and seeded topsoil. The clay cap would provide for the final closure of the CDF as well as for the final closure of the RCRA corrective action unit for parcels IIA and IIB. The sand would provide for drainage of precipitation runoff of the CDF. The exterior sideslopes of the dikes would also be covered with topsoil, seeded, and landscaped as the dikes are constructed to control erosion and enhance their visual appearance. An overall landscaping plan will be developed during the detailed design phase in connection with preparation of the design memorandum. In developing the plan, vegetation will have to be selected and arranged to limit its attractiveness to wildlife and birds in terms of cover and food sources provided and to prevent failure of the integrity of the clay cap which functions as a barrier to infiltration.

During the detailed project design phase, the use of alternate construction materials will be investigated in an effort to reduce overall project costs consistent with sound environmental practices. These investigations will consider a vertical

wall barrier construction technique using a flexible, chemical resistant, impermeable high density polyethylene (HDPE) membrane as an alternative to using the slurry wall. The use of coal combustion by-products such as fly ash produced at coal fired generating stations will be investigated as a potential construction material for the CDF dikes.

The recommended CDF would have a capacity of approximately 4.68 million CY. The initial 15-foot lift would have a capacity of approximately 2.5 million CY. Construction of the second lift of 13-feet would increase the CDF capacity to 4.68 million CY.

Construction and operation of the CDF will require the construction and operation of an on-site treatment plant to provide treatment of the precipitation runoff within the CDF before discharging to the canal. Further study will be required to determine the extent of treatment of the CDF runoff.

RCRA Closure/Corrective Action Features. The selected plan for the RCRA closure/corrective action features is shown on Plates EIS 8 and 9. It involves the use of ECI property parcels I, IIA, and IIB. Under this proposal, the joint use project features applicable to the underlying portion of the ECI facility and the CDF have been integrated into the proposed CDF design, and CDF maintenance and monitoring program. These technical and regulatory requirements include: the engineering requirements for the disposal of 4.68 million CY of sediment, the RCRA closure requirements for parcel I, the RCRA corrective action requirements for parcel I, IIA and IIB, and the TSCA disposal requirements for the dredged sediments associated with regulated concentrations of PCBs.

The features required to complete the RCRA closure/corrective actions at the ECI site would be built as integral parts of the CDF. These elements include: (1) a slurry wall around the perimeter of ECI parcels I, IIA and IIB extending from the ground surface down about 33 feet to the stiff clay underlying the site; (2) a clay cap on parcel I, tied into the slurry wall; (3) a groundwater gradient control system for parcels I, IIA, and IIB; and (4) installation of an on-site facility for treatment of groundwater collected from parcels I, IIA, and IIB, if needed. The CDF, when closed, would act as the final RCRA cap for parcels IIA and IIB. The groundwater collected in connection with the gradient control system would be treated and discharged to the canal. A wastewater treatment unit would be constructed on the ECI site.

Dredging Operations

Dredging would be performed using a closed-bucket or environmental-bucket mechanical dredge. The dredged material would be loaded onto barges or scows which would be then moved to the disposal area. Next, dredged material would be loaded into trucks at the CDF rehandling area (EIS Plate 18). The trucks would then transport the dredged material to the CDF by use of haul roads placed around the site and on top of the dikes. Alternate methods of transport, such as the use of a conveyor system and pumping, may be considered during the detailed design phase.

Dredged material would be placed in the CDF in lifts of approximately 3 feet. Such limited lifts would promote greater efficiency of natural drying processes and greatly enhance potential gains in CDF capacity. To allow for natural drying, not more than one 3-foot lift would be placed on top of the previous lift in each cell. Lifts would continue to be placed until 3 to 4 feet of freeboard remained, at which time the containment dikes would be raised.

Each cell would be graded towards a dewatering sump to avoid ponding of water. Placement would begin at the high end of each cell and continue towards the sump. The first placement of dredged material is expected to be "windrowed" on the bottom of the CDF. Windrows are long parallel piles with space in between for vehicle access. Dump trucks would drive into the CDF and place the dredge material on the bottom in rows 3 to 4 feet high. Subsequent lifts would be windrowed if possible or dumped from the edge and mechanically distributed.

During the first year of CDF construction, the southwest cell dikes would be constructed. In the second year, dredged material would be placed in the southwest cell while the dikes were being constructed in the southeast and north cells. Dredged

material would be placed in the southeast and north cells during the third year, while the existing dredged material in the southwest cell was managed to promote drying and solidification. Placement of dredged material would then be alternated between the southwest cell one year and the southeast and north cells the next year over the next 7 years. No dredging would be undertaken in the following year. Dredging and disposal would be subsequently completed on a 4-year cycle until the three cells were filled to capacity, which would occur between the years 2028 and 2030, and then capped with clay. This cycle would consist of rotating the disposal on an annual basis between the three cells followed by 1-year of no dredging in the fourth year. The cell for the TSCA materials would be constructed prior to the year 2004, and filled with PCB dredged materials from Reaches 6 and 13 of the Indiana Harbor Canal.

AREAS OF CONTROVERSY

The entire Grand Calumet River system, including Indiana Harbor and Canal, has been identified by the International Joint Commission as one of 43 Areas of Concern around the Great Lakes which have impaired beneficial uses. Dredging has been identified as one possible remediation method in the Stage I Remedial Action Plan (RAP), submitted to the International Joint Commission for comment and review in January 1991. However, the contaminated nature of the sediment has raised concerns from various agencies and citizens' groups over whether dredging should be done, the best dredging technique available for use, the best method for disposal of the dredged material, and the magnitude of the environmental impacts of the various alternative plans, including the no action alternative.

Causes of Shoaling

Three major sources account for sediment entering the Indiana Harbor and Canal and Grand Calumet River. Municipal and industrial discharges, combined sewer overflows, and urban runoff contribute an estimated 152,000 cubic yards (182 million pounds) of sediment to the system annually. There are 39 permitted outfalls on the canal and river which serve municipal sewage treatment plants, integrated steel manufacturing facilities, and chemical producers, among others. In addition to these controlled point sources, the sanitary districts of Gary, Hammond, and East Chicago maintain combined sewer systems which overflow into the canal and river during even light storm events.

Most of the Indiana Harbor Canal/Grand Calumet River system has reached a steady-state condition, meaning that there is a balance of sediment deposition and scour/transport. This results in a loading of 100,000 to 200,000 cubic yards of sediment to Lake Michigan from Indiana Harbor each year. The annual sediment load to the lake contains an estimated 67,000 pounds of chromium, 100,000 pounds of lead, and 420 pounds of PCBs. The adverse impacts of this loading can be seen in the surface sediments of the nearshore lake for a distance of more than five miles from the harbor. The transport and resuspension of this material in the littoral zone of the lakeshore greatly increases the exposure of sediment contaminants to the aquatic life inhabiting the area. Contaminated sediment in the littoral zone also has the greatest potential to impact man, as this area provides potable water supplies and recreational opportunities, including a sports fishery. Once contaminated sediments move from the Indiana Harbor and Canal into Lake Michigan, they are essentially beyond remediation.

Plans to Reduce Shoaling

Enforcement actions taken against dischargers by the U.S. EPA and IDEM will result in a reduction of sediment loading to the waterway. A consent decree between the U.S. EPA and the Gary Sanitary District has significantly reduced the number of combined sewer overflows contributing sediment to the canal and river.

Environmental dredging pursuant to consent decrees will also reduce the amount of sediment entering the system. Over the next several years both the USX Corporation and the Gary Sanitary District will be removing contaminated sediments from portions of the Grand Calumet River to comply with their agreements with U.S. EPA. After dredging, a substantial portion of the sediments which would otherwise have moved downstream to Lake Michigan would accumulate in these newly dredged segments of the channel. The Inland Steel Company will also dredge in areas adjacent to their docks

outside of the Federal channel. A consent decree between the U.S. EPA and LTV Steel required the company to dredge sediments from its intake water flume.

Sources of Pollution

Industrial and municipal outfalls, including outfalls from combined sewer systems, are the primary sources of pollution in the Indiana Harbor and Canal and Grand Calumet River. Studies completed by the USX Corporation pursuant to a consent decree with U.S. EPA showed sediment contamination consistent with wastes from industries discharging to the system (directly, or indirectly through sewage treatment plants and combined sewer overflows). Many of these sources lie upstream of the canal; contamination of sediments often occurs before deposition in the navigation channel.

The USX study examined sediments from the east branch of the Grand Calumet River and from the Indiana Harbor Canal. The study area also included a portion of the west branch of the river. Fully one-third of the samples contained PCBs at concentrations greater than or equal to 500 parts per million. Various metals were found at concentrations exceeding levels mandating corrective action throughout the project area.

The U.S. EPA/IDEM Northwest Indiana Action Plan establishes goals for environmental compliance in the area. The U.S. EPA and IDEM are gathering data for development of a "total maximum daily load" for pollutants entering the Grand Calumet River. This information will help to establish new, lower levels of pollutants allowed under future National Discharge Pollutant Elimination System (NPDES) permits.

The U.S. EPA and IDEM are also enforcing removal of existing contaminants from the system. A consent decree between the U.S. EPA and USX requires removal and disposal of a portion of the sediments from the river between the USX culvert and the Gary Sanitary District outfall. Another consent decree requires the Gary Sanitary District to remove a portion of the sediment from between its outfall and Cline Avenue. These projects will reduce the amount of pollutants entering the navigation channel. Dredging by the Inland Steel Company (outside the navigation channel) and by LTV (in its water intake flume) will reduce the amount of sediment entering the channel through sloughing of the channel sideslopes.

U.S. EPA Responsibility

Although the U.S. EPA and other Federal agencies are investigating contamination in Areas of Concern throughout the Great Lakes, there is no binding commitment requiring any Federal agency to take action. There are general authorities for remediation, including Section 115 of the Clean Water Act of 1977, which is specific to contaminated bottom sediments. However, there are no specific authorities or funds available to the U.S. EPA for implementation of remedial action plans.

Cleanup Authorities

The U.S. EPA does have authority to address environmental hazards posed by contaminated sediments, under the Clean Water Act, RCRA, CERCLA, and TSCA. The high background levels of contamination and mixing of contamination within the waterway limits application of these authorities. Under the Clean Water Act, for example, no courts have ordered cleanup of contaminated sediment based on discharge violations.

The Clean Water Act (33 USC 1251 et seq.) authorizes recovery of the cost of removal of contamination associated with discharges violating NPDES permits (Section 311). Under Section 309, authority may be available to order cleanup after demonstrating an imminent danger (see CERCLA discussion below).

The Resource Conservation and Recovery Act or RCRA,(42 USC 6901 et seq.) has several provisions that can be used to deal with contaminated sediments. High background contamination levels or mixing can limit the extent of remediation.

The Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA (42 USC 9601 et seq.), addresses contaminated sediments by remedial actions and removal actions; under CERCLA, the U.S. EPA can order responsible parties to perform

cleanup, or can recover the costs of cleanup (performed by the U.S. EPA) from liable parties.

The Toxic Substances Control Act, or TSCA (15 USC 2602-2671), may require removal of sediment contaminated by TSCA-regulated substances. PCBs are the primary TSCA pollutant with regard to sediment remediation.

Each of the aforementioned authorities is being used in U.S. EPA enforcement actions in the Indiana Harbor area. The State of Indiana has similar, but more limited, authorities to compel dredging by private parties.

COMPLIANCE WITH ENVIRONMENTAL STATUTES

The selected plan has been evaluated in relation to many Federal and state laws, regulations, and policies. This plan is in full compliance with the Fish and Wildlife Coordination Act of 1934, as amended; the River and Harbor Act of 1910, as amended; the Historic and Archaeological Preservation Act, as amended; the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969, as amended; the Clean Air Act, as amended; the Watershed Protection and Flood Prevention Act; the Executive Order 11990 (Protection of Wetlands); the Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations); the CEQ memorandum on Prime and Unique Farmland; the USACE operation and maintenance activities regulations (33 CFR Parts 209, 335, 336, 337, and 338); and RCRA and TSCA as cited above.

The project is in partial compliance with the Endangered Species Act of 1973; full compliance is anticipated on resolution of the "incidental taking" issue regarding the peregrine falcon (reference paragraphs 4.3.3.6 and 6.1.3).

The Coastal Zone Management Act of 1972, as amended, does not apply to the proposed project as the State of Indiana does not yet have an approved management plan. In addition, the Estuary Protection Act, Marine Protection, Research, and Sanctuaries Act, and the Wild and Scenic Rivers Act, do not apply. Floodplain and floodway maps were examined to determine that the proposed disposal site is not in the floodplain or the floodway. Therefore, the site is in compliance with Executive Order 11988 (Floodplain Management).

The Solid Waste Disposal Act was passed in 1965. In 1976, the Solid Waste Disposal Act was amended by the Resource Conservation and Recovery Act (RCRA), which was subsequently modified in 1984 by the Hazardous and Solid Waste Amendments. Subtitle C of RCRA establishes a regulatory system to track hazardous waste from the time of generation to disposal. The law requires safe and secure procedures to be used in the generation, treatment, transportation, storage and the disposal of hazardous waste. RCRA is designed to prevent the creation of new, uncontrolled hazardous waste sites. It is the policy of the USACE that dredged material is not a solid waste and its disposal is, therefore, not subject to the provisions of RCRA.

In contrast to the position of the USACE, it is the policy of U.S. EPA that sediments could require handling as a solid waste or potentially as a hazardous waste. In conformance with this policy, the U.S. EPA sampled and tested sediments from the Federal navigation channel and determined that the vast majority of the material within the limits of the Federal channel would not be subject to the RCRA requirements for hazardous wastes if dredged. However, the same sampling effort was unable to definitively conclude that the sediments located in a small section of the outer harbor were non-hazardous. Since it is USACE policy that RCRA is not applicable to dredged materials, these sediments will not be dredged by the USACE as part of the Federal navigation project.

The sediment from the small section of the harbor termed "presumptively hazardous" will be evaluated and addressed as part of the site-specific remedial activities which will be undertaken by non-Federal interests in berthing/dock areas adjacent to the Federal navigation channel. Prior to disposal in the proposed CDF, sediments that have not been adequately characterized would need to be treated to the standards provided under RCRA prior to placement in any land disposal facility.

ECI SITE RCRA ISSUES

The selected plan provides for construction of the CDF on the site of a former oil refinery which once housed hazardous waste units. These hazardous waste units were never formally closed in accordance with RCRA. Known as the ECI site, the property is also subject to the RCRA corrective action provisions. As discussed above, the RCRA regulatory requirements for the site have been incorporated into the proposed design of the CDF.

Energy Cooperative, Inc. (ECI) located in East Chicago, Indiana, notified the U.S. EPA Region 5 of hazardous waste activity on July 1, 1980. The company submitted a Part A permit application required by RCRA regulations on November 13, 1980. The permit application indicated hazardous waste storage in tanks and treatment by incineration. The hazardous waste streams listed were slop oil emulsion solids from the petroleum refining industry (KO49) and API separator sludge from the petroleum industry (KO51).

The facility had RCRA interim status for the storage and treatment of hazardous waste when ECI filed for reorganization under Chapter 11 bankruptcy in 1981. ECI later attempted to abandon the property, but the United States Bankruptcy Court, Northern District of Illinois, Eastern Division, ordered the facility to close in an environmentally sound manner and allocated funds to accomplish this task. However, the court-approved demolition of the plant did not include the closure of the hazardous waste units as required under RCRA and did not address the RCRA corrective action requirements. The court-ordered demolition activities occurred in the mid-1980's and all buildings and above ground structures were razed. The hazardous wastes identified for removal by the contractor during the court ordered closure activities were: 600 cubic yards of API separator sludge (KO51); two tanks containing a total of 2,558 barrels of KO51; two tanks totaling 61 barrels of slop oil emulsion solid (KO49); six drums of tetraethyl lead waste; and 7,000 barrels of waste gasoline. While the ECI facility's RCRA application indicated the incinerator was intended for hazardous waste disposal, the company insists that there is no evidence that the incinerator had been used for hazardous waste treatment. In addition to the tanks, storage containers, and incinerator on-site, there were several pits, sumps, and spill areas. Pumps were removed from lead pump pits and then the pits were filled. There was no testing of residuals that remained in the pits. After the above ground structures were removed, the site was graded and several inches of clean top soil were placed on the site.

The U.S. EPA and the Indiana Department of Environmental Management (IDEM) share the responsibility for administration and implementation of the RCRA program within the State of Indiana. Both the IDEM and the U.S. EPA agree that the RCRA closure and corrective action issues associated with the ECI site must be addressed. As discussed above, the IDEM and the U.S. EPA have determined that the closure of the hazardous waste units previously housed at this site and corrective action for the portions of the site which would underlie the CDF can be incorporated into the CDF design. The remaining corrective action requirements for the non-CDF facility parcels at the ECI site would be addressed in the future.

CLEAN WATER ACT ISSUES

There are several sections of the Federal Water Pollution Control Act (Clean Water Act; CWA) of 1972 (as amended) which pertain to dredged material disposal. The recommended plan includes the disposal of dredged materials to an upland CDF. The recommended disposal method does not involve the discharge of dredged/fill material to waters of the United States. The discharge from the CDF (return water/runoff) will be treated and discharged to the canal. Sections 404 and 401 of the CWA do apply and will be addressed as part of the IDEM permitting process. The discharge from the disposal facility must meet treatment standards in accordance with NPDES.

TSCA ISSUES

A portion of the bottom sediments within Federal navigation channel of the Indiana Harbor Canal contain levels of polychlorinated biphenyls (PCBs) greater than or equal to 50 parts per million (ppm). Under 40 CFR §761.60(a)(5) of the Toxic Substances Control Act (TSCA), dredged materials that contain PCBs in concentrations of 50 ppm or greater must be disposed of in a TSCA-approved incinerator, TSCA-approved

landfill or by an alternate disposal method that provides adequate protection to health and the environment. The recommended plan provides for the disposal of these sediments in a CDF which is an alternate disposal method and requires the approval of the U.S. EPA Regional Administrator.

In conformance with this requirement, two years prior to the construction of the TSCA cell, an application for an alternate disposal approval will be submitted to the U.S. EPA Region 5 Regional Administrator. An application will not be submitted at this time since the TSCA cell will not be constructed until about year 2004 and a TSCA alternate disposal approval expires five years from the date of approval. Once approved, operators of the CDF may apply for renewal after expiration.

The application will contain detailed technical, environmental and economic information demonstrating that disposal in a TSCA-approved incinerator or chemical waste landfill is not reasonable and appropriate and that the alternate disposal method will provide adequate protection to health and the environment. Additional information necessary for the evaluation of the alternate disposal method such as detailed design and construction plans, traffic plan, waste acceptance and handling plan, surface water handling plan, sampling and monitoring plans, worker protection plan, site security plan, spill prevention control and countermeasures plan, TSCA records maintenance and reporting plan, closure and post-closure plans, inspection procedures and financial assurance documentation will be part of the application. Additional information that the Administrator deems necessary for evaluation of the application will be provided upon request.

PRELIMINARY SECTION 404(B)(1) EVALUATION

I. Project Description

Indiana Harbor is located on the Lake Michigan shoreline in Lake County, Indiana. The Indiana Harbor facilities serve commercial and industrial users only but recreational anglers also utilize the harbor area. Due to the presence of contaminated sediment and lack of a suitable confined disposal facility, the harbor has not been dredged since 1972. The proposed project will remove about 4.7 million cubic yards of sediment from the harbor over the next 30 years. Sediment will be removed from the Federal Channel and areas around private slips using either mechanical or hydraulic dredging equipment. However, due to the effluent volume limitations at the confined disposal facility (CDF), hydraulic dredging would have to move the sediment at in-situ water content. The dredged sediment will be placed at an upland (CDF). Effluent from the disposal site will be treated then discharged to the Indiana Harbor Canal.

This project was authorized by the Rivers and Harbors Act of 1910 (et seq.). The purpose of the project is to maintain adequate depths for commercial shipping in the harbor. As this time, contaminated sediment in the harbor is being flushed into Lake Michigan. Dredging and confinement of the contaminated sediment will reduce the movement of additional contaminated material into Lake Michigan.

General Description of Dredged or Fill Material

Indiana Harbor and Canal sediments range from oily silt to gray sand and gravel. The sediments have high levels of heavy metals, organics, PCBs and nutrients. The sediments were classified as highly plastic clay (CH). Grain size analysis indicates the sediment is mostly silt and clay with some sand. The material is highly impermeable with a permeability of 8.6×10^{-8} cm/sec.

Dredging will be completed in both the Federal Channel and in appropriate non-Federal dock/berthing areas to provide depths commensurate with the adjacent Federal Channel depths. The total amount of material to be dredged over the 30-year life of the project is estimated to be over 4.7 million cubic yards.

Industrial and municipal outfalls, including combined sewer systems are a primary source of pollution of the IHC/GCR sediments. Many of these sources are located upstream of the IHC and contamination of sediments often occurs before deposition in the navigation channel.

Description of the Proposed Disposal Site

The sediment will be placed at an upland confined disposal facility. The facility will be located west of the harbor near the Lake George branch of the canal (Plate EIS-2 in the EIS). The CDF will cover a 131-acre former industrial site, which presently has open RCRA status. Currently habitat at the site consists of native and invasive vegetative growth with a few small trees. Adjacent habitat

consists of heavy industry and petroleum storage tanks. The dredging would take place periodically over the next three decades. The individual dredging operations would likely take place during the normal construction season for the Northwest Indiana region, but may take place throughout the year.

Description of Disposal Methods

Dredging would probably be accomplished using a mechanical dredge unless a hydraulic dredge can move the sediment without entraining additional water. If a mechanical dredge is used the sediment would be loaded into a scow and transported to a rehandling area near the CDF. If a hydraulic dredge is used the material would be pumped directly into the CDF.

II. Factual Determinations

Physical Substrate Determinations

Sediments in the harbor consist of oily silt, gray sand and gravel. The sediments have high levels of heavy metals, organics, PCBs and nutrients. The sediment will not be removed from the CDF after disposal. A small fraction of the contaminants may be released into the water column at the dredging site, however the bulk of the contaminants will remain associated with the dredged material and will be confined with the sediment at the disposal facility. If mechanical dredging is used the operation would be performed with a closed-shell bucket. This type of dredge reduces the amount of sediment lost to the environment during the dredging process.

Any benthos in the area of dredging will be lost. However, considering the degraded conditions in the harbor and the contaminated sediment, the benthic community is likely dominated by a few pollution tolerant species.

Water Circulation, Fluctuation and Salinity Determinations

The dredging operation will not affect water circulation, salinity or fluctuation in the harbor. Water clarity and odor may be adversely affected in the immediate vicinity of the dredging operation. Indiana Harbor is not used as a source of potable water. Dissolved oxygen concentration will be lowered in the vicinity of the dredging operation as oxygen-demanding sediment is stirred into the water column. The dredging project will not likely influence the nutrient load of Indiana Harbor as water in the canal is a primarily composed of industrial and municipal effluent. These impacts are a result of the poor quality of the harbor sediments and are largely unavoidable when sediment of this type is disturbed. Provided additional inputs of contaminants are reduced or eliminated, the aquatic habitat quality in the harbor should be improved once the dredging operation is complete.

Suspended Particulate/Turbidity Determinations

The concentration of suspended solids and associated turbidity will increase in the immediate area of the dredging operation. The effluent from the dewatering facility should not adversely affect turbidity in the canal.

Discharge from the disposal site will be treated to meet applicable water quality standards. Toxic metals and organics will be contained with the sediment in the confined disposal facility. Potentially, fecal coliforms would be associated with the sediment. These bacteria may be mixed into the water column during the dredging operation. This effect is localized and short-term, usually subsiding to background levels within a matter of days. Since the canal is essentially used to convey municipal wastewater the effect of dredging on the availability of pathogens is not expected to be significant. The dredging operation is not expected to adversely affect the area aesthetics. Increases in turbidity associated with the dredging project will be localized and short-term and should not adversely affect primary production, filter feeding or sight feeding organisms.

Contaminant Determinations

Indiana Harbor sediment is heavily contaminated with heavy metals, organics, PCBs and nutrients as shown in Table 1. This material is unsuitable for open water disposal and must be placed in a confined disposal facility (CDF).

Table 1. Volume-weighted mean concentrations of Indiana harbor and Canal sediments

Parameter	Volume-Weighted Mean Concentration[a]	Parameter	Volume-Weighted Mean Concentration
Volatile Solids (%)	14.1	Cadmium	11
Chemical Oxygen Demand	207,575	Chromium	370
Oil & Grease	63,627	Copper	156
Total Kjeldahl Nitrogen	2,929	Iron	144,623
Ammonia	845	Nickel	99
Cyanide	1.4	Lead	837
Manganese	1914	Zinc	3,669
Phosphorus	2,555	Mercury	0.7
Arsenic	53	PCBs	8.9
Barium	45		

a) Units are mg/kg dry weight unless otherwise noted.

Aquatic Ecosystem and Organism Determinations

The proposed project will not adversely affect phytoplankton in the inner harbor area. If, during dredging events, the turbidity of the inner harbor area increases, phytoplankton production may decline and, as a result, zooplankton production may also decline. However, removal and confinement of the contaminants associated with the harbor sediment will have a beneficial effect on the ecosystem in the long term.

Benthos in Indiana Harbor is limited due to the contaminated nature of the sediment. The pollution tolerant benthic community present in the areas to be dredged will be lost. Upon completion of the project cleaner conditions should exist which should facilitate colonization by a more diverse benthic community. However, maintenance dredging activities will continue to periodically remove the benthos.

Indiana Harbor does not provide significant spawning habitat for fish as such the dredging and discharge will not adversely affect larval fish (nekton). In the near term the aquatic food web may be disturbed via decreased water clarity and slightly depressed primary productivity in the immediate harbor. Over the long term the aquatic food web should be improved as contaminants are removed and healthier benthic and planktonic communities which form the basis of the food web begin to thrive. The proposed dredging project will not affect any special aquatic sites.

Due to the relatively elevated levels of petroleum products associated with the sediment some of the material will be mixed with the water column. Left undisturbed the petroleum byproduct would sink. However due to its low molecular weight it may reside on the surface near the dredge for some time. The migration of this oil film will be minimized by the use of controls, which could include an oil boom and absorbents.

There are no threatened or endangered aquatic species in the harbor area. A pair of Peregrine falcons is nesting on one of the Memorial Highway bridge supports. The Corps has determined that the potential for adversely affecting these birds is insignificant. The US Fish and Wildlife Service has expressed concerns about the potential adverse impacts the dredging project may have on these birds, particularly in regard to PAH contamination and mortality of the eggs. Coordination is still underway with this agency to resolve these differences.

Proposed Disposal Site Determinations

An effluent treatment system is currently under development by the Chicago District. Phase 1, now complete, evaluated a wide range of water treatment technologies and methods to determine which methods and technologies were feasible for treatment of the effluent. Phase 2, which is currently underway, is the execution of a treatability study designed in Phase1. The Phase 2 study will evaluate and define operating parameters for the treatment system.

Under the proposed plan the effluent will be treated to comply with applicable water quality standards for the Indiana Harbor Canal. The Indiana Department of Environmental Management (IDEM) has indicated that variances for discharge limits are possible. Based on the Phase 1 results and discussions with IDEM, it is anticipated that the State 401 water quality requirements can be met with an on-site treatment system. The need for a mixing zone and its potential size will be evaluated after the State of Indiana reviews the completed Phase 2 effluent treatability study. Decisions regarding a mixing zone will be based, in part, on the total mass of contaminants entering the system from other discharge sources.

The dredging project will not adversely affect municipal or private water supplies. The limited recreational fishery will not be affected by the dredging project; there is no commercial fishery in the harbor. There is no other water-related recreation at Indiana Harbor or on the Canal. There are no national or historical monuments, or wilderness areas in the vicinity of the project. The Indiana Dunes national lakeshore will not be affected by the dredging project. No research sites in the harbor will be adversely affected by the project.

Cumulative and Secondary Effects on the Aquatic Ecosystem

Cumulative ecosystem effects of the project will be the progressive confinement of contaminated sediments presently available to the Indiana Harbor and Lake Michigan environment. Provided additional contaminant input is reduced, the health and diversity of the aquatic community in Indiana Harbor should improve. Sediment removal will reduce the volume of contaminated sediment currently being flushed from Indiana harbor into Lake Michigan.

Effluent from the sediment dewatering/confinement site will meet the State of Indiana water quality standards deemed applicable by IDEM. Beyond the normal, unavoidable short-term impacts to water quality which occur at the dredge site, the removal of contaminated sediments from Indiana Harbor and Canal should benefit the aquatic ecosystem of Indiana Harbor and nearshore waters of Lake Michigan.

III. Findings of Compliance with the Restrictions on Discharge

No adaptation of the 404(b)(1) guidelines was made for this evaluation. The recommended location for the confined disposal facility (CDF) with effluent discharge to the Indiana Harbor Canal is the most practical alternative for disposal of the dredged material. With treatment the discharge from the CDF will meet the water quality standards set forth for this project by the Indiana Department of Environmental Management and will comply with Section 307 of the Clean Water Act.

The project is in partial compliance with the Endangered Species Act of 1973. Coordination is still underway with the US Fish and Wildlife Service to resolve issues concerning the peregrine falcon.

The project will not have significant adverse effects on the waters of the United States. Short-term impacts include increased turbidity, and minor degradation of water quality in the immediate vicinity of the dredge. These effects will dissipate shortly after dredging. Confinement of the dredged material in an upland disposal facility will remove the contaminants from the system and will avoid to the extent practicable adverse impacts to the environment.

On the Basis of the Guidelines, the Proposed Disposal Site for the Dredged Material is specified as complying with the requirements of these guidelines.

Date 18 JAN 99

Peter J. Rowan, P.E.
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SECTION 1 - PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

1.1.1 The existing Federal navigation project at Indiana Harbor provides a sheltered harbor and a deep-draft channel for commercial navigation traffic. This navigation project is a major facility supporting the commerce and industry of northwest Indiana. The USACE is authorized to operate and maintain this navigation project. Sediments which enter the Grand Calumet River/Indiana Harbor and Canal (GCR/IHC) waterway deposit in the Federal channel, reducing depths, and restricting the movements of navigation traffic. In order to maintain authorized channel depths, these sediments must be dredged periodically.

1.1.2 The navigation channel at Indiana Harbor and Canal has not been maintained since 1972 because an economically feasible and environmentally acceptable method of dredged material disposal has not been approved. There are an estimated one million cubic yards of backlog dredging at this harbor. This is causing deep-draft navigation difficulties and associated increases in the transportation costs of waterborne commerce. In addition, between 100,000 and 200,000 cubic yards of polluted sediments are being discharged annually to Lake Michigan.

1.1.3 Because of the highly urbanized and industrial nature of the GCR/IHC watershed, the bottom sediments are contaminated with a variety of pollutants. The GCR/IHC has been designated as a Great Lakes "area of concern" by the International Joint Commission (IJC). In January 1991, the Indiana Department of Environmental Management submitted to the IJC, for comment and review, Stage I of a Remedial Action Plan (RAP) to address water quality, aquatic habitat, and use impairment issues related to this area of concern. In-place sediment con-tamination was identified as a significant environmental problem that is adversely impacting water quality and aquatic life in the waterway and Lake Michigan.

1.1.4 The draft RAP outlined options for remediating the sediment contamination problem. The completion of the USACE EIS on Indiana Harbor and Canal project maintenance dredging was identified as "an essential step toward implementation of the GCR/IHC Remedial Action Plan" (IDEM, 1988).

1.1.5 The information provided in this document serves as an example for sediment remediation actions for other areas of the GCR/IHC. The dredging and disposal of polluted bottom sediments must be accomplished in accordance with applicable environmental laws. The costs of dredging and disposal alternatives (both economic and environmental) must be weighed against the benefits provided by sediment remediation and the increased shipping efficiencies.

1.2 PROJECT HISTORY, LIMITS, AND AUTHORITY

1.2.1 Project History

1.2.1.1 The existing Federal navigation project at Indiana Harbor and Canal was authorized by the River and Harbor Act of 1910, and by subsequent acts of 1913, 1919, 1922, 1925, 1930, 1932, 1937, 1960, and 1965. The existing project (EIS Plate 2) includes a 1,120-foot rubble-mound breakwater, a 201-foot reinforced concrete caisson breakwater, a 2,300-foot northern extension of that concrete breakwater, a lighthouse crib, and the navigation channels.

1.2.1.2 In 1888 and 1889 the land for the canal was provided by the Forsyth family, the Calumet Canal and Improvement Company, and the Standard Steel and Iron Company (which later became Inland Steel Company). In 1901, the East Chicago Land Company and other private companies began building the inner harbor, outer harbor, and canal. By 1910, docks had been built by Inland Steel, Standard Oil, and American Steel Foundries. With the exception of the Lake George Branch, the canal/harbor construction work was completed by 1911, when the Federal Government (USACE) first took over maintenance responsibilities and dredged the outer harbor and entrance channel.

1.2.1.3 In 1914, the Lake George Branch was completed by the East Chicago Land Company. In 1917, private interests removed the original curved north pier to create a new entrance to the harbor. By 1918, docks had been built by Associated Box

Company, Mark Manufacturing Company (which later became Youngstown Sheet and Tube), Sinclair Refining Company, Consolidated Oil Company (which later merged with Standard Oil), and other private interests.

1.2.1.4 The USACE built the north breakwater between 1915 and 1925. In 1928 and 1929, docks were built by U.S. Gypsum, Shell Petroleum, East Chicago Dock and Terminal, and Empire Oil and Refining. In 1932, the outer harbor, main stem, and Calumet River Branch were widened and deepened by the USACE. The east breakwater was constructed between 1921 and 1936. Between 1937 and 1955, local interests (primarily Inland Steel and Youngstown Sheet and Tube Companies) extended their property by filling the lake behind the breakwaters while under permits. No Federal actions altered the harbor significantly during this time.

1.2.1.5 Between 1956 and 1962, the USACE widened and deepened the mainstem of the canal, the Calumet River Branch, and the Lake George Branch. The entrance channel and turning basin were also enlarged. This resulted in a deep-draft harbor compatible with the St. Lawrence Seaway and the Great Lakes inter-connecting navigation projects. By 1969, the project was complete.

1.2.2 History of Dredged Material Disposal

1.2.2.1 Between 1911 and 1972, the USACE performed routine maintenance dredging of this Federal navigation project. Between 1955 and 1972 approximately 100,000 and 250,000 cubic yards per year were dredged annually by Federal and private interests, respectively, from the Federal channel. Until 1966, dredged material was placed in authorized open-lake disposal areas in Lake Michigan.

1.2.2.2 Environmental concerns were raised in the early 1960's about the impacts of open lake disposal of dredged materials from polluted harbors on the Great Lakes. As a result, the USACE and the Federal Water Pollution Control Administration (the predecessor to the U.S. EPA) began a joint pilot investi-gation of alternative disposal sites for dredged materials from Great Lakes' harbors in 1966. The first confined disposal facilities were constructed by the USACE and monitored by the Federal Water Pollution Control Administration as part of this program.

1.2.2.3 In 1967, the USACE conducted confined disposal demonstrations as part of the normal maintenance dredging occurring at Indiana Harbor and Canal. The existing diked lakefills of Youngstown Sheet and Tube Company and Inland Steel Company were used for the disposal of dredged materials. The Federal Water Pollution Control Administration monitored the water quality impacts at the Inland Steel fill area. During this operation the USACE tested an air bubbler curtain designed to prevent the movement of solids through a gap in the Inland Steel breakwater.

1.2.2.4 As part of the Pilot Program, the USACE (1968) completed a study titled, "Study on Provision for Alternate Disposal Areas for Indiana Harbor, Indiana." Fourteen sites in and around Indiana Harbor and Canal were considered for the disposal of dredged material. One of the sites considered was the Inland Steel Company lakefill. In 1968, the Inland Steel Company offered the use of this site to the USACE for dredged material disposal. The three-year Pilot Program was completed in 1969. The final report concluded that although there was no con-clusive evidence of water quality impairment due to open lake disposal, it was recommended that the unconfined disposal of polluted sediments be discontinued.

1.2.2.5 Congress passed the River and Harbor Act of 1970 (PL91-611) which had a significant impact on the disposal of dredged materials on the Great Lakes. Section 123 of this act authorized the USACE to construct and operate confined disposal facilities (CDFs) for dredged materials from Federal navigation projects which were determined to be not suitable for open lake disposal. This act required that a local sponsor (municipal or state) participate by providing all lands and easements for the CDF, plus share 25% of all construction costs. The local cost share requirement could be waived by the U.S. EPA if the area was in compliance with an approved water quality plan.

1.2.2.6 The USACE initiated a site selection study for a confined disposal facility during 1971. During the same year the Inland Steel Company completed the dike surrounding their lake-fill facility and began filling during the summer. A 200-foot wide gap was left in the dike wall to allow barges to enter, dump material, and leave. In January 1972, the Inland Steel Company formally agreed to allow placement of

dredged material into this facility. The site selection study was subsequently terminated and a letter report discussing a general dredging and disposal plan utilizing the Inland Steel lakefill site was circulated in June 1972 to appropriate reviewing agencies. The agencies made no objections at that time. In October 1972, approximately 250,000 cubic yards of sediment was dredged from the Federal channel and placed into the Inland Steel Company site.

1.2.2.7 In November 1973, the USACE filed a draft EIS on proposed operation and maintenance activities with the Council on Environmental Quality. In December 1977, a preliminary final EIS (which recommended using the Inland Steel Company site for disposal) was sent to the U.S. EPA and the State of Indiana for advance comment. During this same time, the U.S. EPA (1978) completed a sediment sampling program at Indiana Harbor which showed high contaminant levels present, including polychlorinated biphenyls (PCBs). Based on comments from the U.S. EPA on the preliminary final EIS, the USACE discontinued consideration of the Inland Steel fill for dredged material disposal. A final EIS on the use of the Inland Steel site (as is) was never prepared, circulated, or filed.

1.2.2.8 The USACE reinitiated the site selection process in May 1978, with many of the potential CDF sites identified in the 1968 site selection study recon-sidered. The new site selection study was widely coordinated with the U.S. EPA, U.S. Fish and Wildlife Service, U.S. Department of Commerce, U.S. Coast Guard, Northwestern Indiana Regional Planning Commission, Illinois/Indiana Bi-State Planning Commission, Indiana State Board of Health, Indiana Department of Natural Resources (IDNR), Indiana Port Commission, and the cities of Gary, Whiting, East Chicago, and Hammond.

1.2.2.9 Extensive sediment sampling was performed by the USACE' Waterways Experiment Station (WES) in 1979 and 1980. These studies indicated that two areas within the Federal navigation channel contained sediments with PCB concen-trations greater than or equal to 50 parts per million (ppm). The disposal of these sediments is regulated under the Toxic Substances Control Act (TSCA).

1.2.2.10 For a time the site selection study reached an impasse due to the lack of a local sponsor. In 1982, the Lake County Board of Commissioners expressed a willingness to act as a local sponsor. In May 1983, the site selection report was completed and released to the public for review and comment. Sixteen sites were considered with four found to be the most feasible. Later in 1983, the Lake County Board of Commissioners voted to become the local sponsor and identified the Jeorse Park site (Site 12) as their preferred site.

1.2.2.11 The USACE began work on a draft EIS covering Site 12 in 1983. The proposed CDF was to be an in-lake facility, approximately 40 acres in size, located offshore of Jeorse Park (East Chicago, Indiana) in Lake Michigan. Upon the request of the U.S. EPA, a "generic" upland CDF design was also evaluated in equal detail in the draft EIS for comparative purposes. During the preparation of the draft EIS, the USACE conducted or contracted for numerous studies on sediment quality, dredging and disposal technologies, and area aquatic communities.

1.2.2.12 In 1984, the USACE contracted with the Waterways Experiment Station to conduct research on the disposal alternatives for PCB-contaminated sediments from Indiana Harbor and Canal. As part of this study, several new testing protocols were developed and the USACE' "Management Strategy for Disposal of Dredged Material" (Francingues et al., 1985) was applied. The U.S. EPA (1985) completed a "Master Plan for Improving Water Quality in the Grand Calumet River/Indiana Harbor Canal." During this same time, considerable public opposition was raised to the proposed CDF site.

1.2.2.13 The draft EIS was released for public/agency review in February 1986. A public meeting was held in East Chicago in March 1986. Based on agency comments and the recommendations of the State of Indiana, the USACE decided to drop the Jeorse Park site from further consideration. A final EIS was never prepared, circulated, or filed.

1.2.2.14 Later in 1986, the USACE coordinated extensively with the U.S. EPA and the State of Indiana on alternative sites for future consideration. At this same time, the USACE was informed by the Office of the Chief of Engineers that future CDFs would no longer be funded under the authority of PL 91-611. This change removed the local sponsorship requirement. In 1987, the USACE was asked by the State of Indiana to reconsider the Inland Steel Company lakefill site and a new site, known as the J-Pit

site, a former sand quarry in Gary, as possible CDF sites. The U.S. EPA requested that additional upland sites be considered, without any specific locations being identified.

1.2.2.15 In 1987 the USACE began the scoping process for a new draft EIS. A public scoping meeting was conducted in April 1987 at Indiana University-Northwest in Gary. Comments received during this meeting included requests for detailed evaluations of the feasibility of innovative treatment technologies. In addition, two new upland sites were recommended for consideration (the existing Lucas Berg disposal site in Worth, Illinois, and the abandoned ECI site in East Chicago, Indiana). The USACE began preparing and distributing a periodic news-letter to the public and appropriate agencies to keep them informed on the progress of the project.

1.2.2.16 In August 1987, the USACE prepared a Plan of Study outlining new studies proposed to meet the data requirements of the new draft EIS. These included extensive sediment sampling of the Federal channel and nearshore Lake Michigan, aquatic community, toxicity, and bioaccumulation studies, and bench-scale testing of innovative treatment technologies of Indiana Harbor sediments. This Plan of Study was coordinated with the U.S. EPA, U.S. Fish and Wildlife Service, IDNR, and IDEM.

1.2.2.17 Most of these studies were conducted in 1988. During this time, the USACE evaluated other alternatives proposed during the scoping coordination. In October 1988, the USACE distributed a Plan of Study describing the overall scope of the EIS and the alternatives to be considered in detail. The alternatives included three potential CDF sites (Inland Steel Company's lakefill, J-Pit site, and 141st Street site) and four potential treatment technologies (incineration, extraction, oxidation, and solidification). This Plan of Study was coordinated with appropriate agencies and the public via meetings held in October and December 1988.

1.2.2.18 In March 1989, a fourth CDF site (ECI site) was added to the list of alternatives and, at the request of the U.S. EPA, consideration was given to the possibility of dredging outside of the Federally authorized navigation channel. A Letter Report and draft EIS were submitted to the North Central Division, Corps of Engineers in January 1989 and to Region 5, U.S. EPA in September 1990 for internal review. In an effort to perform a more effective environmental clean-up of the region, the U.S. EPA and Chicago District entered into a Memorandum of Understanding (MOU) during the summer of 1991. The MOU provides for the USACE to be the responsible lead agency and for the U.S. EPA to be a cooperating agency for the recommended project at the Indiana Harbor and Canal.

1.2.3 Limits and Authority

1.2.3.1 The Congressionally authorized project depths in the Federal navigation channels are 29 feet in the outer harbor approach channel; 28 feet in the anchorage basin in the outer harbor; 27 feet in the canal entrance channel; 22 feet in the main canal; 22 feet in the upstream turning basins; and 22 feet in the Lake George and Calumet River Branches of the Canal. All depths are referred to the International Great Lakes Low Water Datum (LWD), which is 576.8 feet above mean water level at Father Point, Quebec).

1.2.3.2 The authorized channel extends from Lake Michigan to Columbus Drive (141st Street) on the Calumet River Branch and to approximately 1,170 feet west of Indianapolis Boulevard on the Lake George Branch (EIS Plate 2; CMP Figure 2). The channels vary in width from 800 feet in the approach channel to 160 feet in the main canal. Channel limits usually extend within 20 feet of bulkheads and piers. A more detailed description of the project can be found in the preceding Comprehensive Management Plan.

1.2.3.3 The USACE is authorized to operate and maintain the Federal navigation project at Indiana Harbor and Canal. Maintenance activities include the dredging and disposal of bottom sediments from the navigation channel and routine struc-ture maintenance. Funding for these activities is provided under the USACE operation and maintenance (O&M) authority for this project.

1.2.3.4 Federal regulations concerning O&M dredging and disposal activities are contained in 33 CFR Parts 209, 335, 336, 337, and 338 (as published in the Federal Register on April 26, 1988). These regulations define the Federal Standard as "the dredged material disposal alternative or alternatives identified by the USACE which

represent the least costly alternative consistent with sound engineering practices and meeting the environmental standards established by the 404(b)(1) evaluation process" of the Clean Water Act.

1.2.3.5 Legislation provided authority to the USACE to conduct environmental dredging and provide support to remedial action plans. Section 312 of the Water Resources Development Act (WRDA) of 1990 authorized the USACE to dredge contaminated sediments outside of Federal navigation channels for environmental remediation purposes. A non-Federal sponsor is required by this authorization to provide 50 percent of the funds for dredging and 100 percent of the disposal costs. Section 401 of WRDA 1990 authorized the USACE to provide support to state and local governments in the development and implementation of remediation action plans (RAPs) at designated areas of concern on the Great Lakes. This RAP support required a local cost share of 50 percent. Limited funding for Section 312 and 401 was appropriated to the USACE in FY 1994.

1.2.3.6 Section 201 of the 1996 Water Resources Development Act (WRDA) provides that land based dredged material disposal facilities associated with the construction, operation and maintenance of Federal navigation projects shall be considered general navigation features and cost shared in accordance with Title I of the 1986 WRDA. Under WRDA 96, Section 101(a) cost sharing, the non-Federal sponsor would pay during construction 25 percent of the cost of disposal facility for a project with depths greater than 20 feet but not greater 45 feet. The non-Federal sponsor would also have to pay an additional 10 percent of the cost of the disposal facility over a period of not to exceed 30 years but with the value of lands, easements, rights-of-way and relocations credited against this additional 10 percent payment.

1.2.3.7 Section 217 of the 1996 WRDA addresses dredged material disposal facility partnerships. This section allows the Corps of Engineers to provide additional capacity at a dredged material disposal facility if the non-Federal interest pays the costs of the capacity during construction. It also permits the use of any dredged material disposal facility managed by the Corps of Engineers by a non-federal interest if such use will not reduce the availability of the facility for project purposes and may impose fees to recover capital, operation and maintenance costs associated with such use.

1.3 PUBLIC CONCERNS

1.3.1 The environmental impacts associated with dredging and disposal of contaminated bottom sediments have been a concern of citizens' and environmental groups in northwest Indiana. Specific concerns include: the water quality impacts caused by sediment resuspension during dredging; the location, construction, and operation of a disposal area for the dredged sediments; the long-term impacts from dredged sediments, and; the impacts of delays or no action on the local economy and environment. The application of treatment methods to the contaminated dredged sediments has been proposed by some citizens' groups.

1.4 NON-PROJECT ACTIONS POTENTIALLY AFFECTING THE PROPOSED PROJECT

1.4.1 There are a number of programs and activities currently under investigation which may have impacts on, or be impacted by the proposed Federal actions described herein. Remediation of existing, contaminated sediments within the Grand Calumet River/Indiana Harbor Canal (GCR/IHC) is being considered through at least three such programs or authorities.

1.4.2 Remedial Action Plan (RAP)

1.4.2.1 The Indiana Department of Environmental Management (IDEM) has prepared a draft Remedial Action Plan for the GCR/IHC as directed under the Great Lakes Water Quality Agreement. In-place sediment contamination is identified in the RAP, submitted to the International Joint Commission in January 1991 for comment and review, as a significant non-point source of pollution to the GCR/IHC and adjacent Lake Michigan. Methods for the management of sediment contamination, including remedial dredging are considered in the RAP.

1.4.2.2 The completion of this EIS is identified in the draft RAP as a signi-ficant step toward the implementation of the RAP goals. The evaluation of dredging and disposal technologies for contaminated sediments in this EIS may be used by the state

and local agencies for evaluations of potential remedial dredging actions on other portions of the GCR/IHC.

1.4.2.3 The implementation of the RAP by the IDEM would greatly reduce the loadings of sediment contaminants to the GCR/IHC and reduce the levels of future sediment contamination in the Federal channel.

1.4.3 Assessment and Remediation of Contaminated Sediments (ARCS) Program

1.4.3.1 Under Section 118(c)(3) of the Clean Water Act of 1987, the U.S. EPA was directed to conduct a five-year study and demonstration program on contaminated sediment remediation at locations on the Great Lakes. One of the five locations identified in the legislation was the Grand Calumet River. The Assessment and Remediation of Contaminated Sediments (ARCS) Program, managed by the U.S. EPA Great Lakes National Program Office, was organized to implement the demonstrations. The USACE has provided technical support through an interagency agreement with U.S. EPA.

1.4.3.2 An ARCS study of the GCR/IHC sediments has been initiated. Other types of demonstrations of innovative dredging and/or disposal alternatives could be conducted in association with the proposed USACE maintenance activities if funding was made available. The ARCS Program was a demonstration program, not a clean-up authority. Results from this program indicate that technologies are feasible to render sediments less toxic. However, it is doubtful that they will become cost-effective for use in connection with large volumes of dredged materials in the foreseeable future.

1.4.4 U.S. EPA Clean Water Act Enforcement

1.4.4.1 The U.S. EPA has active enforcement actions against three municipalities and two industries along the GCR/IHC for alleged CWA violations. The U.S. EPA and city of Hammond have been negotiating a possible settlement which would involve the remedial dredging of contaminated sediments from portions of the Grand Calumet River. Such actions could reduce the flow of contaminated sediments into the Federal channel.

1.4.4.2 Other such actions are pending. However, none of these actions can be implemented without a suitable place for disposal and/or treatment of contami-nated sediments. The sediments labeled as presumptively hazardous by U.S. EPA and IDEM will not be dredged as part of the Federal navigation project. These materials will have to be addressed as part of the site-specific remedial activities which will be undertaken in the berthing/dock areas adjacent to the Federal channel. If these sediments are dredged without further testing, they would require treatment to the standards provided under 40 CFR part 268 of the RCRA Subtitle C regulations prior to land disposal.

SECTION 2 - ALTERNATIVES INCLUDING THE PROPOSED PLAN

2.1 PLANS ELIMINATED FROM FURTHER STUDY

2.1.1 Dredging Methods

2.1.1.1 A number of available dredging technologies were considered for use at Indiana Harbor and Canal. These technologies included mechanical, hydraulic and special purpose dredges. Several of these dredging methods were eliminated from further consideration because of production rate, ability to handle material, physical site restrictions, availability, and cost. More detailed information on dredging technologies can be found in Appendix H, Dredging Technologies and Impacts.

2.1.2 Confined Disposal Alternatives

2.1.2.1 Alternatives for the disposal of dredged materials which were considered as part of previous site selection studies (USACE, 1968; 1983) included the construction of a confined disposal facility (CDF). Nearly 20 locations were considered for CDF construction. Most of these sites were eliminated for engineering or environmental reasons or the lack of a local sponsor (required at the time). Three of these sites were reconsidered as part of this EIS.

2.1.2.2 Other confined disposal sites considered include the Lucas Berg CDF, use of existing petrochemical tank farms, and the filling of the Lake George Branch of the Canal. These alternatives were recommended for consideration by citizens at public coordination meetings and by U.S. Fish and Wildlife Service (USFWS) staff in coordination letters.

2.1.2.3 The Lucas Berg CDF, located in Worth, Illinois was constructed by the USACE in 1981-1982 for the disposal of contaminated dredged materials from the Cal-Sag Channel. This site is located over 20 miles away (by barge) from the mouth of Indiana Harbor and would require Section 401 certification from the Illinois EPA. Disposal of dredged materials from Indiana Harbor and Canal would violate the agreement with the local sponsor (Metropolitan Water Reclamation District of Greater Chicago). This facility was constructed to serve a different navigation project (Illinois Waterway). Disposal at this existing CDF was eliminated from further consideration for these reasons.

2.1.2.4 The Indiana Harbor and Canal has several petrochemical industries which use steel storage tanks. Disposal and/or storage of dredged materials from Indiana Harbor and Canal in tank farms was eliminated from further consideration for engineering reasons. A typical oil storage tank is designed to hold about 5,062,500 gallons (25,000 cubic yards) of fluid. To store 3,000,000 cubic yards of dredged materials would require 120 tanks, occupying an area of about 240 acres. Steel storage tanks were not designed to hold semi-solid materials, and would require extensive modification. In addition, the filling, dewatering, and high maintenance of the tanks would be problematic.

2.1.2.5 An alternative proposed in the U.S. FWS Coordination Act Report involved closing off portions of the Lake George Branch of the Canal upstream of Indianapolis Boulevard and filling it with dredged material. This alternative would eliminate the use of this portion of the Federal channel for existing or future navigation use and would cause drainage problems upstream. Filling of this channel could also cause direct and indirect impacts to adjacent and upstream wetlands. A preliminary analysis indicated that the existing channel would have a very limited capacity (less than 300,000 cubic yards) and the closure of this reach might interfere with existing pipelines (water, gas, and sewer) which cross the channel. This alternative was eliminated from further consideration for these reasons.

2.1.2.6 In 1991, a site within the City of Hammond was briefly examined, then dropped from consideration because of its high potential for containing hazardous material. The site lies immediately south of the 141st Street site; it is a flat expanse of slag and ash. The site contains some remnant wet-lands, and was apparently filled between 1920 and 1960. It is adjacent to an abandoned asphalt plant which is now a U.S. EPA Superfund site; tar and oil were seen oozing from the ground onto the site. No known

remediation actions have been taken on this site to date and the ownership status of the site is unknown.

2.1.3 Sediment Treatment Technologies

2.1.3.1 Other alternatives that have been considered for the disposal of dredged materials include treatment technologies. Eighteen treatment technologies were initially screened by the USACE for feasibility. Four technologies were selected for further evaluation based on engineering feasibility. The other technologies were eliminated from further consideration as discussed in the preceding Comprehensive Management Plan in the section entitled "Sediment Treatment Technologies". The technologies evaluated are also described in Appendix G, Application of Treatment Technologies to Contaminated Sediments.

2.1.3.2 Sediments outside the Federal navigation channel (which include sediments presumed hazardous) require further testing before disposal in the proposed CDF would occur. These sediments will be addressed by non-Federal interests as part of the site-specific remedial activities which will be undertaken in the berthing/dock areas adjacent to the Federal channel. If these sediments are dredged in the absence of further testing, the non-Federal interests responsible for the sediments will be required to treat them in accordance with the standards provided under 40 CFR Part 268. These treatment standards would have to be met prior to the land disposal of these sediments. Since these materials will not be dredged as part of the navigation project, a review of the treatment alternatives for complying with the RCRA standards is not provided in this document. This evaluation of technologies would be included with the documentation associated with the site or property-specific remedial activities under which the undercharacterized sediments would be addressed.

2.2 NO ACTION ALTERNATIVE

2.2.1 Under this alternative, maintenance of the Federal navigation project would not take place; authorized depths in the Federal channel would not be maintained; breakwaters and other navigation structures would not be maintained. A detailed description of the no action plan is contained in Appendix C, No Action Alternative.

2.3 PLANS CONSIDERED IN DETAIL

2.3.1 The following discussion deals with (1) dredging alternatives, and (2) disposal site (CDF) alternatives, and (3) sediment treatment technologies.

2.3.2 Dredging Alternatives

2.3.2.1 Dredging would remove sediments from the Federal channel to restore and maintain authorized depths for navigation. Several dredging technologies were evaluated, based on ability to perform as needed, production rate, environmental impacts, availability, and cost. Detailed information on the dredging techno-logies considered is contained in Appendix H, Dredging Technologies and Impacts.

2.3.2.2 Three alternative dredging plans were analyzed in detail as described in the following three paragraphs. The three dredging plans were based on the use of a closed-bucket or environmental-bucket mechanical dredge; the dredged material would be loaded into barges or scows which would be moved to the disposal area. The dredged material would then be loaded into trucks at the CDF rehandling area (EIS Plate 7). The trucks would transport the dredged material to the CDF using haul roads constructed around the site and atop the dikes. The trucks would drive into the CDF and dump the dredged material on the bottom in rows 3 to 4 feet high. Subsequent layers of dredged material might be dumped from the edge of the CDF and mechanically redistributed. This method of dredging was selected because it can operate with a high production rate, remove fine-grained sediments and debris, and work in close quarters and around bridges. In addition, this dredging method is especially suited to the recommended disposal plan, removing sediments with a minimal amount of additional water. Environmental controls which could be used include the use of an oil boom and sorbants around the dredge to capture surface oil slicks that may develop due to the disturbance of oily sediments. Alternate methods of moving the dredged material from the barges or scows into the CDF, such as a conveyor system and pumps, will be considered during the detailed design phase.

2.3.2.3 Alternative Dredging Plan 1 (Partial Federal Channel Dredging) - Plan 1 would involve dredging the harbor and canal from Lake Michigan to the E.J. & E. Railroad bridge (EIS Plate 4). This portion (Reaches 1-5) of the channel would be dredged to project depth, plus an average of one-half foot overdepth. The wedge-shaped berthing area (Inland Steel Company hopper and stone docks) in the Reaches 2 and 3 would be dredged to -28 feet LWD, plus an average of one-half foot overdepth. Inland Steel and LTV Steel Companies docks on either side of the canal in Reach 5 would also be dredged to -27 feet LWD, plus an average of one-half foot overdepth.

2.3.2.4 Alternative Dredging Plan 2 (Complete Federal Channel Dredging) - Plan 2 would involve dredging the entire Federal channel to authorized depths, plus an average of one-half foot overdepth, from Lake Michigan to the upstream project limits on the Lake George Branch and Calumet River Branch (EIS Plate 4). This portion includes Reaches 1-13. Dredging in berthing areas in Reaches 1-5 would be the same as for Plan 1. In addition, berthing areas in Reach 7 (Inland Steel Plant 1 blast furnace dock) and Reach 11 (American Oil Company dock) would be dredged to -22 feet LWD, plus an average of one-half foot overdepth.

2.3.2.5 Alternative Dredging Plan 3 (Cooperative Dredging Program) - Plan 3 is the recommended plan; it would involve dredging the entire Federal channel and associated berthing areas (Plan 2), and dredging along selected Inland Steel dockfaces (EIS Plate 4). This alternative was developed to maximize commercial navigation benefits and meet the spirit and intent of a Consent Decree involving the Inland Steel Company and the U.S. EPA.

2.3.3 Confined Disposal Alternatives

2.3.3.1 Four sites were evaluated in detail for potential construction and operation of a confined disposal facility (CDF). At each site, several designs were evaluated. These alternate designs were considered with respect to engineering (Appendices L and M), environmental (Appendix F), and cost (Appendix K) factors. A number of environmental controls were developed for each CDF site to minimize the loss of contaminants from dredged sediments. The need for specific environmental controls was determined by implementation of the USACE' "Management Strategy for Disposal of Dredged Material: Contaminant Testing and Control" (Francingues et al., 1985). In addition, analysis of a generic "environmentally clean upland site" was completed.

2.3.3.2 141st St. Site

2.3.3.2.1 This plan consists of the construction of a CDF at a site located immediately north of 141st Street and east of the Indiana east-west tollroad in Hammond (EIS Plate 3). The site is approximately 83 acres in area and is situated several hundred feet south of the Lake George Branch of the Indiana Harbor Canal. This location was previously identified in the Site Selection Study (USACE, 1983) as site 14B.

2.3.3.2.2 The CDF would be constructed with a design capacity of 2.0 million cubic yards. This design capacity is smaller than the other plans because of limitations on available real estate and dike height. The CDF would be approximately rectangular in shape and be divided into two cells of different sizes (EIS Plate 12).

2.3.3.2.3 The CDF would be constructed of earthen dikes using primarily offsite materials. Approximately 756,000 cubic yards of earthen fill would be used to construct the dikes to a height of 24.5 feet above the existing ground surface. The CDF would have a barrier layer consisting of three feet of compacted clay along the inside of the dikes (EIS Plate 12). This liner would require an additional 72,500 cubic yards of off-site clay and would have an effective permeability of 10^{-7} (0.0000001) cm/sec. Dried dredged materials would be used to construct a barrier between the TSCA sediments and the CDF dike. A slurry wall would also be constructed at the base of the dike to key the liner into the underlying clay deposits. This would require approximately 184,500 square feet of materials. The dikes would be seeded to enhance stability and erosion control.

2.3.3.2.4 The water that would drain from precipitation and from the dredged materials as they consolidate would be collected and treated.

2.3.3.2.5 The dredged materials would be disposed of in the largest cell first. Dredged materials would be either trucked to the CDF from an unloading area located along the Lake George Branch or pumped through a pipeline constructed between the unloading area and the CDF. If pumping is used, a method which does not use excess water would be required. Water would be collected by surface drainage and from the underdrainage system. Additional water treatment would be accomplished by filtration/carbon sorption, as needed. An agreement would be negotiated with the Hammond Sanitary District to discharge the pre-treated effluent into the local sewer for final treatment by the Sanitary District.

2.3.3.2.6 The first cell of the CDF would be capped when it was completely filled and the dredged material consolidated. The cap would be composed of a two-foot layer of clay covered by a one-foot drainage layer and two feet of topsoil. Approximately 191,300 cubic yards of clay, 191,300 cubic yards of topsoil, and 143,600 tons of drainage layer materials would be required from offsite sources. The cap would be seeded with grasses and have a surface area of approximately 60 acres. The cap would have an effective permeability of 10^{-7} cm/sec. The second cell would also be capped in a similar manner once filled with dredged material.

2.3.3.3 J-Pit Site

2.3.3.3.1 This plan involves construction of a CDF at a site located west of Colfax Avenue, east of the E.J. & E. Railroad, and south of 15th Avenue in western Gary (EIS Plate 3). The site is a sand borrow pit, approximately 100 acres in area, excavated to a depth of about 40 feet. The pit has been used intermittently for disposal of construction debris. The CDF would be constructed with two cells and a design capacity of 3.0 million cubic yards (EIS Plate 6).

2.3.3.3.2 The CDF would require construction of only one new (cutoff) dike. The other three sides and bottom would be constructed utilizing the existing pit with some modifications. Approximately 355,300 cubic yards of onsite material would be regraded to form the dike embankments (EIS Plate 13). Three designs were considered for barrier systems of the diked embankment as follows: (1) trenched slurry wall, (2) injected slurry wall, and (3) clay liner. A system combining a 2-foot soil/bentonite trenched slurry wall, which may be necessary to prevent infiltration of groundwater into the CDF, and a clay liner on the sides of the dike, was determined to be the most effective for this site. The system would be keyed into the natural clay formation at the base of the pit. This existing 7 to 41-foot thick clay formation would serve as the barrier layer on the bottom. Approximately 327,700 square feet of material would be required for construction of the slurry wall. Approximately 102,000 cubic yards of clay would be required for the three-foot compacted clay liner. The design would have an effective permeability of at least 10^{-7} cm/sec. The outside of the cutoff dike would be covered with topsoil and seeded for stability and erosion control.

2.3.3.3.3 Dried dredged materials disposed of in the CDF would be used to construct a barrier between the TSCA sediments and the CDF walls and floor.

2.3.3.3.4 Dredged materials would have to be trucked to the CDF from an unloading area located along the harbor or canal. Water draining from dredged material during consolidation and water from precipitation would be collected and treated. Water treatment would have to be accomplished by filtration/ carbon sorption, as needed. An agreement would have to be negotiated with the Gary Sanitary District to discharge pre-treated effluent into local sewers for final treatment by the Sanitary District.

2.3.3.3.5 The CDF cells would be capped one at a time when they were completely filled and the dredged material consolidated. The cap would be composed of a two-foot layer of clay covered by a one-foot drainage layer and two feet of topsoil. Approximately 191,400 cubic yards of clay, 191,400 cubic yards of topsoil, and 143,600 tons of drainage layer materials would be required. The topsoil and drainage materials would be obtained from offsite sources. The clay may be obtained either onsite, if suitable quantities are present, or offsite. The cap would be seeded with grasses and have a surface area of approximately 60 acres. The cap would have an effective permeability of 10^{-7} cm/sec.

2.3.3.4 Inland Steel Company Site

2.3.3.4.1 This plan involves construction of a CDF within the existing lakefill area surrounded by the Inland Steel Company bulkhead. Portions of the area have been filled with slag and other steel mill wastes. The CDF would be located in the northeast corner of the lakefill (EIS Plate 3), in an area which has received relatively little fill to date.

2.3.3.4.2 The CDF would be constructed with a design capacity of 3.0 million cubic yards. The CDF would be rectangular in shape, approximately 70 acres in area, and divided into 3 cells of equal area (EIS Plate 14). Initially, three different CDF configurations were considered. These are discussed in Appendix M, Coastal Hydraulic/Engineering Analysis. The other two designs were eliminated from further study and will not be discussed further in this draft EIS.

2.3.3.4.3 Three liner designs were considered. All dikes would utilize graded stone construction regardless of the liner design. Approximately 393,500 tons of stone ranging in size from 15 pounds to 3 tons would be required from offsite. The three dike liners considered are: a bentonite/cement slurry wall, a grout mattress, and a synthetic (polyethylene) membrane liner. The use of a synthetic liner is preferred, although there are construction difficulties with each of the liner systems. The permeability of the barrier system for this CDF would be a combination of the permeability of the liner employed directly within the CDF and the permeability of the existing Inland Steel Company bulkhead. Synthetic liners have reported permeabilities as low as 10^{-15} cm/sec. The permeability of the Inland Steel bulkhead has not been quantified; however, visual observation has shown that the breakwater can maintain a hydrostatic head of several feet for extended periods of time.

2.3.3.4.4 An estimated 1,344,600 square feet of polyethylene would be required for lining the inside of the CDF dikes. For the disposal of TSCA regulated dredged materials, the non-TSCA dredgings would be used as a secondary barrier. The combination of these barrier systems should exceed an equivalence of three feet of clay with 10^{-7} cm/sec permeability.

2.3.3.4.5 The CDF would be filled one cell at a time and capped. Barges would enter the Inland Steel Company lakefill for CDF construction and disposal activities by creating a breach in the southern-most corner of the existing breakwater. Water treatment would be accomplished by primary and secondary settling. As dredged materials were placed in one cell, displaced water would pass to the adjoining cell over an adjustable weir. Water would be pumped out from whichever cell provides maximum settling time. Tertiary treatment of water would be accomplished by filtration/carbon sorption, if needed. Water would be discharged to the ponded area in the adjoining Inland Steel lakefill.

2.3.3.4.6 Each CDF cell would be capped when completely filled and the dredged material consolidated. The cap would be composed of a two-foot layer of clay covered by a one-foot drainage layer and two feet of topsoil. Approximately 207,000 cubic yards of clay, 207,000 cubic yards of topsoil, and 155,000 tons of drainage layer materials would be required from offsite sources. The cap would be seeded with grasses and have a surface area of approximately 64 acres. The cap would have an effective permeability of at least 10^{-7} cm/sec.

2.3.3.5 ECI Site: Dredging Alternative 1-Partial Federal Channel Dredging

2.3.3.5.1 This site was formerly occupied by Energy Cooperative, Incorporated (ECI) and consists of approximately 285 acres of land divided by the Lake George Branch. The portion of the site which would be used for the proposed CDF lies north of the Lake George Branch and parcel I (EIS Plate 16). Under Dredging Alternative 1 (EIS Plate 4), approximately 90 acres would be required to construct the CDF (EIS Plate 5).

2.3.3.5.2 The CDF would be constructed entirely south of the railroad spur (EIS Plate 5). The earthen CDF dikes would be constructed in stages. The first stage would be constructed to a height of 15 feet. The second and third stages would each be ten feet high and would be constructed as the previous stage nears capacity. A portion of the dike material, all of the clay liner material, and all of the topsoil

would come from offsite sources. Approximately 244,600 cubic yards of clay, 183,500 cubic yards of topsoil, and 244,600 cubic yards of drainage layer materials would be required from offsite sources. Following the filling of the CDF, the CDF would be capped with three feet of clay, six inches of sand, 2 feet of clean fill and six inches of topsoil. The entire CDF site would be seeded to prevent erosion.

2.3.3.5.3 The various elements required to complete RCRA closure/corrective action at the ECI site have been incorporated into the proposed CDF design under Alternative 1. These include: (1) a slurry wall around the perimeter of ECI parcels I, IIA and IIB extending from the ground surface down about 33 feet to the stiff clay underlying the site; (2) a clay cap on parcels I and IIB, tied into the slurry wall; (3) a groundwater gradient control system on parcels I, IIA, and IIB; and (4) installation of an on-site facility for pre-treatment of groundwater collected from parcels I, IIA, and IIB, if needed. The CDF, when closed, would act as the final RCRA cap for parcel IIA.

2.3.3.5.4 The CDF would be constructed with two cells, a design capacity of 4.2 million cubic yards, and an estimated design life of about 34 years. The CDF would be rectangular in shape and divided into two cells of different sizes (EIS Plate 5). The north cell or cell (proposed for Dredging Alternatives 2 and 3) would not be built; the north cell location would be capped with clay to complete the RCRA corrective action for ECI parcel IIB. During the first year of project implementation, the southwest cell dikes would be built. In the second year, dredged material would be placed in the southwest cell while the southeast cell dikes were being built. Dredged material would be placed in the southeast cell during the third year, while the existing dredged material in the southwest cell was managed to speed drying and solidification. Placement of dredged material would then be alternated annually between the two cells for the next fourteen years. No dredging would be done in the fifteenth year. Dredging and disposal would be done subsequently on a three-year cycle until these two cells were filled to capacity (in about 2031) and then capped with clay. These three-year cycles would involve disposal in the southwest cell in the first year, disposal in the southeast cell in the second year, and no dredging or disposal in the third year.

2.3.3.5.5 PCB contaminated sediments will be disposed of in a TSCA-approved subcell constructed within the northwest portion of parcel IIA. The cell is expected to completed prior to the year 2002. The elements required to comply with the TSCA disposal requirements have been incorporated into the proposed CDF design. These include a slurry wall with a hydraulic conductivity of 10^{-7} cm/sec around the perimeter of parcels I, IIA and IIB that ties into the stiff clay underlying the site; a groundwater gradient control system; the TSCA - regulated on-site pre-treatment of groundwater collected from parcel IIA, if needed; segregation of PCB contaminated sediments from non-PCB sediments and capping of parcel IIA with three feet of clay, six inches of sand, two feet of clean fill and six inches of seeded topsoil. TSCA maintenance and monitoring requirements will be integrated into the maintenance and monitoring requirements for the CDF.

2.3.3.5.6 Approximately 705,500 cubic yards of earth fill would be used to construct the CDF dikes to a height of 25 feet above the existing ground surface. The CDF would have a barrier layer of recompacted clay and a slurry wall extending down to clay till (EIS Plate 6). This liner would require an addi-tional 66,600 cubic yards of clay which would be obtained off-site. This clay liner would have an effective permeability of 10^{-7} cm/sec. The dikes would be topsoiled, seeded and landscaped to prevent erosion and enhance their appearance. For a detailed discussion of the dike design, see Appendix O, Civil Design Analysis.

2.3.3.5.7 The dredged material would be dewatered by a progressive trenching method. The water that drains from the dredged materials during consolidation and from preceiption would be collected along with the groundwater from the gradient control system and discharged to the East Chicago wastewater treatment plant for final treatment. A facility would be installed on-site to provide initial treatment, if necessary, to meet East Chicago Sanitary District pre-treatment standards. For a detailed discussion of the discharge of the drainage water into the sewer system, see Appendix I, Effluent Pretreatment.

2.3.3.5.8 Final closure design of the CDF would entail the placement of six feet of material above the final layer of dredgings. The six feet of material would consist of 3 feet of compacted clay, six inches of sand, two feet of clean fill, and six inches of seeded topsoil. The clay would seal the CDF and provide for the RCRA capping of parcel IIA. The sand would provide for drainage of rainwater off of the CDF. Exterior slopes of dikes would be covered with top-soil, seeded and landscaped to prevent erosion and enhance the visual appearance of the dikes. After final closure, maintenance of the CDF will include the removal of any volunteer vegetation which could impact the hydraulic conductivity of the compacted clay liner.

2.3.3.6 ECI Site: Dredging Alternative 2 - Complete Federal Channel Dredging

2.3.3.6.1 This CDF would occupy approximately 131 acres of the ECI site (the site is described in paragraph 2.3.3.5.1 and shown on Plate EIS 16). The dike design and RCRA closure/corrective action features would be similar to ECI Site: Dredging Alternative 1. The main difference would be that a third, separate cell (covering 43 acres) would be constructed north of the railroad spur track (EIS Plate 7); the two other cells, located south of the railroad spur, would cover 88 acres. The southwest cell would be divided to create a subcell to segregate TSCA sediments from the non-TSCA dredged material. The CDF would accommodate approximately 4.67 million cubic yards of dredged material and have a design life of about 32 years. This CDF design would allow more dredging (and subsequent drying) during the first several years of operation, and eliminate the sediment backlog in the navigation channel more quickly.

2.3.3.6.2 The various elements required to complete RCRA closure/corrective action at the ECI site have been incorporated into the proposed CDF design under Alternative 2. These include: (1) a slurry wall around the perimeter of ECI parcels I, IIA and IIB extending from the ground surface down about 33 feet to the stiff clay underlying the site; (2) a clay cap on parcel I, tied into the slurry wall; (3) a groundwater monitoring/gradient control system on Parcels I, IIA, and IIB; and (4) installation of an on-site facility for pre-treatment of groundwater collected from parcels I, IIA, and IIB, if needed. The CDF, when closed, would act as the final RCRA cap for parcels IIA and IIB.

2.3.3.6.3 A cross-section through the CDF is shown on EIS Plate 6. The dikes would be built in three stages, in incremental lifts of 15, 10 and 10 feet, respectively.

2.3.3.6.4 The first-stage earth dikes would be built of off-site clean materials. The second stage dikes would be built of offsite materials 9 to 17 years after initial dike construction. The dikes would be built atop a 3-foot layer of compacted clay tied into the slurry wall. The interior sideslopes would be lined with a 3-foot layer of compacted clay, tied into the bottom clay layer.

2.3.3.6.5 Offsite materials would be used to build the initial 10-foot lift of the dike separating the two cells south of the railroad spur; dried dredged material would be used to continue construction of this dike. The interior dikes surrounding the TSCA subcell will be built from dried dredged material after completion of the initial dredging operations.

2.3.3.6.6 The final six feet of the third-stage lift would consist of 3 feet of compacted clay, six inches of sand, two feet of clean fill, and six inches of seeded topsoil. The clay would seal the CDF and provide for the RCRA capping of parcels IIA and IIB. The sand would provide for drainage of rainwater off of the CDF. Exterior slopes of dikes would be covered with topsoil, seeded and landscaped to prevent erosion and enhance the visual appearance of the dikes. After final closure, maintenance of the CDF will include the removal of any volunteer vegetation which could impact the hydraulic conductivity of the compacted clay liner.

2.3.3.6.7 Dredged material would be placed in the CDF in lifts of about 3 feet until 2 to 3 feet of freeboard remained; at that point the containment dikes would be raised. Limiting the lifts to 3 feet would speed drying of the dredged materials.

2.3.3.6.8 Each cell would be graded toward a dewatering sump to prevent ponding. Placement of dredged material would begin at the higher end of each cell and proceed toward the sump. The initial placement of dredged material is expected to be "windrowed" (placed in long, parallel piles with space between piles for truck

access) on the bottom of the CDF. Dump trucks would enter the CDF and dump the dredged material into rows 3 to 4 feet high. Subsequent lifts would be windrowed, or dumped from the edge and redistributed with heavy equipment.

2.3.3.6.9 The dredged material would be dewatered by a progressive trenching method. The water that drains from the dredged materials during consolidation and from preceiption would be collected along with the groundwater from the gradient control system and discharged to the East Chicago wasteater treatment plant for final treatment. A facility would be installed on-site to provide intial treatment, if necessary, to meet East Chicago Sanitary District pre-treatment standards. For a detailed discussion of the discharge of the drainage water into the sewer system, see Appendix I, Effluent Treatment.

2.3.3.6.10 Dredging Alternative 2 is described in paragraph 2.3.2.4 and shown on EIS Plate 4. Under this alternative, all three cells or cells would be built and filled. In the first year of operation the southwest cell dikes would be built. In the second year, dredged material would be placed in the southwest cell while the dikes of the southeast and north cells were being constructed. Dredged material would be placed in the southeast and north cells during the third year, while the existing dredged material in the southwest cell would be managed to speed drying and solidification. Placement of dredged material would then be alternated between the southwest cell in one year and the north and southeast cells in the following year, over the next six-year period. No dredging would be done in the following year. Dredging and disposal would be done subsequently on a four-year cycle until the three cells were filled to capacity in about 2029 and then capped with clay. This cycle would involve rotating disposal annually between the three cells, with no dredging in the fourth year.

2.3.3.6.11 PCB contaminated sediments will be disposed of in a TSCA-approved subcell constructed within the northwest portion of parcel IIA. The cell is expected to be completed prior to the year 2004. The elements required to comply with the TSCA disposal requirements have been incorporated into the proposed CDF design. These include a slurry wall with a hydraulic conductivity of 10^{-7} cm/sec around the perimeter of parcels I, IIA and IIB that ties into the stiff clay underlying the site; a groundwater gradient control system; stiff clay; on-site pre-treatment of groundwater collected from parcel IIA, if needed; segregation of PCB contaminated sediments from non-PCB sediments and capping of parcel IIA with three feet of clay, six inches of sand, two feet of clean fill and six inches of seeded topsoil. TSCA maintenance and monitoring requirements will be integrated into the maintenance and monitoring requirements for the CDF.

2.3.3.6.12 Parcel I previously housed the RCRA hazardous waste units at the facility. These structures were razed along with the rest of the above ground structures, but were never closed in conformance with the RCRA regulations. Proposals for the closure of RCRA hazardous waste units in the State of Indiana must be approved by the IDEM. Due to the ubiquitous nature of the on-site contamination on this parcel, the U.S. EPA and IDEM determined that closure in-place would be most appropriate for the area which previously housed the hazardous waste units. The in-situ closure design for parcel I would include slurry wall, a gradient control system consisting of groundwater extraction wells which would maintain groundwater flow into this portion of the CDF and an over-lying 3-foot compacted clay cap with a hydraulic conductivity of 10^{-7} cm/sec. The compacted clay cap would be placed on the existing surface and would overlie parcel I. The slurry wall would extend approximately 33 feet from the ground surface into an underlying clay till unit. The U.S. EPA has determined that construction of these components would also address the corrective action requirements for parcel I. These RCRA closure and corrective action components have been incorporated into the proposed CDF design. Once constructed, parcel I would be subject to the RCRA post-closure care and permitting requirements applicable to hazardous waste units for maintenance and monitoring. The post-closure care requirements under RCRA would be integrated into the maintenance and monitoring requirements for the CDF.

2.3.3.6.13 The CDF will also overlie facility parcels IIA and IIB. Unlike parcel I, these portions of the site never housed hazardous waste units and are not subject to the RCRA closure requirements. However, these facility portions are subject to the

RCRA corrective action requirements, which addresses releases associated with waste handling practices to the environment. The implementation of corrective action within the State of Indiana is currently the responsibility of the U.S. EPA. Given the apparent widespread contamination of these parcels, the U.S. EPA determined that an acceptable corrective action would be similar to the proposed corrective action outlined above for parcel I. This would consist of a perimeter slurry wall associated with a hydraulic conductivity of 10^{-7} cm/sec tied into the underlying clay unit, and a groundwater removal system consisting of groundwater extraction wells placed within the interior of the slurry wall. The final cap for this site would be accomplished at the same time as final closure of the CDF. The corrective action components for Parcels IIA and IIB would be incorporated into the CDF design and connected to the closure/corrective action components for parcel I. The corrective action maintenance and monitoring requirements for these facility parcels would integrated into the maintenance and monitoring requirements of the CDF.

2.3.3.7 ECI Site: Dredging Alternative 3 - Cooperative Dredging Program

2.3.3.7.1 The RCRA closure/corrective action features and the CDF features for ECI Site: Dredging Alternative 3 - Cooperative Dredging Program, are identical to those described for Dredging Alternative 2 and identified on EIS Plate 7. The difference between these two alternatives is that Dredging Alternative 3 incor-porates the disposal of the Inland Steel Company Consent Decree dredged material as indicated in paragraph 2.3.2.5 and indicated on EIS Plate 4. The Consent Decree dredging is not included in Dredging Alternative 2. Alternative 3 also incorporates the RCRA closure and corrective action elements described in Alternative 2.

2.3.3.7.2 Under Dredging Alternative 3 all three cells would be built and filled. In the first year of operation the southwest cell dikes would be built. In the second year dredged material would be placed in the southwest cell while the dikes of the southeast and north cells were being constructed. Dredged material would be placed in the southeast and north cells during the third year, while the existing dredged material in the southwest cell would be managed to speed drying and solidification. Placement of dredged material would then be alternated between the southwest cell in one year and the north and southeast cells in the following year, over the next eight-year period. No dredging would be done in the following year. Dredging and disposal would be done subsequently on a four-year cycle until the three cells were filled to capacity in about 2028 and then capped with clay. This cycle would involve rotating disposal annually between the three cells, with no dredging in the fourth year.

2.3.3.7.3 PCB contaminated sediments will be disposed of in a TSCA-approved subcell constructed within the northwest portion of parcel IIA. The cell is expected to completed prior to the year 2004. The elements necessary for compliance with the TSCA disposal requirements have been incorporated into the proposed CDF design and are the same as those listed in section 2.3.3.6.10. As in Alternative 2, TSCA maintenance and monitoring requirements will be integrated into the maintenance and monitoring requirements for the CDF.

2.3.3.8 ECI Site: Dredging Alternative 3 Modified - Cooperative Dredging Program (Selected Plan)

2.3.3.8.1 The CDF under this alternative would occupy approximately 131 acres of the ECI site (the site is described in paragraph 2.3.3.5.1 and shown on Plate EIS 16). The dike design and layout would be modified as shown on EIS Plates 18 and 19 to account for additional CDF volume created by moving the CSX Railroad spur to the north edge of the site. The RCRA closure/corrective action features would be the same as in ECI Site: Dredging Alternative 3. Relocating the rail-road spur would delete the need for one of two CDF dikes which would run parallel to the existing spur under ECI Site: Dredging Alternative 3, as shown on EIS Plate 7. In addition, due to the additional capacity in the CDF created by moving the rail spur, there would be no need for the Stage III dike construction as required in Dredging Alternative 3. Alternative 3 Modified would require only a two-stage dike construction, as shown on EIS Plate 19. The CDF would be constructed as three separate cells, two in the southern portion of the ECI site and one in the northern portion, as shown on EIS Plate 18. The west cell on the southern portion of the site would be divided to create an isolated subcell for

disposal of TSCA level PCB contaminated sediments. The CDF would accommodate approximately 4.68 million cubic yards of dredged material and have a design life of about 30 years.

2.3.3.8.2 The RCRA closure/corrective action features and the CDF features for ECI Site: Dredging Alternative 3 Modified - Cooperative Dredging Program, are identical to those described for Dredging Alternative 3 and identified on EIS Plate 7. Dredging Alternative 3 Modified incorporates the disposal of the Inland Steel Company Consent Decree dredged material as indicated in paragraph 2.3.2.5 and shown on EIS Plate 4.

2.3.3.8.3 A cross-section through the CDF is shown on EIS Plate 19. The dikes would be built in two stages, in incremental lifts of 15 and 13 feet, respectively.

2.3.3.8.4 The first-stage earth dikes would be built of off-site clean materials. The second stage dikes would be built of offsite materials approximately 9 years after initial dike construction. The dikes would be built on top of a 3-foot layer of compacted clay tied into the slurry wall. The interior sideslopes would be lined with a 3-foot layer of compacted clay, tied into the bottom clay layer.

2.3.3.8.5 Onsite materials would be used to build the initial 10-foot lift of the interior dikes separating the three CDF cells; dried dredged material would be used to continue construction of these dikes. The interior dikes surrounding the TSCA subcell would be built from dried dredged material after completion of the initial dredging operations.

2.3.3.8.6 The final six feet of the second-stage lift would consist of 3 feet of compacted clay, six inches of sand, two feet ofclean fill, and six inches of seeded topsoil. The clay would seal the CDF and provide for the RCRA capping of parcels IIA and IIB. The sand would provide for drainage of rainwater off of the CDF. Exterior slopes of dikes would be covered with topsoil, seeded and landscaped to prevent erosion and enhance the visual appearance of the dikes. After final closure, maintenance of the CDF will include the removal of any volunteer vegetation which could impact the hydraulic conductivity of the compacted clay liner.

2.3.3.8.7 Dredged material would be placed in the CDF in lifts of about 3 feet until 3 to 4 feet of freeboard remained; at that point the containment dikes would be raised. Limiting the lifts to 3 feet would speed drying of the dredged materials.

2.3.3.8.8 Each cell would be graded toward a dewatering sump to prevent ponding. Placement of dredged material would begin at the higher end of each cell and proceed toward the sump. The initial placement of dredged material is expected to be "windrowed" (placed in long, parallel piles with space between piles for truck access) on the bottom of the CDF. Dump trucks would enter the CDF and dump the dredged material into rows 3 to 4 feet high. Subsequent lifts would be windrowed, or dumped from the edge and redistributed with heavy equipment.

2.3.3.8.9 The dredged material would be dewatered by a progressive trenching method. The water that drains from the dredged materials during consolidation and from preceiption would be collected along with the groundwater from the gradient control system treated and discharged to the canal. For a detailed discussion of the discharge of the drainage water, see Appendix I, Effluent Treatment.

2.3.3.8.10 Under Dredging Alternative 3 Modified all three cells would be built and filled. In the first year of operation the southwest cell dikes would be built. In the second year dredged material would be placed in the southwest cell while the dikes of the southeast and north cells were being constructed. Dredged material would be placed in the southeast and north cells during the third year, while the existing dredged material in the southwest cell would be managed to speed drying and solidification. Placement of dredged material would then be alternated between the southwest cell in one year and the north and southeast cells in the following year, over the next seven-year period. No dredging would be done in the following year. Dredging and disposal would be done subsequently on a four-year cycle until the three cells were filled to capacity in about year 2030 and then capped with clay. This cycle would involve rotating disposal annually between the three cells, with no dredging in the fourth year.

2.3.3.8.11 PCB contaminated sediments will be disposed of in a TSCA-approved subcell constructed within the northwest portion of parcel IIA. The cell is expected to completed prior to the year 2004. The elements necessary for compliance with the TSCA disposal requirements have been incorporated into the proposed CDF design and are the same as those listed in section 2.3.3.6.10. As in Alternative 2, TSCA maintenance and monitoring requirements will be integrated into the maintenance and monitoring requirements for the CDF.

2.3.3.9 Generic Clean Upland Site

2.3.3.9.1 A generic clean upland site (EIS Plates 10 and 11) was studied for comparative purposes. Using an environmentally clean site is an alternative to using a contaminated location (such as the ECI site). No such clean sites exist in the immediate vicinity of the harbor and canal.

2.3.3.9.2 The U.S. EPA and Indiana Department of Environmental Management indicated in 1992 that a CDF on a clean upland site would have to be a "bathtub" design, with total separation between the CDF and the clean site and underlying groundwater. Construction of several very expensive liners and monitoring layers would be necessary.

2.3.4 Sediment Treatment Technologies

2.3.4.1 Because of the presence of sediments having concentrations of PCBs greater than or equal to 50 parts per million (ppm) in Indiana Harbor and Canal, a portion of the dredged material is regulated for disposal under TSCA. PCB and PCB contaminated sediments must be disposed of in a TSCA-approved incinerator or chemical waste landfill. Upon application, and subject to the approval of the U.S. EPA Regional Administrator, PCB and PCB contaminated sediments may also be disposed of by an alternate disposal method, such as a CDF. The applicant must demonstrate that the alternative disposal method provides adequate protection to health and the environment and that disposal in an incinerator or chemical waste landfill is not reasonable and appropriate. As part of the compliance with the PCB alternate disposal requirements, and in response to comments from the public and agencies during the Draft EIS scoping coordination, the USACE has conducted an analysis of the applicability of treatment technologies to dredged materials from Indiana Harbor and Canal.

2.3.4.2 Eighteen sediment treatment technologies were examined and screened based on technical feasibility factors. From this analysis, the following technologies were selected for additional evaluation: incineration, chemical extraction, wet air oxidation, and solidification/stabilization. These treatment technologies are briefly summarized in the following paragraphs. The results of these evaluations are discussed in the preceding Comprehensive Management Plan and are presented in Appendix G, Application of Treatment Technologies to Contaminated Sediments.

2.3.4.3 When dealing with large volumes of dredged materials, treatment tech-nologies cannot be used without a confined disposal facility. Some form of CDF would be required for temporary storage, dewatering, and disposal of residual materials. Of the treatment technologies evaluated and demonstrated by the ARCS program, no single technology was found to be effective on all contaminants. Typically technologies are designed to handle either the organic contaminants, such as PCBs or PAHs, or the heavy-metal contaminants. The sediment within the Indiana Harbor and Canal is heavily contaminated with both organic and heavy-metal contaminants and therefore it is unlikely that any single treatment technology can adequately treat those sediments.

2.3.4.4 Incineration

2.3.4.4.1 Incineration uses high temperature (700 to 1,700 degrees C) thermal oxidation to convert organic wastes to ash and gaseous combustion products. The types of incinerators capable of handling dredged material include multiple hearth, rotary kiln, and fluidized bed incinerators; an on-site rotary kiln is the type of incinerator with the greatest potential for application to dredged material from the IHC. The destruction and removal efficiency of an incinerator depends on three factors: temperature, the amount of mixing which occurs between the air and the waste material, and the residence time of the waste material in contact with air in the

incinerator. Since the heating value (BTU content) of dredged material is too low to sustain combustion, special pretreatment such as dewatering and blending with fuel oil may be required to make incineration feasible. Gravity dewatering requires long holding periods in containment facilities. Dewatering requirements significantly impact the technical feasibility of incineration and could be prohibitive.

2.3.4.5 Chemical Extraction

2.3.4.5.1 Extraction is the removal of chemical constituents from contaminated material with the goal of producing an uncontaminated residue. Chemical solvent extraction is the transfer of contaminants from a solid or a liquid to another medium, generally a fluid, for treatment and disposal by another set of processes. Since metals cannot be degraded, they can only be removed and relocated. Sometimes treatment of organic contaminants after extraction can be carried out under more favorable conditions, at lower risk, and at reduced costs.

2.3.4.5.2 Solvent extraction has primarily been used to recover certain organic chemicals from wastewater (liquid extraction). Application of solvent extraction to mixtures of solids and water such as dredged material is still developmental. Various solvents are potentially applicable to dredged material including alcohols, amines, ketones, glycols, benzene, toluene, kerosene, Freon, and others. Finding a solvent that meets all criteria for an optimal system design is a difficult task. Unless degradation of organics after solvent extraction is more feasible than direct application of degradation processes to contaminated dredged material, solvent extraction may not be cost effective.

2.3.4.6 Wet Air Oxidation

2.3.4.6.1 Wet air oxidation is a technology based on aqueous phase oxidation of contaminants at elevated temperature and pressure. Contaminants are oxidized at temperatures that are significantly lower than incineration temperatures. Wet air oxidation uses temperatures of 250 to 325 degrees C and pressures from 1,000 to 2,000 psi. Destruction efficiencies for PCBs are around 30-50 percent. The process has not been demonstrated for soils or dredged material.

2.3.4.7 Solidification/Stabilization

2.3.4.7.1 Solidification/stabilization is one of a group of processes that immobilize contaminants through physical, chemical, or combined physical/chemical reactions. Solidification is accomplished by adding setting agents that react with water to form a hardened mass, somewhat like concrete. Typical setting agents include portland cement, lime, fly ash, kiln dust, slag, and combinations of these materials. Stabilization (chemical immobilization) of organic contam-inants against aqueous leaching is generally not thought to occur when portland cement and pozzolan-based systems are used.

2.3.4.8 Sediment Treatment Technology Plan. A conceptual plan of applying treatment technologies in the disposal of dredged materials from the Indiana Harbor and Canal is illustrated in EIS Plate 15. The treatment plan includes a solvent extraction process to treat the PCBs and PAHs followed by solidification/stabilization to immobilize the heavy metals. The effectiveness of these processes has been evaluated by the U.S. EPA ARCS program in pilot-scale demonstrations.

2.3.5 Structure Maintenance

2.3.5.1 The recommended plan calls for the long-term operation and maintenance of all existing structures associated with this Federal project. Such structures may include, but are not limited to, breakwaters, bulkheads, and bridge abut-ments. Continuing these activities would ensure safe navigation within the Federal channel into the future. Maintenance activities would typically involve routine repairs such as the placement of new stone, concrete, asphalt or steel sheet piling on existing structures or the complete removal of old structures and replacement with similar, but new materials. These activities qualify as categorical exclusions under the National Environmental Policy Act (NEPA) (33 CFR 230.9) and require no further NEPA documenta-tion. However, such activities still must fulfill the requirements of all other

environmental laws and regulations. Major rehabilitation or new construction is not part of the proposed plan and is not categorically excluded or covered by this environmental document.

2.3.6 Borrow Areas

2.3.6.1 Much of the construction material for the various alternative plans would have to be obtained offsite. The stone for the CDF at the Inland Steel site and for structure maintenance activities of the Federal channel would come from existing, commercial quarries. The earth fill materials (i.e. native soils and miscellaneous fill), clay, drainage materials (sand or gravel), and topsoil for the dikes and cap of several of the alternative upland sites would come from existing, commercial sources, or sites provided by the construction contractor. Sites provided by the contractor that have not previously been used for borrow material would have to be evaluated and additional environmental documentation prepared at a later date when the location of the site(s) is made available. It is impossible to specify such potential sites at this time, particularly for the clay cap material which would not be required for approximately 30 years. Concrete, cement, bentonite clays, and synthetic fabrics used in the dike liners would come from existing, commercial sources. Concrete, asphalt, and steel sheet-piling used for structure maintenance would come from existing, commercial sources.

2.4 COMPARATIVE IMPACTS OF ALTERNATIVES

2.4.1 The comparative impacts of the various alternative actions are summarized in Table EIS-1. This table compares the alternatives based on the impacts to existing area resources. The disposal alternatives have also been compared using a mathematical model where the mass (pounds) of contaminants lost to water (surface and groundwater) and air have been estimated for each disposal alter-native. Two points in time are considered; the first is when the CDF is half filled or what is considered average operating conditions, while the other is after the CDF has been capped or the long term scenario. The results are summarized in Table EIS-2. It should be noted that the effluent contaminant pathway, defined in Table EIS-2, is not a true loss pathway to the environment since this flow stream will be directed to further treatment. Also, the seepage pathway loss is based on pore water concentration assuming no sorption to soils. The contaminant loss from the ECI Site: Alternative Dredging Plans 2 and 3 would be approximately 50 percent more than that of ECI Site: Alternative Dredging Plan 1 as those plans would cover approximately 43 more acres of the site (a surface coverage increase of approximately 50 percent). The analytical method used to develop these loss estimates are described in Appendices C, "No Action" Alternative, and F, Environmental Engineering.

2.4.2 A comparison of contaminant losses for the no action alternative and the tentatively recommended plan are provided in Table EIS-3. The numbers represent the mass of contaminants lost over the project lifetime which is approximately 35 years. The mass loss is based on current conditions within the project area remaining constant, and does not account for any future changes to land use within the project area.

2.4.3 Structure maintenance activities may cause temporary, localized increases in turbidity, but this would not cause significant impacts. Such activities are categorically excluded from further evaluation under the National Environmental Policy Act. There would be no significant impacts associated with the use of existing, commercial sources of borrow/construction materials. The impacts at potential borrow sites provided by the contractor cannot be assessed at this time.

Table EIS-1 Comparative Impacts of the Alternative Plans

Resource	No Action	Channel Dredging	Advanced Treatment Technologies	Confined Disposal Facility Site				Structure Maintenance	Borrow Areas
				141st St.	J-Pit	Inland Steel	ECI Plans		
Geology/ Soils	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	Permanent removal of on-site soils, sand, gravel, or rock.
Groundwater	Any existing groundwater contamination at upland sites remain.	No impact.	Long-term isolation of potential groundwater contaminants	Isolation of groundwater contamination underneath the site.	No significant impacts.	No significant impacts.	Isolation of groundwater contamination underneath the site for original ECI plan. No impact EMS or EMC plans.	No impact.	Can not be determined at this time.
Sediment Quality	Existing sediments remain as a source of contamination to the Grand Calumet River and Lake Michigan	Removal of contaminated sediments from the Canal and Harbor. Reduction of contaminants entering Lake Michigan.	Removal and destruction or immobilization of some contaminants.	Containment of contaminated sediments on the site.	Containment of contaminated sediments on the site.	Containment of contaminated sediments on the site.	Containment of contaminated sediments on the site.	No impact.	No impact.
Water Quality	Continuation of water quality degradation due to contaminant release from sediments.	Short-term, localized increase in turbidity, suspended solids, and soluble contaminants. Long-term elimination of contaminant source.	Effluents from these technologies would require treatment prior to being discharged. Impacts similar to confined disposal.	No significant impact. Effluent would be discharged to the Hammond Wastewater Treatment Plant.	No significant impact. Effluent would be discharged to the Gary Sanitary Dist. Wastewater Treatment Plant.	Short-term, localized impact to Lake Michigan. Mixing with Lake Inland waters would quickly return mixing zone to ambient conditions.	No significant impact. Effluent would be discharged to the East Chicago Wastewater Treatment Plant.	Sediment resuspension would cause localized, short-term decrease in water quality.	Can not be determined at this time.
Terrestrial Communities	No significant changes in existing conditions. Continued potential for contaminant impacts in the food chain.	Potential for temporary increases in contaminant uptake during dredging.	Similar impacts as those for confined disposal sites.	Loss of several acres of wetlands requiring mitigation. Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	Loss of several acres of wetlands requiring mitigation. Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	Potential for contaminant uptake by vegetation and wildlife prior to CDF capping.	No significant impacts.	Can not be determined at this time.
Threatened and Endangered Species	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	Can not be determined at this time.
Natural Areas and Public Lands	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	Can not be determined at this time.
Archaeological and Historic Resources	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	No impact.	Can not be determined at this time.
Social Setting	Loss of waterborne commerce impacting area economy.	Temporary disruptions, but long-term benefits for commercial navigation.	Long-term operation impacts of increased odors, employment, noise, and traffic plus initial impacts of CDF construction.	Increased truck traffic resulting from hauling construction, dredged, and cap materials to the site.	Increased truck traffic resulting from hauling construction, dredged, and cap materials to the site. Impacts to	Increased traffic if cap material is hauled to site by truck.	Increased truck traffic resulting from hauling construction cap materials to the site.	Temporary, localized disturbances during repairs.	Temporary, local increases in area noise, dust, and traffic.

Table EIS-1 (Cont'd) Comparative Impacts of the Alternative Plans

Resource	No Action	Channel Dredging	Advanced Treatment Technologies	Confined-Disposal Facility Site				Structure Maintenance	Borrow Areas
				141st St.	J-Pit	Inland Steel	ECI Plans		
Air Quality	Continued loss of volatile contaminants across the water/air interface of the canal, harbor, and lake to the air.	Potential for volatile contaminant release upon exposure of sediment to air, and from resuspension of solids.	Some volatile loss of contaminants from sediment drying, re-handling, and treatment.	Volatile contaminant release from drying sediments.	Volatile contaminant release from drying sediments.	Volatile contaminant release from drying sediments and CDF pond.	Volatile contaminant release from drying sediments.	Temporary increases in hydrocarbons due to equipment operations.	No signinficant impact.
Aquatic Communities	Continued exposure and uptake of contaminants by aquatic organisms.	Removal of benthic invertebrates and many contaminants. Exposure and uptake of contaminants by aquatic organisms due to sediment resupension and from underlying sediments.	Similar impacts as those for confined disposal sites.	Permanent loss of several acres of existing, degraded aquatic resources. Long-term reduction in contaminants impacting Lake Michigan aquatic resources.	Permanent loss of several acres of existing, degraded aquatic resources. Long-term reduction in contaminants impacting Lake Michigan aquatic resources.	Permanent loss of about 70 acres of nearshore habitat. Loss would occur with or without Federal action. Long-term reduction in contaminants impacting Lake Michigan aquatic resources.	No impacts.	No significant impacts.	Can not be determined at this time.
Energy Requirements	No significant impacts.	No significant impacts.	Large quantities of fuel or electricity would be required.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.
Cumulative Impacts	IHC would continue to be a significant source of contaminated sediments to Lake Michigan. Cumulative impacts of this source combined with other similar sources could be significant.	Significant reductions in contaminated sediments entering Lake Michigan would occur.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	Can not be determined at this time.

Table EIS-2 Contaminant Loss for Average Operating Conditions and Capped Conditions (Lbs/Yr)[1/]

	141st Site						J-Pit Site					
	Average Operating Conditions			Capped Operating Conditions			Average Operating Conditions			Capped Operating Conditions		
Constituent	Seepage	Effluent	Volatile	Total	Seepage	Effluent	Volatile	Total	Seepage	Effluent	Volatile	Total	Seepage	Effluent	Volatile	Total
Arsenic	0.069	0.06		0.12	0.02	0.03		0.050	0.063	0.094		0.16	0.032	0.035		0.67
Cadmium	0.023	0.02		0.038	0.008	0.008		0.016	0.021	0.026		0.047	0.011	0.010		0.021
Chromium	0.29	0.50		0.80	0.11	0.24		0.35	0.27	0.85		1.1	0.14	0.31		0.45
Copper	1.0	0.10		1.1	0.37	0.07		0.44	0.95	0.17		1.1	0.48	0.094		0.57
Iron	23	3.0		26	8.2	1.8		10	21	4.5		26	10	2.3		12
Lead	0.44	0.33		0.77	0.16	0.17		0.33	0.40	0.56		0.96	0.20	0.21		0.41
Manganese	0.10	1.0		1.1	0.040	0.47		0.51	0.095	1.7		1.8	0.048	0.61		0.66
Mercury	0.0010	0.0061		0.0071	0.0004	0.003		0.0034	0.00090	0.010		0.011	0.00046	0.0037		0.0042
Nickel	0.88	0.020		0.90	0.32	0.03		0.35	0.81	0.03		0.84	0.41	0.041		0.45
Zinc	1.6	1.0		2.6	0.59	3.2		0.59	1.5	1.7		3.2	0.75	0.64		1.4
Ammonia	1500	22		1500	540	49		590	1400	37		1400	700	63		760
Phosphorous	10	1.0		11	3.5	0.8		4.3	9.0	2.0		11	4.6	1.0		5.6
PCBs	0.000071	0.000072	1.3	1.3	0.000020	0.000020	----	0.000040	0.000045	0.000085	1.4	0.000023	0.000023	0.000032	----	0.000055

	Inland Steel Company Site								ECI Site							
	Average Operating Conditions				Capped Operating Conditions				Average Operating Conditions				Capped Operating Conditions			
Constituent	Seepage	Effluent	Volatile	Total	Seepage	Effluent	Volatile	Total	Seepage	Effluent	Volatile	Total	Seepage	Effluent	Volatile	Total
Arsenic	0.033	0.49		0.52	0.29	0.32		0.061	0.7	0.10		0.17	0.034	0.038		0.72
Cadmium	0.014	0.83		0.84	0.010	0.0090		0.019	0.23	0.028		0.051	0.011	0.010		0.021
Chromium	0.15	4.5		4.7	0.13	0.29		0.42	0.30	0.92		1.2	0.15	0.33		0.48
Copper	0.49	5.4		5.9	0.44	0.087		0.53	1.0	0.18		1.2	0.51	0.10		0.61
Iron	10	89		99	10	2.1		12	23	4.9		28	11	2.5		14
Lead	0.21	4.4		4.6	0.19	0.20		0.39	0.44	0.61		1.1	0.22	0.23		0.45
Manganese	0.085	9.0		9.1	0.044	0.58		0.62	0.10	1.9		2.0	0.050	0.68		0.73
Mercury	0.0006	0.055		0.056	0.00042	0.0034		0.0038	0.0010	0.011		0.012	0.00049	0.0040		0.0045
Nickel	0.41	4.1		4.5	0.38	0.038		0.42	0.89	0.037		0.93	0.44	0.044		0.48
Zinc	0.79	14		15	0.69	0.59		1.3	1.6	1.8		3.4	0.80	0.69		1.49
Ammonia	670	71		740	640	58		700	1500	40		1500	740	67		810
Phosphorous	4.0	17		21	4.20	0.93		5.1	10	2.1		12	4.9	1.1		6.0
PCBs	0.000068	0.000045	0.28	0.28	0.000021	0.000029	----	0.000050	0.000049	0.000092	1.6	1.6	0.000024	0.000034	----	0.000058

1/ Average operating conditions represent the situations when the CDF is at one-half capacity. Capped cxonditions represent long-term losses. Seepage is the mass loss from passage through the CDF. Effluent is the mass loss, prior to any pretreatment, which is routed to waste water treatment. Volatile is the mass loss from exposed and ponded sediment.

Table EIS-3 Comparison of Contaminant Losses Over 35-Year Project Life for No-Action and Recommended Plan

Constituent	Loadings from GRC/IHC to Lake Michigan (Lbs.) No-Action	Recommended Plan[1/]		Contaminant losses from Recommended Plan (Lbs.)
Total Suspended Solids	7,000,000,000	2,000,000,000	3,000,000,000	110,000
Arsenic	250,000	75,000	120,000	7
Cadmium	76,000	23,000	38,000	2
Chromium	2,600,000	770,000	1,300,000	49
Copper	940,000	280,000	470,000	49
Iron	660,000,000	200,000,000	330,000,000	1,100
Lead	3,800,000	1,100,000	1,900,000	42
Manganese	7,600,000	2,300,000	3,800,000	81
Mercury	4,800	1,400	2,400	0.50
Nickel	500,000	150,000	250,000	37
Zinc	20,000,000	6,000,000	10,000,000	140
Ammonia	5,800,000	1,800,000	3,000,000	62,000
Phosphorous	18,000,000	5,300,000	8,800,000	480
Oil & Grease	390,000,000	118,000,000	200,000,000	----
PCBs1	4,000	4,200	7,000	61[3/]

[1/] Represents a 70%-50% reduction from "No-Action" conditions.
[2/] Losses include seepage, effluent, and volatile over 35-year filling lifetime.
[3/] 60.5 lbs volatile loss and 0.01 lbs seepage and effluent loss.

SECTION 3 - AFFECTED ENVIRONMENT

3.1 PROJECT AREA DESCRIPTION

3.1.1 The Grand Calumet River/Indiana Harbor and Canal (GCR/IHC) system is located along the southwest end of Lake Michigan, in Lake County, Indiana (EIS Plates 1 and 2). The harbor is within the city of East Chicago. The area surrounding the harbor and canal is heavily industrialized. The primary industries are manufacturing, with the most notable related to production of steel, electricity, and petroleum. In addition to waterborne transportation, the area is serviced by major railroads and state and Federal highways (USACE, 1986).

3.2 CLIMATE

3.2.2.1 The area climate is continental, with warm summers and relatively cold winters. The climate is modified somewhat by the proximity of Lake Michigan (commonly referred to as the "Lake effect"). The average annual temperature is 50 degrees F, with a low average temperature of 25 degrees F in January and a high average of 75 degrees F in July. Average annual precipitation is around 34.5 inches. Snowfall comprises about one-half of the winter precipitation and one-tenth of the total annual precipitation (USACE, 1986).

3.3 PHYSICAL RESOURCES

3.3.1 Geology/Soil Types

3.3.1.1 General

3.3.1.1.1 The topography of the project area is generally flat, except for remnant beach ridges and man-made landfills and borrow pits. This flatness is largely the result of glacial action. Northwest Indiana, including the northern Lake County area, has undergone a series of geologic events which have shaped its current surface and subsurface features. Deposition and erosion of flat-lying sediments, followed by consolidation, account for the significant thicknesses of sedimentary rocks, up to 4,000 feet, which underlie the region. Three major glaciation events have occurred which has led to erosion of the sedimentary rock surface and the deposition of glacial till moraines on top of the bedrock surface. Glaciation was followed by the formation of an ancient glacial lake, which laid down the lacustrine deposits that constitute most of the near-surface soils in the area. Finally, a lowering of the glacial lake occurred, and sand dunes formed along beaches associated with the lake as it receded to the north. Today, those sand dunes are expressed at the surface as arc-shaped ridges parallel to the existing shoreline of Lake Michigan. Bedrock is approximately 100 feet to 150 feet below the ground surface in the project area.

3.3.1.1.2 The northern portion of Lake County lies in an area known as the Calumet Lacustrine Plain. Sediments in this area consist of fine lake silt and clay, swamp deposits of muck and peat, expansive beach and dune sand, glacial outwash sand and fine gravel with some till inclusions, and clay till of varying thickness and distribution. These general soil types are classified as part of the Oakville-Tawas Association (IDNR, 1976). The site-specific soil conditions at the four disposal sites are summarized below. A more detailed description of these soil conditions is provided in Appendix L, Soils and Geology.

3.3.1.2 141st St. Site

3.3.1.2.1 Surface soils on this site are composed of urban (fill) and Tawas muck. The site is surrounded by open water and marsh to the north and west, and urban lands to the east and south (Soil Conservation Service, 1972). This site is located within the youngest and northernmost of the relic beaches formed when glacial Lake Chicago was between 580 and 605 feet MSL. Test borings drilled at the tollway interchange to the southwest of the site indicate that the soils of the area consist of approximately 23 feet of sand, overlying silty clay. The relative strength of the silty clay increases from soft to hard with depth. The surrounding locality includes some swamp areas composed of Tawas muck (Rosenshein, 1961).

3.3.1.3 J-Pit Site

3.3.1.3.1 This site has been mined for sand in the recent past. The exposed bottom consists of silty clay. This site is located in another of the relic beaches along the south shore of Lake Michigan. This beach, known as the Calumet beach, was formed when the lake levels were an elevation of about 620 feet MSL. The sand thickness in the surrounding area is approximately 40 feet, covering about 40 feet of silty clay. The silty clay experiences an increase of strength with depth.

3.3.1.4 Inland Steel Site

3.3.1.4.1 This site is an entirely aquatic site enclosed within a bulkhead. Lake bottom sediments are primarily composed of lacustrine deposits of fine sands, silts, and clays. Soil borings taken prior to the construction of the Inland Steel Company bulkhead indicate that approximately 10 feet of sand overlie the finer bottom sediments. Due to the construction of the bulkhead and the creation of a stillwater area, additional fine sediments may have been deposited on the lake bottom over the sand.

3.3.1.5 ECI Site

3.3.1.5.1 The ECI site is a former petroleum refinery located near the 141st Street site, within the same relic beach formed when the Lake Chicago level was between 580 and 605 feet MSL. Soil borings drilled to the northeast of the site indicate approximately 33 feet of sand overlying stiff clay. The underlying soils on-site are heavily contaminated with substantial quantities of free-phase hydrocarbons. Estimates of the degree of contamination vary. In July 1990, the site was the source of a substantial oil spill into the Lake George Branch. Heavy rains caused an estimated 100,000 gallons of paraffin oil to flow into the canal.

3.3.1.6 Prime and Unique Farmland

3.3.1.6.1 All alternative disposal sites were evaluated with regard to the presence of prime and unique farmland in accordance with 7 CFR 658. None of the sites are presently being farmed or contain soils suitable for farming. None of the sites were found to contain prime or unique farmlands.

3.3.1.7 Generic Clean Upland Site

3.3.1.7.1 The northern portion of Lake County lies in an area known as the Calumet Lacustrine Plain. Sediments in this area consist of fine lake silt and clay, swamp deposits of muck and peat, expansive beach and dune sand, glacial outwash sand and fine gravel with some till inclusions, and clay till of varying thickness and distribution. These general soil types are classified as part of the Oakville-Tawas Association (IDNR, 1976).

3.3.2 Groundwater

3.3.2.1 The Calumet aquifer is an extensive, surficial, thin aquifer formed from the deposited dune, beach, and lacustrine soils in the Grand Calumet River drainage basin. The shallow Calumet aquifer underlies about 10 feet of overburden. Glacial till and lacustrine clay underlie the shallow aquifer. The Calumet aquifer is composed of fine to medium sand with a saturated thickness of 0 to 45 feet. The aquifer is generally thickest in the eastern part of the GCR/IHC watershed, thins to the west, and pinches out to lacustrine clay near the Indiana/Illinois State line.

3.3.2.2 The shallow Calumet aquifer discharges to the Little Calumet River, Grand Calumet River/Indiana Harbor and Canal system, and directly to Lake Michigan (IDEM, 1988). Preliminary analysis by USGS (Banaszak and Fenelon, 1988) indicates that the water table has been lowered by several feet from pre-urban, pre-industrial development conditions. This lowering appears to have been actuated by drainage of former marsh lands to sewers, ditches, and possibly downward leakage to the bedrock.

3.3.2.3 The major source of water for the municipalities located in northern Lake County, Indiana is Lake Michigan. The main reasons for this usage are cost, availability, quality, and the lack of significant groundwater sources in the unconsolidated soils, which are primarily fine silts and clays. A few thousand domestic wells are scattered throughout the region and are typically drilled into lacustrine sands less than 50 feet deep, with water level elevations between 580 feet and 590 feet MSL. A few wells have been drilled into the bedrock with water levels typically between an elevation of 560 feet and 570 feet MSL.

3.3.2.4 A preliminary study has been made of the aquifer area groundwater quality out of concern for potential contamination of surface waters of the area from groundwater discharge (Banaszak and Fenelon, 1988). Although the study is still preliminary, for some parameters analyzed in the aquifer study area there is a somewhat wide variation in groundwater quality which appears to be related to the variation in land use. Out of 88 organic chemicals tested for in the study, 67 were not detected in any well samples and 21 were detected in at least one well sample. Phenol was found in 35 samples from 35 wells with a median concentration of 3 ug/l and a maximum detected value of 310 ug/l. Benzene was found in 17 samples from 31 wells with a median concentration of 0.20 ug/l and a maximum of 1900 ug/l. Concentrations of ammonia nitrogen found in well samples ranged from 0.01 to 640 mg/l with a median of 0.80 mg/l.

3.3.2.5 There appears to be a distinct layer of petrochemical contamination on the surface of the shallow aquifer in areas around the Indiana Harbor and Canal. The distribution of this layer is not fully understood. Past industrial practices and the numerous petrochemical pipelines in the area are possible sources of this layer. At least two industries (LTV Steel and Amoco Oil) have active programs for reclaiming petrochemicals from the shallow groundwater within their properties and use this material as a fuel supplement. The reclaimed material is characterized as a Number 2 fuel oil. The site-specific groundwater conditions of the four disposal sites are summarized below. More detailed groundwater quality information is provided in Appendix F, Environmental Engineering.

3.3.2.6 <u>141st St. Site</u>

3.3.2.6.1 The groundwater table at and surrounding this site is approximately five feet below the surface. The drainage pattern of the shallow aquifer at this site is unknown and may be influenced by the Lake George Branch and wetlands to the north or the Hammond sewer system to the southwest. No domestic or other groundwater wells are known to exist in the immediate vicinity of this site. Monitoring wells in the vicinity of this site were found to have levels of benzene, iron, phosphorus, ammonia nitrogen, sulfate, and phenol higher than the average values of other wells studied in the Calumet aquifer (Banaszak and Fenelon, unpublished data).

3.3.2.7 <u>J-Pit Site</u>

3.3.2.7.1 A perched groundwater table near this site is above the bottom of the sand excavation. The site is maintained in a semi-dry condition by constantly pumping water from the bottom of the pit. The bedrock unit contains a confined aquifer beneath the site, approximately 140 feet below the original ground surface. The flow direction of the shallow aquifer at this site is unknown. This site appears to be on the divide between the Little Calumet River and GCR/IHC watersheds. There are a number of scattered domestic wells in the shallow aquifer in the Black Oak area of Gary near the J-Pit site. Monitoring wells in the vicinity of this site were found to have levels of chloride higher than the average value of other wells studied in the Calumet aquifer (Banaszak and Fenelon, unpublished data).

3.3.2.8 <u>Inland Steel Site</u>

3.3.2.8.1 The groundwater table at the Inland Steel site is interconnected with Lake Michigan. The bedrock aquifer exists at an elevation of approximately 100 feet below the current lake level. The Calumet aquifer drains into Lake Michigan, and there is no indication of groundwater recharge from the Lake in this area.

There are no known groundwater wells in the vicinity of this site. The quality of the shallow groundwater in the area is assumed comparable with the quality of Lake Michigan surface water since the two are contiguous.

3.3.2.9 ECI Site

3.3.2.9.1 The groundwater table at and surrounding this site is approximately five feet below the surface. The drainage pattern of the shallow aquifer at this site is unknown and may be influenced by the Lake George Branch to the south and pumping by petrochemical industries to the north and east. No domestic or other groundwater wells are known in the immediate vicinity of this site. Monitoring wells in the vicinity of this site were the same used for the 141st Street site. The monitoring results of these wells were previously discussed in section 3.3.2.6.1.

3.3.2.10 Generic Clean Upland Site

3.3.2.10.1 The Calumet aquifer is an extensive, surficial, thin aquifer formed from the deposited dune, beach, and lacustrine soils in the Grand Calumet River drainage basin. The shallow Calumet aquifer underlies about 10 feet of overburden. Glacial till and lacustrine clay underlie the shallow aquifer. The Calumet aquifer is composed of fine to medium sand with a saturated thickness of 0 to 45 feet. The aquifer is generally thickest in the eastern part of the GCR/IHC watershed, thins to the west, and pinches out to lacustrine clay near the Indiana/Illinois State line.

3.3.3 Sediment Quality

3.3.3.1 Section 404 of the Clean Water Act directs the USACE to regulate the discharge of dredged or fill materials in the waters of the United States. Guidelines for the evaluation of dredged or fill material were developed by the U.S. EPA in conjunction with the USACE (40 CFR 230). The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of the waters of the United States through the control of discharges of dredged or fill material.

3.3.3.2 Interim guidance on the application of these Guidelines was developed by the USACE in 1975 (USACE, 1976). The U.S. EPA and USACE are currently developing new guidance on the testing and evaluation of dredged material at a national and regional level. The Guidelines, interim guidance, and the new guidance under development all recommend that biological-effects-based evaluations be used to determine the suitability of dredged material for discharge to the waters of the United States. The physical and chemical properties of sediments may be a part of their evaluation, but can rarely be used alone to determine the suitability of a disposal alternative.

3.3.3.3 Sediments are sampled and tested for a variety of purposes, including academic studies of contaminant distribution, investigations of in-place sediment toxicity, and remedial evaluations of sediment treatability. Sediments to be dredged are tested and evaluated in order to determine their suitability for available disposal options and the need for controls to prevent or reduce contaminant-related impacts. The U.S. EPA and USACE recently published a technical framework for evaluating the environmental effects of dredged material management alternatives (USACE/U.S. EPA, 1992). This technical framework was adapted from the USACE "Management Strategy for Disposal of Dredged Material: Contaminant Testing and Controls" (Francingues et al., 1985). The USACE/U.S. EPA framework describes a number of testing and evaluation procedures developed specifically for dredged materials to evaluate contaminant migration pathways.

3.3.3.4 Lake Michigan

3.3.3.4.1 Sediment quality in Lake Michigan is influenced to some extent by littoral drift, shoals buffering deep-water wave action, and sediment quality in streams and channels tributary to the lake. Near shore currents contributing to littoral drift in southern Lake Michigan run parallel to the shoreline in a clockwise or counter clockwise direction depending upon the direction of the prevailing wind. Littoral drift currents are not only subject to changing wind directions but also natural obstructions such as the Indiana Shoals and man made obstructions such as the Indiana Harbor and Calumet Harbor complexes. These obstructions can provide pockets for sediment deposition and in the case of the

Indiana Harbor/Calumet Harbor system, a cell where scour and deposition rates between the structures balance out providing a stable shoreline. The Indiana Shoals are found northeast of Indiana Harbor at depths ranging from 17 to 35 feet. The Lake Michigan sediment deposits comprising the Indiana Shoals contribute to the stability of the shoreline by buffering deep-water wave action from the northeast.

3.3.3.4.2 Particles scoured and deposited and received from tributaries by littoral drift currents range in decreasing size from sand, to silt, to clay, to colloidal particles. Total solids may include particles of the larger sizes while dissolved solids may include particles smaller than the colloidal sizes. Colloidal, clay, and silt particles remain suspended longer once they are picked up by the currents during wave action or storms, and require calm water or very gentle currents to settle and redeposit. These smaller particles can be carried and spread further by the currents in many directions. Some pollutants tend to be adsorbed and held tightly by the smaller particles.

3.3.3.4.3 In an effort to examine surface sediment deposition quality in Lake Michigan around Indiana Harbor, a study was conducted by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) under contract with the USACE (Polls, 1988). Sediment grab samples were collected by MWRDGC along 5 radial transects from Indiana Harbor. The results of this study are discussed in Appendix C, "No Action" Alternative and summarized in Appendix E, Sediment Quality. Generally, bulk chemical concentrations of sediments in the lake were much lower than concentrations found in the Indiana Harbor and Canal. Moderate to high levels of lead were found in some sediment samples in all directions from the harbor. Polluted concentrations of lead, manganese, and zinc were found along the littoral cell bounded by Calumet and Indiana Harbors. Sediment samples analyzed east of Indiana Harbor showed the least number of moderately polluted samples (2 samples). Total volatile solids, oil and grease, arsenic, and total PCBs were at nonpolluted levels on all the Lake Michigan transects.

3.3.3.5 Grand Calumet River/Indiana Harbor and Canal

3.3.3.5.1 The GCR/IHC is, for the most part, a man-made waterway. The Indiana Harbor Canal began as drainage ditches which were excavated to navigation channels by local interests by 1914. Much of the Grand Calumet River has also been modified by municipalities and private industry. As a result, it is difficult to say there is a "natural" stream bed in the waterway. The bottom of the IHC was originally excavated to sand or clay till.

3.3.3.5.2 Nearly all of the GCR/IHC has deposits of fine-grained sediments which have accumulated over many years. The physical and chemical characteristics of these sediments reflects the land and water use practices of northwest Indiana. Significant sources of sediments and sediment contamination in the GCR/IHC include municipal and industrial discharges, combined sewer overflows, and urban runoff. It is estimated that about 182 million pounds of sediment are discharged to the GCR/IHC each year from these sources. The discharge and transport of sediment in the GCR/IHC is discussed further in Appendix C, "No Action" Alternative.

3.3.3.5.3 The bottom sediments in the Indiana Harbor and Canal have been extensively sampled by the USACE and U.S. EPA to determine the appropriate disposal methods for dredged materials. Samples were collected from the Federal navigation project in 1977, 1979, 1980, 1983, 1984, 1985, 1987, twice in 1988, 1990, 1991 and 1992. A discussion of the sediment sampling and testing conducted is provided in Appendix E, Sediment Quality.

3.3.3.5.4 There are approximately one million cubic yards of backlog dredging at Indiana Harbor and Canal. For the most part, the sediment deposits are deepest along the sides of the channel. Existing mid-channel depths are at or below project depth in much of the harbor and canal, except for the turning basin and Calumet and Lake George Branches.

3.3.3.5.5 The bulk chemistry from the discrete sampling events consistently shows high levels of most metals, nutrients, oil & grease, and volatile solids. Using the results of U.S. EPA and USACE sediment sampling, the volume-weighted

concentrations of measured contaminant parameters have been calculated. The concentrations determined from each sampling event were weighted against a representative volume of sediment in order to determine the average concentration. The results are shown in Table EIS-4. The Indiana Harbor and Canal Sediments are not suitable for open-lake disposal or beneficial uses.

Table EIS-4 Volume-Weighted Mean Concentrations of Indiana Harbor and Canal Sediments

Parameter	Volume-Weighted Mean Concentration[1/]
Volatile Solids	14%
COD	208,000
Oil & Grease	64,000
TKN	2,900
Ammonia	850
Cyanide	1
Manganese	1,900
Phosphorus	2,600
Arsenic	53
Barium	45
Cadmium	11
Chromium	370
Copper	160
Iron	145,000
Nickel	99
Lead	840
Zinc	3,700
Mercury	0.7
PCBs	8.9

[1/] All concentrations are mg/kg dry weight, unless otherwise noted.

3.3.3.5.6 Sampling in 1979 and 1983 detected PCBs in concentrations between 1 and 90 ppm. The highest concentrations were detected in the deeper layers in the most upstream portion of the Calumet River Branch, and along the north bank of the main canal between the Indiana Harbor Belt Railroad and Pennsylvania Railroad bridges. Based on this data, it is estimated that approximately 70,000 cubic yards of sediments are regulated for disposal under TSCA. However, data from a 1988 sampling event detected PCBs in concentrations below concentrations detected in previous sampling events.

3.3.3.5.7 In addition to bulk chemical testing of sediment samples, the USACE' management strategy has been applied to the Indiana Harbor project. Sediment testing has been conducted using this tiered protocol. The application of this management strategy led to the development of the recommended plan. The application of this management strategy is further detailed in Appendices E, Sediment Quality and F, Environmental Engineering.

3.3.3.5.8 In 1990, U.S. EPA collected core samples from six locations in the Indiana Harbor and Canal area. All of the samples were analyzed via the Toxicity Character-istic Leaching Procedure (TCLP), to determine the status of the project sediments under Subtitle C of RCRA in accordance with U.S. EPA policy. The USACE and the U.S. EPA have different national policies regarding the application of RCRA to dredged material. It is USACE policy that dredged material is not a solid waste, and its disposal is, therefore, not subject to the provisions of RCRA. That policy was established in an opinion of the Corps of Engineers' Chief Counsel in a DAEN-CCH 1st Indorsement, dated 7 June 1977, subject Resources Conservation and Recovery Act of 1976. In this opinion, the Chief Counsel determined that the RCRA of 1976 does not apply to Corps' generated dredged material, since it is not a "discarded material … resulting from industrial, commercial, mining, or agricultural operations …," in accord with Section 1004 (27) of the Act. In contrast, it is U.S. EPA policy that dredged material could require handling as a solid waste or potentially as a hazardous waste subject to the provisions of RCRA.

3.3.3.5.9 The 1990 TCLP results initially passed their laboratory review and were approved for regulatory use under U.S. EPA policy. However, further review of the 1990 TCLP results determined that the TCLP methodology for the organic constituents was not conducted properly and therefore the initial data approval for these compounds was reversed. During the interim, the 1991 TCLP sampling effort was completed. The 1991 sampling effort was based upon the results of the

1990 TCLP results. When the data quality problems associated with the 1990 results were found, U.S. EPA Region 5 decided to resample the entire Federal navigation channel in accordance with U.S. EPA policy in 1992. The purpose of the 1992 effort was to characterize the project sediments under Subtitle C of RCRA. The 1992 data was the basis of the regulatory determination provided by the U.S. EPA to the USACE in September 1993.

3.3.3.5.10 Only one regulatory exceedance was found to be associated with the 1990 TCLP data sets which was a benzene value included with the 1990 data set, which was found to have been obtained from a location outside of the limits of the navigation project. As noted above, this benzene value along with all of the organic data from the 1990 TCLP data was later found to be unusable for U.S. EPA regulatory determinations.

3.3.3.5.11 The 1992 sediment TCLP characterization effort consisted of the collection of 16 sediment core samples from 14 locations covering all sections of the Federal channel. Two of the 16 core samples were field duplicates which were collected from two separate locations in the channel. The samples were analyzed via the TCLP for metals, volatiles, semi-volatiles, pesticides, and herbicides. With the exception of one of the samples, all of the TCLP results were found to be acceptable for regulatory U.S. EPA determinations and to be below the TCLP regulatory thresholds. The sample with an exceedance was a field duplicate that failed for benzene and had a laboratory error which rendered that particular result unusable for regulatory determinations. Consequently, the U.S. EPA/IDEM determined that all of the project sediments, with the exception of the sediments associated with the benzene exceedance, would not be regulated as a RCRA hazardous waste if dredged. The sediments represented by the benzene exceedance were determined to be "presumptively hazardous" if dredged. The designation "presumptively hazardous" means that upon dredging, these sediments would require handling in accordance with RCRA Subtitle C, unless further retesting clarified that the sediments did not exhibit the hazardous waste characteristic of toxicity for benzene. The location of the "presumptively hazardous" sediments is shown on EIS Plate 17.

3.3.3.5.12 If these sediments continue to be classified by the U.S. EPA/IDEM as hazardous after further sampling and testing for benzene is completed, they will not be dredged as part of the Federal navigation project. These materials will have to be addressed as part of the site-specific remedial activities which will be undertaken in the berthing/dock areas adjacent to the Federal channel. If these sediments are dredged in the absence of further testing, they will require treatment in accordance with the standards under Subtitle C of RCRA prior to land disposal.

3.3.3.6 <u>141st St. Site</u>

3.3.3.6.1 There are no permanent bodies of surface water at this site. The Lake George Branch is north of the site, but this portion of the canal is not part of the authorized navigation channel and no sediment data is available for this reach.

3.3.3.7 <u>J-Pit Site</u>

3.3.3.7.1 Small wetlands are present in the J-Pit which are dewatered by pumping. No specific data is available on the sediments in these areas, although the floor of the pit is known to be at clay till and construction wastes have been disposed to the pit in the past.

3.3.3.8 <u>Inland Steel Site</u>

3.3.3.8.1 This site has water depths of 25 to 35 feet. Although this site is part of the lakefill which has been actively filled by the Inland Steel Company, this particular area has received little fill to date. Dredged materials were also disposed to the Inland Steel fill by the USACE in 1972. Sediment samples collected from this area of the fill (personal communication, IDEM) showed predominantly lake sand with only traces of steel waste fill or dredged materials.

3.3.3.9 ECI Site

3.3.3.9.1 This site is bifurcated by the Lake George Branch. The quality of these sediments are described above.

3.3.3.10 Generic Clean Upland Site

3.3.3.10.1 No specific site has been identified as the Generic Clean Upland Site. Therefore, no specific statement can be made concerning permanent bodies of surface water or sediment at this site.

3.3.4 Water Quality

3.3.4.1 Water quality standards for all streams, rivers, and lakes have been established by the State of Indiana. These standards are specific for individual waterways and their associated water use designations. The state water quality standards (as of 1993) and results of ambient monitoring conducted by the IDEM are shown on Table EIS-5. A more detailed discussion of ambient water quality is provided in Appendix F, Environmental Engineering.

3.3.4.2 Lake Michigan

3.3.4.2.1 The quality of Lake Michigan water near Indiana Harbor is generally very good, meeting most State standards. State standards for phosphorous and E. coli are violated mainly during the spring and summer months. Factors affecting water quality in the nearshore lake include the discharges from the Grand Calumet River and Indiana Harbor and Canal, discharges from other tributaries, airborne inputs, and releases from recreational marinas. Pollutants which enter Lake Michigan are quickly dispersed by nearshore littoral currents and diluted in the large volume of water in the lake.

3.3.4.3 Grand Calumet River/Indiana Harbor and Canal

3.3.4.3.1 The GCR/IHC are designated by the State of Indiana as industrial water supply, full body contact, warm water aquatic life waters. These waterways have a history of water quality problems and have been identified by the Inter-national Joint Commission on the Great Lakes as an Area of Concern (AOC). Over 90 percent of the dry weather flows in the GCR/IHC are from municipal and industrial discharges. The levels of ammonia nitrogen exceed state standards throughout the entire year. Fecal coliforms exceed standards mainly during winter months, and dissolved oxygen levels in portions of the Grand Calumet River have dropped to levels low enough in recent years to cause noticeable odor problems.

3.3.4.4 141st St. Site

3.3.4.4.1 This site is south of the Lake George Branch of the Indiana Harbor Canal. The existing water quality of Indiana Harbor and Canal was described in the previous paragraph. The site is adjacent to wetlands whose water quality is unknown.

3.3.4.5 J-Pit Site

3.3.4.5.1 The existing excavation at this site extends below the local groundwater table. Ponded areas exist within this pit, and are pumped intermittently. Much of this site qualifies as wetland that contains water during at least part of the year. The water quality of this wetland is unknown.

3.3.4.6 Inland Steel Site

3.3.4.6.1 The Inland Steel site is located along the southeastern side of the Inland Steel lakefill. This area is part of Lake Michigan which has been cutoff by a bulkhead. The existing water quality would be similar to the quality of Lake Michigan near Indiana Harbor.

3.3.4.7 ECI Site

3.3.4.7.1 The existing water quality of this waterbody was discussed previously.

3.3.4.8 Generic Clean Upland Site

3.3.4.8.1 No specific site has been identified as the Generic Clean Upland Site. Therefore, no statement can be made regarding the quality of any permanent bodies of water at this site.

3.3.5 Air Quality

3.3.5.1 Northwest Indiana

3.3.5.1.1 As is generally the case with water and sediment quality, air quality tends to be lower near major urban/industrial centers. The Chicago metropolitan area, including northwestern Indiana, is the largest such center on Lake Michigan. Sources of air pollution are both mobile and stationary. Mobile sources (automobile exhaust) are the major sources of carbon monoxide (CO) and volatile organic compounds (VOCs). Stationary sources (power plants and industrial/manufacturing plants) are major sources of ozone-producing VOCs (O_3) and sulfur dioxide and nitrogen oxides. Nitrogen oxides play a role in ozone-production, which causes smog. Sulfur dioxide emissions contribute to acid rain. At high levels, all of these compounds can cause negative health effects in humans.

3.3.5.1.2 The IDEM maintains an inventory of emissions from all significant industrial sources in northwest Indiana. The largest contributors are USX, Inland Steel, Commonwealth Edison, American Oil, LTV Steel, and NIPSCO. Several air quality monitoring stations are present in the immediate vicinity of the project area.

3.3.5.1.3 The air quality in northwest Indiana is lower than that specified under the Clean Air Act for some priority pollutants. All of Lake County is presently classified as "non-attainment" for sulfur dioxide (SO_2), particulate matter (PM), and ozone. Portions of Lake County are non-attainment for CO. The lead (Pb) standard is also violated occasionally. PM has been a long standing problem in northwest Indiana, but concentrations have been declining over time. As a result of the lack of a PM control plan, a construction ban on new sources of particulates was temporarily implemented in Lake County. This ban was lifted in July 1987 when the U.S. EPA adopted new PM standards (IDEM, 1988).

3.3.5.1.4 The IDEM maintains 23 ambient air monitoring stations in Lake County. A total of six air quality parameters are monitored, but not all stations monitor the same parameters. Total suspended particulates (TSP), particulate matter less than 10 micrometers in size (PM-10), sulfur dioxide, carbon monoxide, ozone, and lead are the only parameters monitored. The most recent year for which complete summary air quality data is available is 1987. During this year, TSP violated the geometric annual mean primary standard of 75 micrograms per cubic meter (ug/m^3) at 5 of the 18 sampling stations where this parameter was monitored. Four of these stations were in East Chicago. The fifth was located on the tollroad in Gary. PM-10 violated the standard of 150 ug/m^3 on one occasion at three of the five sampling stations where this parameter was monitored.

3.3.5.1.5 The sulfur dioxide annual arithmetic mean primary standard of 80 ug/m^3 was not violated at any of the five sampling stations where this parameter was measured. The carbon monoxide maximum eight-hour primary standard of 10,000 ug/m^3 was violated on one occasion at one of the two sampling stations where this parameter was monitored. The ozone primary standard, where not more than one day per year may have an hourly concentration above 225 ug/m^3, was not violated at either of the two sampling stations where this parameter was monitored. The lead quarterly average primary standard of 1.5 ug/m^3 was violated during two quarters at one of the twelve sampling stations where this parameter was monitored (IDEM, Unpublished Data).

Table EIS-5 Existing Water Quality and State Water Quality Standards for Lake Michigan (LM), Grand Calumet River (GC), and Indiana Harbor and Canal (IHC)[1/]

Parameter	Units	Monitoring Station							Water Quality Standards		
		LM EC	LM H	LM W	IHC 0	IHC 1,2	IHC 3S	IHC 3W	LM	IHC/GC	State Standard
Ammonia	ug/l	0.1	<1	<1	0.6	0.5	0.6	0.6	0.10 (harbor areas) 0.05 (LM waters)	0.02 (E. Br. GC&IHC) 0.05 (W. Br. GC)	--- ---
Arsenic	ug/l	1.2	1.6	0.8	1.4	1.5	1.5	1.4	.022	190	190
Barium	ug/l	22.9	19.4	21.3	26	25	29.5	26.9	1000	---	---
Cadmium	ug/l	2.0	2.0	2.0	2.0	2.0	---	---	$e^{(0.7852[\ln Hard]-3.49)}$	$e^{(0.7852[\ln Hard]-3.49)}$	$e^{(0.7852[\ln Hard]-3.49)}$
Chloride	mg/l	19.7	12.9	13.4	57.4	46	57.4	57.9	15	230	230
Chromium	ug/l	4	4	4	4.0	4.4	4	4	11	11	11
Copper	ug/l	10.1	39.3	18.6	5.7	6.1	---	---	$e^{(0.8545[\ln Hard]-1.465)}$	$e^{(0.8545[\ln Hard]-1.465)}$	$e^{(0.8545[\ln Hard]-4.465}$
Cyanide	ug/l	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.005	5.2	5.2	5.2
DO	mg/l	---	---	---	8.7	7.5	7.2	7	7	---	---
E. Coli	#/100 ml	<10	<10	<10	315	243.3	971.3	326.3	235	235	235
Fluoride	mg/l	23	14	17	6	5	---	---	1.0*	2	2
Hardness	mg/l	152.8	142.1	145	189.9	182.4	206.1	202.9	---	---	---
Iron	ug/l	---	---	328	574	594.9	955.5	1301	300*	---	---
Lead	ug/l	10.0	10.0	10.0	10	10	---	---	$e^{(1.273[\ln Hard]-4.075)}$	$e^{(1.273[\ln Hard]-4.075)}$	$e^{((1.273[\ln Hard]-4.075)}$
Manganese	ug/l	---	---	21.1	48.9	41.8	---	---	---	---	---
Mercury	ug/l	0.1	0.1	0.1	0.1	0.1	0.1	---	0.012	0.012	0.012
Nickel	ug/l	5.6	6.9	6.3	6.6	6.8	---	---	13.4	$e^{(.8460[\ln Hard]+1.1645)}$	---
Nitrate+Nitrite	mg/l	0.5	0.3	0.3	1.2	1.2	1.5	1.6	10	---	---
Oil & grease	mg/l	---	---	---	---	---	---	---	No visible sheen	No visible sheen	No visible sheen
PCB	ug/l	---	---	---	---	---	---	---	0.00079	0.00079	0.00079
pH		7.8	7.9	7.9	7.8	8	7.6	7.5	7.5 - 8.5	6.0 - 9.0	6.0 - 9.0
Phenols	ug/l	<5	<5	<5	---	<5	<5	<5	0.001	---	---
Phosphorus	mg/l	<0.03	<0.03	<0.03	<0.03	0.05	0.09	0.07	.03 mg/l	---	---
Selenium	ug/l	1	1	1	1	1	1	1	10	35	35
Sulfate	mg/l	---	---	---	---	---	---	---	26	250	250
TDS	mg/l	197.3	168.8	172.5	313.4	391.6	---	---	172	750	750
TKN	mg/l	---	---	---	1.1	1.3	1.3	1.3	---	---	---
Zinc	ug/l	12.9	31.3	11.6	33.3	26.3	---	---	$e^{(0.8473[\ln Hard]+0.7614)}$	$e^{(0.8473[\ln Hard]+0.7614)}$	$e^{(0.8473[\ln Hard]+0.7614)}$

1/ Source: IDEM, 1993.
2/ --- indicates no data or standard available.
* Based on daily max (all other values are based on a monthly average.

3.3.5.1.6 Standards have been set for hydrocarbons and nitrogen dioxide (NO_2), but these parameters are apparently not monitored in Lake County at the present time. In addition, there are four sampling stations near the Illinois-Indiana State line located in Calumet City and Chicago (just west of the project area) that monitored a variety of additional parameters in 1987. These included sulfates (SO_4), nitrates (NO_3), arsenic (As), beryllium (Be), cadmium (Cd), chromium (Cr), iron (Fe), manganese (Mn), nickel (Ni), and selenium (Se). Trace levels of all of these substances were detected at one or more of these four stations. (IEPA, 1988). Neither the State of Illinois nor the State of Indiana presently have ambient air quality standards for these substances.

3.3.5.1.7 It is estimated that 20% to 25% of the pollutants currently entering the Great Lakes and 50% or more entering Lake Michigan come from the atmosphere (Elder et al., 1987). Table EIS-6 lists estimates of various organic contaminants that are deposited each year to Lake Michigan from the air.

3.3.5.1.8 Polychlorinated biphenyl (PCB) levels in the air near or over Lake Michigan have been measured during several past studies and ranged from 3.6 to 11.0 (mean = 8.0) nanograms per cubic meter (ng/m^3) during 1975 to 1976 (Murphy and Rzeszutko, 1977), 0.57 to 4.6 ng/m^3 during 1976 to 1978 (Doskey, 1978; Doskey and Andren, 1981), and 0.84 to 4.6 (mean = 2.8) ng/m^3 in 1979 (Rice et al., 1982). PCBs represent one group of volatile organic compounds. Other VOCs include polynuclear aromatic hydrocarbons (PAHs). It is estimated in Appendix T, U.S. EPA Inhalation Risk Analyses, that the volatile PCB loss from in-place sediments in the Indiana Harbor and Canal is 3 kg/yr. In comparison, estimates made for volatile PCB losses at Waukegan Harbor and Lake Calumet indicate that there is a net transfer to the air of 1.4 kg/yr from Lake Calumet and 0.25 kg/yr from Waukegan Harbor (Murphy, et al., 1989). VOCs in the air may later deposit in the southern end of Lake Michigan or elsewhere. The IDEM and U.S. EPA are working on inventorying sources of these types of (currently non-regulated) air pollutants and establishing monitoring stations in northwestern Indiana (IDEM, 1988).

Table EIS-6 Estimated Annual Atmospheric Input of Organic Contaminants to Lake Michigan

Chemical	Metric Ton/Year
Total PCB	6.9
Total DDT	0.40
a-BHC	2.3
y-BHC	11.2
Dieldrin	0.38
HCB	1.2
p,p'-Methoxychlor	5.9
a-Endosulfan	5.6
B-Endosulfan	5.6
Total PAH	114.0
Anthracene	3.4
Phenanthrene	3.4
Pyrene	5.9
Benz(a) Anthracene	2.9
Perylene	3.3
Benzo(a) Pyrene	5.6
DBP	11.0
DEHP	11.0
TOC	140,000.0

Source: Eisenreich et al., 1981.

3.3.5.2 141st St. Site

3.3.5.2.1 There is no specific air quality monitoring data for this site. The site is bordered on the west by a major interstate highway and there are petro-chemical industries to the north and east. These probably contribute lead, VOCs, and other contaminants to the area air.

3.3.5.3 J-Pit Site

3.3.5.3.1 There is no specific air quality monitoring data for this site. The site is bordered on the east by the Gary municipal landfill. The landfill may contribute objectionable odors, methane gas, and other contaminants to the area air.

3.3.5.4 Inland Steel Site

3.3.5.4.1 This site is immediately west of Inland Steel plant. This plant and other area industries contribute to the local air pollutant loadings.

3.3.5.5 ECI Site

3.3.5.5.1 There is no specific air quality monitoring data for this site. The site is bordered on the east by a major industrial highway, and there are petro-chemical industries to the west, north, and east. These probably contribute lead, VOCs and other contaminants to the area air.

3.3.5.6 Generic Clean Upland Site

3.3.5.6.1 The air quality in northwest Indiana is lower than that specified under the Clean Air Act. Most of Lake County is presently classified as "non-attainment" for sulfur dioxide (SO_2), carbon monoxide, and ozone. The lead (Pb) and particulate standards are also violated occasionally. Suspended particulates have been a long standing problem in northwest Indiana, but concentrations have been declining over time. As a result of the lack of a particulate control plan, a construction ban on new sources of particulates was temporarily implemented in Lake County. This ban was lifted in July 1987 when the U.S. EPA adopted new standards (IDEM, 1988).

3.4 BIOLOGICAL RESOURCES

3.4.1 Aquatic Communities

3.4.1.1 Lake Michigan

3.4.1.1.1 Lake Michigan is one of the largest freshwater lakes in the world. The aquatic communities contained therein have had immense importance to man both historically and now. In the 1800's and early 1900's the lake supported a significant commercial native fishery. However, this fishery has declined in the recent past due to many changes. These include excessive pollution, over-fishing, and the introduction of the Sea lamprey (Petromyzon marinus) and other exotic species. In the late 1960's and early 1970's many bordering states, in conjunction with the U.S. Fish and Wildlife Service began a salmonid stocking and research program on the Great Lakes, including Lake Michigan. Despite the fact that most of these species were not native to the Great Lakes this program has been successful in establishing (a primarily put and take) salmonid recreational fishery of great economic importance. There are presently indications that although these species are successfully spawning in some areas, several species are declining in numbers. This has been attributed in part to declining Alewife (Alosa pseudoharengus) populations.

3.4.1.1.2 Periphyton and Plankton. The phytoplankton community in Lake Michigan is dominated by diatoms with blue-green algae, and occasionally green algae are abundant. The southern end of the lake has two major phytoplankton blooms; one during the spring and the other during the fall (Limnology Work Group, 1976). The spring bloom consists almost entirely of diatoms, including species of the genera Asterionella, Cyclotella, Fragilaria, Stephanodiscus, Tabellaria, and Melosira. Populations of blue-green algae, including Mycrocystis spp. and Aphanizomenon spp., mix with the diatoms in the fall bloom. In addition, pilings and submerged structures tend to be covered with mats of green algae (usually Cladophera spp.) up to several inches long. Copepods dominate the biomass of Lake Michigan zooplankton. However, protozoans and rotifers may also be present in large numbers. Cladocerans are abundant during the summer months. There appears to be only one major zooplankton peak annually (Limnology Work Group, 1976).

3.4.1.1.3 Invertebrates. Polls and Dennison (1984) collected macroinvertebrates from a nearshore Lake Michigan location immediately southwest of the Inland Steel peninsula. A total of 13 species were collected. The collection was dominated by tubificid worms (91%). Densities of tubificids were relatively high and ranged from 9,800 to 24,500 individuals per square meter. Fingernail clams (Sphaeridae), snails

(Gastropoda), water mites (Hydracarina), and chironomids were also collected.

3.4.1.1.4 The Illinois Natural History Survey conducted aquatic invertebrate surveys at 12 locations in the harbor and canal portion of the project area in 1988 (Risatti and Ross, 1989). One station was located in the Lake George Canal, three stations in Indiana Harbor Canal, two stations in Indiana Harbor, and six locations from nearshore Lake Michigan adjacent to Indiana Harbor and the Inland Steel peninsula (EIS Plate 15). A total of 20 taxa were collected with tubifi-cids being the most abundant. Data from this collection are included in Appendix C, "No Action" Alternative. Three species of crayfish were also collected during this study (primarily for contaminant analyses). Data for these species are presented in Table EIS-7.

Table EIS-7 Number of Fish and Crayfish Collected in the Indiana Harbor Area by the Illinois Natural History Survey in 1988

Species		Station				
Common Name	Scientific Name	Canal	Harbor	Outside Harbor	Off Inland Steel	Total
Common carp	Cyprinus carpio	6	3	0	0	9
Goldfish	Carassius auratus	5	0	0	0	5
Emerald shiner	Notropis atherinoides	1	0	0	0	1
Golden shiner	N. crysoleucas	24	0	0	0	24
Alewife	Alosa pseudoharengus	2	25	0	3	30
Gizzard shad	Dorosoma cepedianum	25	19	0	0	44
Johnny darter	Etheostoma nigrum	0	1	0	0	1
Mottled sculpin	Cottus bairdi	0	0	1	0	1
Sunfish	Lepomis spp.	3	3	0	0	6
Yellow perch	Perca flavescens	0	0	30	0	30
Crayfish	Orconectes rusticus	0	0	1	0	1
Crayfish	O. virilis	0	15	1	5	21
Crayfish	Procambarus acutus	7	0	0	0	7

Source: Risatti and Ross, 1989.

3.4.1.1.5 Fish. Fish species common to the nearshore of Lake Michigan within the project area include salmonids, herrings, minnows, suckers, catfish, and sunfish. Two stations in the nearshore waters of Lake Michigan within the project area were sampled for fish in 1976. One station was located near the harbor mouth and the other was located offshore, north of the Inland Steel peninsula. Twenty-two Spottail shiners, 41 Sand shiners (N. stramineus), two Longnose dace (Rhinichthys cataractae), and two Yellow perch were collected (CDM/Limnetics, 1976). Sixty-one individuals representing thirteen species were collected in the nearshore area immediately southwest of the Inland Steel peninsula during electroshocking and gill netting surveys by Polls and Dennison (1984). Rainbow trout, Lake trout (Salvelinus namaycush), Brown trout, Chinook salmon (Onchrhynchus tshawytscha), Yellow perch, Smallmouth bass (Micropterus dolomieui), Alewife, Gizzard shad, Common carp, Rainbow smelt (Osmerus mordax), and White sucker (Catostomus commersoni) comprised the catch.

3.4.1.1.6 The Illinois Natural History Survey collected fish from two nearshore locations in Lake Michigan in 1988 (Risatti and Ross, 1989). They found lower species diversity and abundance of species compared to the harbor and canal stations and earlier nearshore studies. However, they attributed this to rough weather conditions that hampered the sampling effort in the nearshore waters and the ineffectiveness of their electroshocking equipment in water over 20 feet in depth. It should also be noted that the Indiana Department of Natural Resources (IDNR) did not permit the use of gill nets or the collection of any salmonids during this study. This also contributed to the lack of comparability of these results to other fish studies in the area. Only 34 fish representing three species were collected in these two nearshore areas. Yellow perch dominated the catch (Table EIS-7).

3.4.1.1.7 The IDNR has stocked Chinook salmon, Brown trout, and Lake trout annually in the Jeorse Park area immediately southwest of the Inland Steel peninsula since 1974. Chinook salmon and Lake trout return to this area as adults and may attempt to

spawn during the fall. However, there is no evidence of successful spawning in the area. Yellow perch and Rainbow smelt are also commonly taken by fishermen in the shallows and off breakwaters in the East Chicago area.

3.4.1.1.8 Alewife - The first alewife was recorded in Lake Michigan in 1949. By 1957, the alewife had dispersed throughout the lake, with an explosive population increase in the late 1950s and early 1960s. During high population years, major die-offs of alewife occurred in the spring after spawning, causing significant refuse problems along the shoreline. The abundant and seemingly uncontrollable alewife was the impetus for the introduction of Pacific salmon into the lake to provide a put-and-take fishery. Coho, chinook, and other non-indigenous salmon and trout were stocked beginning in the late 1960s; since the mid-1970s alewife populations have generally declined. In the late 1980s alewife declined enough to cause a scarcity of food for the salmon, despite an increase in native species eaten by the salmon. In 1995 and 1996 there were significant post-spawning die-offs along the Indiana shoreline, indicating that the alewife population is again increasing (UFWS letter dated 16 September 1996).

3.4.1.1.9 Yellow Perch - The native yellow perch fishery is declining from unknown causes, with poor larval survival beginning in 1990. Alewife predation on eggs and larvae may be partially responsible. Yellow perch occur throughout the East Chicago area in summer, and are available to both boat and shoreline fishermen; they are also sought by Indiana's 13 commercial fishermen. In early 1995 the four state bordering Lake Michigan reduced perch harvest by lowering commercial catch quotas, reducing sport catch limits, and closing all prech fishing in June; despite these efforts, perch abundance continues to drop. The perch population in Indiana declined 67% from 1994 to 1995 (USFWS letter date 16 September 1996).

3.4.1.10 Sport Fishery - The Indiana DNR conducts creel surveys to assess fishing pressure on various species. Data from 1993-1995 shows that most fishing is done from boats (boat fishermen catch about 91% of the total harvest); yellow perch, coho, lake trout, steelhead, chinook, and brown trout are the major species caught. While the number of yellow perch caught has declined, the number of lake trout caught hs steadily increased; coho are the dominant salmonid caught. Because ot the reduced numbers of yellow perch available to catch, total fishing effort (hours) of Indiana anglers in Lake Michigan declined between 1987 and 1995. Fishing access is available at several sites near Indiana Harbor; to the west, launch ramps and fishing piers are at Hammond Marina and Whiting Park; to the east are similar facilities at Pastrick Marina in East Chicago. Three public utilities allow public fishing access; to the west are the Stateline Generating Station and Hammond Water Filtration Plant; to the east is the Dean Mitchell Generating Station.

3.4.1.1.11 Contaminants in Fish - Constant or increasing levels of PCBs have occurred in Lake Michigan fish species despite declining PCB levels in Lake Michigan water. For a number of years Indiana has issued public health advisories regarding consumption of Lake Michigan fish; these apply particularly to children, women of child-bearing age, and sport or subsistence fishermen. Fish bearing the greatest burdens of potential carcinogens tend to be large, bottom-dwelling, high in the food web, and high in fat content. Despite its potential as a high quality fishery (due to its connection with Lake Michigan), the fishery in the project area remains poor.

3.4.1.1.12 Grand Calumet and Indiana Harbor and Canal - The fishery in the Grand Calumet River and Indiana Harbor and Canal has improved in recent years, but remains poor. During 1985-1988, 43 fish collections were made in the Grand Calumet/Indiana harbor system to measure the health of the fish community; twenty-one species were collected, with the largest number occurring in the Indiana Harbor Canal. The east branch of the Grand Calumet and the Indiana Harbor Canal showed the greatest improvements in water quality and habitat quality during 1985-1988. The west branch of the Grand Calumet showed a significant reduction in water quality with the lowering of Lake Michigan water levels in 1987-1988, with no fish collected in the west branch during those years. A follow-up study of the west branch of the Grand Calumet was done in 1992; stations were sampled between Indianapolis Blvd. In East Chicago and the river's mouth at Burnham, Illinois; ten species of fish were collected in the best habitat near Indianapolis Blvd., but septic conditions (with no fish) prevailed further west. USFWS samplin in the east branch of the Grand Calumet in 1994 revealed ten species of fish; species diversity and fish numbers decreased in a downstream direction; low numbers and diversity were observed throughout the east

branch (USFWS letter dated 16 September 1996).

3.4.1.2 Grand Calumet River/Indiana Harbor and Canal

3.4.1.2.1 The State of Indiana presently classifies the GCR/IHC system as suitable for "limited aquatic life". This classification acknowledges the degraded conditions of the aquatic environment, due to the extensive amount of urban-industrial development throughout the system. Pollutant discharges from these developments have impacted area water and sediment quality and have limited the aquatic communities in the system. Biological surveys in the past have reported a virtual absence of life in the canal and limited communities near the mouth of the harbor (Gannon and Beeton, 1969). Several more recent studies have been conducted and are summarized in the following sections.

3.4.1.2.2 Periphyton and Plankton. Periphyton and plankton were sampled in the Indiana Harbor and Canal portion of the project area by the Illinois Natural History Survey in 1988 (Risatti and Ross, 1989). Overall species diversity was low. A high diversity of periphyton species are reported from the Marquette Park lagoons at the very upstream end of the Grand Calumet River (Hardy, 1984).

3.4.1.2.3 Invertebrates. The Potos (1981) study examined macroinvertebrates from 13 sites within the harbor and canal. The survey found the benthic community in the canal was extremely limited in abundance and diversity. Species diversity in the canal ranged from 1 to 10 total taxa by sampling site. Fifteen total taxa were collected outside of the harbor mouth. Benthic life was virtually lacking from the upstream reach of the canal south of Dickey Road. Populations at the more lakeward sites within the canal were heavily dominated by pollution tolerant oligochaetes such as Tubifex spp.

3.4.1.2.4 The Indiana State Board of Health collected invertebrates from a permanent sampling station at Dickey Road bridge (IHC-1) in the harbor. In 1979, one sample was collected from the station which yielded a few oligochaetes, but nothing else. In 1980, 1981, and 1982, three replicate samples were collected from this station. Oligochaetes dominated all samples in all three years, but a few individuals of Trichopetera, Odonata, Ephemeroptera, Gastropoda, Chirono-midae, and Hirudinea were also collected (Indiana State Board of Health, Unpubl. Data).

3.4.1.2.5 The results of the invertebrate survey conducted in 1983 by Polls and Dennison (1984) were similar to the Potos (1981) study. Invertebrates were found in the sediments at all sampling sites in the canal and harbor. The benthic community was characterized by low diversity and high density of pollution-tolerant organisms. Tubificids, primarily Limnodrilus spp., comprised much of the benthic fauna. High densities of up to 340,000 per square meter were found in the middle reach and Calumet River Branch of the canal.

3.4.1.2.6 The distribution of tubificids and chironomids indicates pollution in the harbor. High densities of tubificids and no chironomids were found in the canal while lower densities of tubificids and some chironomids were found in the outer harbor. Wentsel and McIntosh (1977) reported similar distributions of Limnodrilus sp. and Chironomus sp. which were limited by waters with high metal concentrations. As in the Potos (1981) study, species diversity increased downstream with the greatest number of taxa found near the harbor mouth. The Polls and Dennison (1984) survey found high densities of tubificids in portions of the harbor and canal that were devoid of benthos during the Potos (1981) study.

3.4.1.2.7 Triplicate samples were collected again at station IHC-1 in 1984 and 1986. Oligochaetes dominated the collection in 1984 and bryozoans were described as "abundant". During 1986, bryozoans were described as "dominant". Oligo-chaetes and Porifera were present. Small numbers of Chironomidae, Hirudinea, Gastropoda, and Odonata were also present during both sample years (IDEM, 1988).

3.4.1.2.8 The macroinvertebrate community of the Grand Calumet River has been sampled by the IDEM (Unpublished Data). Their collections were dominated by pollution tolerant snails, midges, and oligochaetes. One exception to this condition is found in the Marquette Park lagoons which are upstream of most industrial discharges and are connected to the river by partially constricted culverts (IDEM,

1988). A high diversity of benthic invertebrates was also reported from the lagoons by Hardy (1984).

3.4.1.2.9 Fish. Two stations were sampled for fish near the confluence of the Grand Calumet River and Indiana Harbor and Canal in 1976. Only one Alewife was collected (CDM/Limnetics, 1976). The Indiana State Board of Health and IDEM conducted electrofishing surveys in the GCR/IHC in 1980, 1982, 1984, 1986, and 1987. Part of their collections were used for tissue analyses. In 1980, five Common carp (Cyprinus carpio), one Spotfin shiner (Notropis spilopterus), and one Yellow perch (Perca flavescens) were collected. In 1982, 18 Common carp, one Golden shiner (N. crysoleucas), and one Central mudminnow (Umbra limi) were collected (IDEM, 1988).

3.4.1.2.10 In 1984, five Common carp, 10 Golden shiners, and one darter sp. were collected. In 1986, 111 Common carp, 64 Golden shiners, three Yellow perch, 92 Goldfish (Carassius auratus), 23 Pumpkinseed (Lepomis gibbosus), one Bullhead minnow (P. vigilax), and 11 Rainbow trout (S. gairdneri) were collected. In 1987, 19 Common carp, 25 Golden shiners, 142 Yellow perch, one Spotfin shiner, 113 Goldfish, 48 Pumpkinseed, two Emerald shiners, two Bluegill, (L. macrochirus), one Fathead minnow (P. promelas), 21 Bluntnose minnows, and 96 Gizzard shad were collected (IDEM, 1988).

3.4.1.1.11 Polls and Dennison (1984) also conducted a fish survey of the harbor and canal in 1983. Eighteen species were collected. Forage and rough fish such as Gizzard shad (Dorosoma cepedianum) and Yellow perch dominated the catch by number. Higher species diversity and numbers were found at the junction of the lower portion of the canal and inner harbor. A single Brown trout (Salmo trutta) was collected at the harbor entrance. Emerald shiners (N. atherinoides), Spottail shiners (N. hudsonius), Bluntnose minnows (Pimephales notatus), Rock bass (Ambloplites rupestris), and Black crappie (Pomoxis nigromaculatus) were collected from the inner harbor, but not further upstream.

3.4.1.2.12 The Illinois Natural History Survey collected fish from two stations in the harbor and canal in 1988 (Risatti and Ross, 1989). They collected a total of 117 fish representing eight species. Gizzard shad, Alewife, and Golden shiner dominated the collection (Table EIS-7). Chinook salmon are commonly caught by fishermen in the harbor entrance channel and are taken as far upstream as the turning basin (Greenwood et al., 1984). However, sportfishing is generally not pursued within the harbor and canal due to the safety hazards posed by the passage of large ships and the area's poor esthetic quality (IDEM, 1988). A general lack of small-boat access and the contaminated nature of the fish found in the harbor and canal also likely affect the sportfishing opportunities.

3.4.1.3 Contaminants in Aquatic Organisms

3.4.1.3.1 The State of Indiana collected fish (common carp) in the harbor and canal for tissue contaminant analyses in 1980, 1982, 1984, 1986, and 1994 (State of Indiana, unpubl. data). These samples have been analyzed for pesticides, PCBs, and metals. The results of the most recent 1994 analysis are presented in Table EIS-8. The Illinois Natural History Survey collected a variety of bio-logical samples for tissue contaminant analyses in 1988. These samples included periphyton, plankton, crayfish, and fish. The Illinois State Geological Survey (ISGS) performed lab analyses on these samples and tested for PCBs and 26 metals. The results are presented in Risatti and Ross (1989) and are summarized in Table EIS-9.

Table EIS-8 Contaminants in Fish Tissue (Common Carp) Collected from the Indiana Harbor and Canal/Grand Calumet River System, Indiana [1/]
(Skin-on, Scaleless Fillets with Values in ppm)

1994 Hepta- Sites	Sample N	Fat	% (g)	Wt. dane	Chloro- PCBs	drin	Diel- Endrin	DDT	Total HCB	PCA	chlor	Hepta- Epoxide	chlor
1 IHC/1	3.46	2100	<.02	4.9	0.023	<.01	<.02	<.01	<.016	<.008	<.008		
Dickey	1	20.9	2724	0.096	2.3	0.026	<.01	<.02	0.02	<.016	<.008	0.011	
Road 1	2.7	624	<.02	3	<.01	<.01	<.02	<.01	<.016	<.008	<.008		
2 GCR/2	5.37	1887	<.02	6.8	<.01	<.01	<.02	<.02	<.008	<.008	<.008		
Bridge St.	1	5.99	993	<.02	6.6	<.01	<.01	<.02	<.01	<.008	<.008	<.008	
3 GCR/2	1.64	762	<.02	0.8	<.01	<.01	<.02	<.01	<.008	<.008	<.008		
Cline	2	5.09	1703	<.02	8.4	<.01	<.01	<.02	<.01	<.008	<.008	<.008	
Avenue	1	12	7037	0.024	27	0.021	<.01	<.02	<.01	<.008	<.008	<.008	
4 GCR/3	8.22	2072	<.02	11	<.01	<.01	<.02	<.01	<.008	<.008	<.008		
Indpls	3	5.03	1052	<.02	5.7	<.01	<.02	<.02	<.01	<.008	<.008	<.008	
Blvd.	1	16.5	2696	0.059	19	0.016	<.01	<.020	0.01	<.008	<.008	<.008	
5 GCR/3	4.75	1078	<.02	7.9	<.01	<.01	<.02	<.01	<.008	<.008	<.008		
Kennedy	4	6.64	474	<.02	6.5	<.01	<.01	<.02	<.01	<.08	<.008	<.008	
Avenue	2	8.81	3632	0.027	16	0.015	<.01	<.02	<.02	<.008	<.008	<.008	
FDA Action Limit [2/]				0.3	2	0.3	0.3	5	none	none	0.3	0.3	

1994 Sample Sites	N	Alpha BHC	Beta BHC	Delta BHC	Gamma BHC	Hg	Cd	Pb	Cr	As	Co	Zn
1 IHC/	1	<.008	<.008	<.008	<.008	.05	<.01	<.05	13	<.05	<.04	14
Dickey	1	<.008	<.008	<.008	<.008	.06	.01	.08	12	.06	<.04	17.5
Road	1	<.008	<.008	<.008	<.008	<.04	<.01	.17	11	.1	<.04	34
2 GCR/	2	<.008	<.008	<.008	<.008	<.02	<.02	.2	na	na	na	na
Bridge	1	<.008	<.008	<.008	<.008	.05	<.02	.13	na	na	na	na
3 GCR/	2	<.008	<.008	<.008	<.008	.03	<.02	.16	na	na	na	na
Cline	2	<.008	<.008	<.008	<.008	.02	<.02	.08	na	na	na	na
Avenue	1	<.008	<.008	<.008	<.008	.13	<.02	.15	na	na	na	na
4 GCR/	3	<.008	<.008	<.008	<.008	.02	<.02	.19	na	na	na	na
Indpls	3	<.008	<.008	<.008	<.008	.02	<.02	.21	na	na	na	na
Blvd.	1	<.008	<.008	<.008	<.008	.04	<.02	.12	na	na	na	na
5 GCR/	3	<.008	<.008	<.008	<.008	.03	<.02	.09	na	na	na	na
Kennedy	4	<.008	<.008	<.008	<.008	.02	<.02	.07	na	na	na	na
Avenue	2	<.008	<.008	<.008	<.008	.13	<.02	1.5	na	na	na	na
FDA Action Limit [2/]		none	none	none	none	1.0	none	none	none	none	none	none

1/ Source: Indiana Department of Environmental Management, 1994, Unpublished Data.
2/ Source: Food and Drug Administration, 1987.
na/ Did not test for this chemical.

3.4.1.3.2 The Chicago District conducted a study of the PCB contamination problem and trends in Lake Michigan fish which appeared as Appendix D to a draft EIS prepared on a proposed dredging and disposal project at Waukegan Harbor, Illinois (USACE, In Prep.). The study consisted of compiling all existing data that had been generated by other agencies on PCB levels in fish. Data was found for approximately 4,000 samples collected lakewide between the years 1970 to 1986. In general, PCB levels in fish appear to have declined during that time lakewide. In addition, fish from Indiana waters have tended to have higher PCB concentrations than fish from other parts of the lake. The annual mean PCB concentrations in Common carp collected from the entire lake ranged from a low of 1.00 ppm (in 1986) to a high of 118.93 ppm (in 1977) compared to a range for individual composite samples of 1.42 ppm to 12.50 ppm collected from the project area between 1980 and 1986 by the Indiana State Board of Health (Table EIS-7). PCB Concentrations in Common carp collected in 1988 by the Illinois Natural History Survey ranged from 0.16 to 7.86 ppm (Table EIS-9).

Table EIS-9 PCB, Lipid, Water, and Ash Content of Biological Samples Collected for Chemical Analysis from Indiana Harbor and Canal in 1988

Sample Type	Location	PCBs (ppm)[1/]	% Lipid	% Water	% Ash
Periphyton	harbor	0.27	0.24	95.77	1.76
Periphyton	harbor		0.38	95.42	1.41
Periphyton	harbor	0.28	0.79	94.29	1.22
Periphyton	harbor	0.03	2.11	95.45	0.76
Periphyton	harbor	0.11	16.94	91.45	3.42
Periphyton	harbor		1.51	90.28	3.32
Plankton	canal	0.16	6.44	95.4	2.3
Plankton	harbor	0.48	2.57	95.45	1.82
Crayfish	harbor	0.12	1.64	72.9	13.08
Crayfish	harbor	0.15	23.15	75.53	12.77
Crayfish	ns lake	0.09	1.61	76.85	11.11
Crayfish	canal	0.38	13.37	78.02	6.59
Crayfish	canal	0.12	2.14	83.78	6.31
Crayfish	Inland bw	0.36	5.32	67.5	20
Common Carp	harbor	4.21	11.32	68.75	4.46
Common Carp	harbor	4.47		66.77	4.08
Common Carp	harbor	0.63	11.35	69.28	2.29
Common Carp	harbor	0.98	9.34	67.71	3.59
Common Carp	canal	1.82	8.13	72.57	2.86
Common Carp	canal	7.86	31.57	64.84	1.65
Common Carp	canal	0.45	0.71	70.11	3.26
Common Carp	canal	1.62	16.16	73.45	2.82
Common Carp	canal	1.18	1.68	81.71	1.71
Common Carp	canal	0.20	32.14	83.64	1.82
Gizzard Shad	harbor	0.04	23.12	66.2	4.69
Gizzard Shad	harbor	0.27	4.21	78.29	1.55
Gizzard Shad	harbor	0.14	12.63	63.25	2.32
Gizzard Shad	harbor	1.62	6.16	75.73	1.94
Gizzard Shad	harbor	0.92	4.83	84.06	2.17
Gizzard Shad	harbor	0.89	4.48	84.35	0.87
Gizzard Shad	harbor	0.12	15.66	76.82	1.72
Gizzard Shad	harbor	0.12	20.09	80.91	1.66
Gizzard Shad	canal	0.42	19.54	67.07	1.83
Gizzard Shad	canal	0.21	5.15	78.38	3.15
Gizzard Shad	canal	0.21			
Alewife	harbor	0.31	33.44	78.45	4.31
Alewife	harbor	0.12	8.34	71.86	3.8
Alewife	harbor	0.02	7.44	77.31	0.84
Alewife	harbor	0.01	7.35	76.19	4.76
Alewife	harbor	0.41	16.51	74.92	3.91
Alewife	canal	0.13	2.56	82.93	0.81
Alewife	canal	0.53	5.05	79.65	5.31
Alewife	nsh lake	0.11	5.37	80	4.35
Sunfish spp.	canal	0.51	10.84	82.63	3.68
Sunfish spp.	harbor	0.73	2.49	78.35	5.15
Sunfish spp.	harbor	0.79	2.2		
Goldfish	canal	0.74	6.79	74.78	3.48
Goldfish	canal	1.13	5.08	76.87	3.75
Yellow Perch	Inland bw	0.38	2.87	74.92	5.69

[1/] Mean detection level is 13.75 ppb.

3.4.1.3.3 PCB levels in fish sampled within the Grand Calumet River/Indiana Harbor and Canal remain above the FDA action limit. This is due, in part, to the FDA recently lowering the action limit for PCBs from 5.0 ppm to 2.0 ppm. However, PCBs are not the only contaminant of concern in area fish tissue. As a result of these contaminant concerns, a fish consumption advisory has been issued stating no fish from the Grand Calumet River/Indiana Harbor and Canal system should be eaten (IDEM, 1988).

3.4.1.4 141st St. Site

3.4.1.4.4 A small pond is present in the northeastern corner of the site (USACE, 1983). This is the only permanent water body on this site in the immediate area of the CDF location. The aquatic community of this pond is not known. The site is also bordered by wetlands and open water habitat complexes on the north and west. The aquatic communities from these surrounding areas are not known, but are likely degraded due to the urban influences in the area. The wetland areas are discussed further in the Terrestrial Communities (section 3.4.2.).

3.4.1.5 J-Pit Site

3.4.1.5.1 This site has open water and wetland habitats. The existing aquatic communities have not been studied. However, due to the highly disturbed nature of the site and the lack of a nearby recruitment source, the overall aquatic community diversity and abundance is probably very low.

3.4.1.6 Inland Steel Site

3.4.1.6.1 This site consists of a portion of Lake Michigan that has been cutoff from the lake proper by the construction of bulkheads. The plankton communities at this site were sampled during a cursory study performed in 1985 for Inland Steel Company (Whitman et al., 1985). This study found that the phytoplankton community was dominated by diatoms (78% by number), followed by blue-green algae (11%) and green algae (10%). The zooplankton community was dominated by Copepoda (81% by number), followed by Cladacera (16%) and Rotifera (2%). Samples taken in inside the bulkhead were "roughly comparable" to samples taken outside the bulkhead in nearshore Lake Michigan.

3.4.1.6.2 The invertebrate and fish community at this site has not been surveyed. It is likely comprised of similar species as that of nearshore Lake Michigan. Though there is no permanent opening between the lakefill and Lake Michigan, water (and presumably adult fish, larvae, and eggs) overtops the break-water during periods of high lake levels and storm events. Therefore, there is some limited movement of fish between Lake Michigan and the lakefill and vice versa.

3.4.1.7 ECI Site

The aquatic communities of the GCR/IHC system were discussed previously.

3.4.1.8 Generic Clean Upland Site

3.4.1.8.1 No specific site has been identified as the Generic Clean Upland Site. Therefore, no statement can be made concerning aquatic habitat on this site.

3.4.2 Terrestrial Communities

3.4.2.1 Indiana Harbor and Canal

3.4.2.1.1 The terrestrial resources immediately along and surrounding the Indiana Harbor and Canal are generally very limited in diversity and abundance due to the urban/industrial nature of the area and lack of habitat. The sparse vegetation that is present tends to be weedy, pioneering species such as ragweed (Ambrosia sp.), goldenrods (Solidago sp.), garden sunflower (Helianthus annus), sweet clover (Melilotus sp.), cottonwood (Populus deltoides), and tree of heaven (Ailanthus altissima) (USACE, 1986). Nearby residential areas contain typical urban plantings such as Kentucky bluegrass (Poa pratensis) and ornamental trees and shrubs of various species.

3.4.2.1.2 The wildlife species present are primarily small mammals and birds which

are typical of urban and waterfront areas. This includes House Sparrows (Passer domesticus), Starlings (Sturnus vulgaris), Rock Doves (Columba livia), gulls (Larus sp.), thirteen-lined ground squirrels (Citellus tridecemlineatus), and eastern cottontails (Sylvilagus floridanus).

3.4.2.1.3 A number of bird species migrate through the area in the spring and fall. The Lake Michigan shoreline is a major flyway for loons, grebes, waterfowl, raptors, and shorebirds. Few bird species have been observed foraging or resting on the Indiana Harbor and Canal. This may be due to a number of factors including disturbance from boat traffic, low diversity and abundance of invertebrates, and lack of shallow water. No waterfowl have been observed on the harbor and canal by IDNR biologists during recent aerial waterfowl counts. The only species regularly seen in this area are Herring and Ring-billed Gulls (L. argentatus and L. delawarensis) (USACE, 1986).

3.4.2.1.4 Wildlife in the River/Canal System - There have been only incidental observations of amphibians, reptiles, and mammals along the Grand Calumet River/Indiana Harbor Canal system. Snapping turtle and midland painted turtle has been seen along the east branch of the Grand Calumet and the Mobil Oil (141st Street) property. Numerous amphibian and reptile species have been reported at remnant dune and swale habitats along the east branch of the Grand Calumet, including tiger salamander, American toad, Fowler's toad, western chorus frog, Blanding's turtle, eastern box turtle, six-lined racerunner, Chicago garter snake, plains garter snake, black rat snake, and eastern hognose snake. Blanding's turtle is a Federal- and state-listed Species of Special Concern, being investigated for listing as a threatened or endangered species. Mammals likely to use the river/canal system within the project area proper (and known to occur within the Hammond/East Chicago/Gary area) include beaver, mink, raccon, muskrat, opposum, and mice and voles; beaver are known from the lower Indiana Harbor Canal, where they fell cottonwoods on LTV Steel property (USFWS leter dated 16 September 1996).

3.4.2.2 141st St. Site

3.4.2.2.1 Most of this approximately 80-acre site is comprised of urban fill overlying Tawas muck (a wetland soil). Some ponding results after periods of heavy rainfall. Field observations in October 1981, April 1983 (USACE, 1983), and November 1988 has shown little invasion of the site by either wetland or upland species. The site is bordered by a thin fringe of approximately 10 to 15-year old cottonwoods and shrubs on the north and east. There are thin, scattered patches of young cottonwoods, grasses, and flowering perennials such as goldenrods and asters (Aster sp.) throughout.

3.4.2.2.2 The site is bordered on the north and west by an open water/wetland complex. These areas have been identified in the National Wetlands Inventory and have been classified by the U.S. Fish and Wildlife Service according to Cowardin et al. (1979) as two major types: (1) palustrine, emergent, semi-permanently flooded, and (2) palustrine, unconsolidated bottom, permanently flooded, excavated wetlands. These areas are dominated by cattails (Typha sp.) and lie outside the area of possible CDF construction.

3.4.2.2.3 Another area within the boundary of this site has been identified in this inventory and is classified as a palustrine, unconsolidated bottom, semi-permanently flooded wetland. The U.S. Environmental Protection Agency (1987) has determined that this wetland did not qualify as being "unsuitable for filling" during its wetlands investigation of the Indiana Harbor area. However, this area may fail to qualify as a wetland under the new wetland delineation methodology due to the lack of wetland indicator plants (Federal Interagency Committee for Wetland Delineation, 1989). Common Crows (Corvus brachyrhynchos) and Rock Doves were the only wildlife species observed during a site visit in November 1988. Approximately 30 gulls were observed on the site in April 1989. Other common urban wildlife species may also use the site, but its overall value to wildlife is very low.

3.4.2.3 J-Pit Site

3.4.2.3.1 This area consists of an abandoned sand mine pit, approximately 100-acres in size. Exposed soils are primarily sand and some clay. Organic matter and invertebrates are lacking. Wetland vegetation is present over portions of the site,

but is composed almost entirely of common reed (Phragmites communis). Most all of the site is identified as wetlands in the National Wetlands Inventory. The U.S. Fish and Wildlife Service has classified these areas as being of two major types: (1) palustrine, unconsolidated bottom, semi-permanently flooded, excavated and (2) palustrine, emergent, seasonally flooded, excavated wetlands. The U.S. Environmental Protection Agency (1987) did not identify these wetlands as being "unsuitable for filling" during its wetlands investigation of the Indiana Harbor area. Much of the site may qualify as wetlands under the new wetland delineation methodology (Federal Interagency Committee for Wetland Delineation, 1989). The existing habitat is of very low wildlife value. The present owner of the site, Waste Management, Inc., has graded potions of the pit bottom to a uniform elevation which may affect the area's ability to function as a wetland in the future.

3.4.2.3.2 The site is surrounded on several sides by an approximate 50-foot wide border of early successional vegetation. Vegetation in this area includes approximately 10- to 30-year old cottonwoods, giant ragweed (A. trifida), and common evening primrose (Oenothera biennis). The only wildlife observed during a November 1988 site visit consisted of several gulls. Representatives of the U.S. Fish and Wildlife Service visited the site in 1986. They observed a variety of migratory birds using the site and cattails and cottonwoods were the dominant plant species at that time (Draft Coordination Act Report, dated January 30, 1989).

3.4.2.4 Inland Steel Site

3.4.2.4.1 This site, which is approximately 70 acres in size, is entirely aquatic except for the presence of a concrete-filled bulkhead on the south, east, and north sides, some fill material on the north side, and rocky fill material on the west side. The site provides very limited terrestrial resources. The U.S. Fish and Wildlife Service has classified this area as lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked or impounded habitat. The U.S. Environmental Protection Agency (1987) did not identify this site as being a wetland "unsuitable for filling" during a wetlands investigation of the Indiana Harbor area.

3.4.2.4.2 No portion of the site qualifies as wetland habitat under the new wetland delineation methodology (Federal Interagency Committee for Wetland Delineation, 1989). A site visit in November 1988 revealed a large amount of bird guano along the top of the breakwater indicating heavy use (presumably for resting/perching) by gulls. One dead gull was observed on top of the breakwater. One scaup (Aythya sp.) and approximately 75 to 100 mergansers (Mergus sp.) were observed immediately outside of the breakwater in a wind protected area of nearshore Lake Michigan.

3.4.2.4.3 A variety of waterfowl species use nearshore areas of Lake Michigan in the vicinity of Jeorse Park (immediately to the south of the Inland Steel peninsula) during migration (USACE, 1986). A series of 12 bird surveys were conducted by USACE' biologists between September 1985 and April 1986 in the nearshore area of Lake Michigan immediately south of the Inland Steel peninsula. Fourteen species were observed in the area. These species consisted primarily of migrating waterfowl and shorebirds. Lesser Scaup (A. affinis) and Ring-billed Gulls (Larus delawarensis) were the two most abundant species observed (Table EIS-10).

3.4.2.5 ECI Site

3.4.2.5.1 This property is composed of approximately 285 acres of an abandoned industrial complex. The property proposed for CDF construction is bisected by a set of railroad tracks. Buildings and other structures have been demolished and removed from the site. Terrestrial vegetation can presently be characterized as early old field. A site inspection in early 1989 revealed that much of the site was bare soil. A portion of the northwest corner was covered by short, mowed herbaceous species. No wildlife were observed on the site during this inspection. A site inspection during September 1991 revealed that most of the site had developed a good cover of herbaceous species with a few isolated small trees and shrubs. The western edge of the site (next to the railroad tracks) contained a few prairie remnant species. No wetlands are on the site although the north central portion of the site (north of the railroad tracks) did contain some wetland plant species during the 1991 site visit. A complete listing of plants identified on the site during the September 1991 site visit is included in Table EIS-11. Wildlife species observed in the area during this

site visit included American kestrel (Falco sparverius), an unidentified hawk sp., Mourning dove (Zenaida macrocura), Double-crested cormorant (Phalcrocorax auritus), gull (Larus spp.), and Garter snake (Thamnophis sp.).

3.4.2.6 Generic Clean Upland Site

3.4.2.6.1 The terrestrial resources surrounding the Indiana Harbor and Canal are generally very limited in diversity and abundance due to the urban/industrial nature of the area and lack of habitat. The sparse vegetation present tends to be weedy, pioneering species such as ragweed (Ambrosia sp.), goldenrods (Solidago sp.), garden sunflower (Helianthus annus), sweet clover (Melilotus sp.), cotton-wood (Populus deltoides), and tree of heaven (Ailanthus altissima) (USACE, 1986). Nearby residential areas contain typical urban plantings such as Kentucky blue-grass (Poa pratensis) and ornamental trees and shrubs of various species. The wildlife species present are primarily small mammals and birds which are typical of urban and waterfront areas. This includes House Sparrows (Passer domesticus), Starlings (Sturnus vulgaris), Rock Doves (Columba livia), gulls (Larus sp.), thirteen-lined ground squirrels (Citellus tridecemlineatus), and eastern cottontails (Sylvilagus floridanus).

3.4.2.7 Wildlife in Hammond-East Chicago Area - Wildlife in the vicinity of the Indiana harbor and Cal are limited to remaining pockets of undeveloped or recently cleared land within the urban/industrial complex of Hammond, East Chicago, Whiting, and Gary. Lands not heavily industrialized are largely commercial or residential developments, with limited wildlife value due to lack of cover. The best remaining areas for wildlife are along undeveloped reaches of the Grand Calumet River, abandoned industrial sites (reverting to grass or scrub-shrub habitats), isolated railroad rights-of-way, and the "migrant trap" northwest of the Hammond Marina (USFWS letter dated 16 September 1996).

3.4.2.8 Mobil Oil/141st Street Wetlands - There is a large parcel of wildlife habitat along the Lake George Branch of the Indiana Harbor Canal, west of the Federal project limits. Some of this land is natural wetland (remnants of the Lake George/Wolf Lake complex which covered much of the Hammond Whiting area prior to settlement), while some is abandoned industrial land with wetlands mixed with slag and other debris. Species observed on Mobil Oil property at this site include mute swan, mallard, blue-winged teal, wood duck, red-tailed hawk, kestrel (sparrow hawk), great blue heron, black-corwned night heron, sora rail, coot, pied-billed grebe, woodcock, ring-billed gull, lesser yellowlegs, killdeer, shorebirds, kingfisher, yellow warbler, yellowthroat, other warblers, tree swallow, northern oriole, mourning dove, marsh wren, rufus-sided towhee, gray catbird, goldfinch, song sparrow, red-winged blackbird, grackle, cardinal, robin, and willow flycatcher (USFWS letter dated 16 September 1996).

3.4.2.9 Grand Cal/Indiana Harbor Canal Junction - There are also wetlands along the Grand Calumet River east and west of its junction with the Calumet Branch of the Indiana Harbor Canal. To the east are significant cattail marshes, bordering the river for about 6 miles; landward of these marshes are remnants of significant dune and swale habitat. The dune support sand prairies or black oak savannas; the swales are marshes or buttonwood swamps (USFWS letter dated 16 September 1996).

3.4.2.10 East Branch Grand Calumet - Additional significant habitat exists along the east branch of the Grand Calumet River east of Industrial Highway, at the west end of the U.S. Steel complex in Gary. This area is a dune and swale and cattail marsh habitat with 2 ponds.

3.4.2.11 Lead Refinery Wetland - A third marsh and dune and swale remnant exists along the north bank of the east branch of the Grand Calumet between Kennedy Avenue and the Indiana Harbor Canal. This 80-acre site contains an abandoned lead refinery which is undergoing environmental remediation (clean-up). The western portion of this parcel is dune and swale habitat.

3.4.2.12 Roxana Marsh (Roxana Pond) - A wetland along the west branch of the Grand Calumet, at the crossing of the Indiana Toll Road. Though polluted by sewage from the nearby Hammond and East Chicago sewage treatment plants, it is a significant habitat for waterbirds and shorebirds. Shorebirds occur at Roxana Marsh in great numbers, including marbled godwit, Hudsonian godwit, American avocet, stilt sandpiper, long-billed dowitcher, and red-necked phalarope. State-endangered yellow-

headed blackbirds have probably nested here; regular nesters include mallard, blue-winged teal, American coot, common moorhen, marsh wren, and red-winged blackbird. This site is thought to support the region's largest moorhen population (USFWS letter dated 16 September 1996).

3.4.2.13 Migrant Trap - A significant bird habitat about three miles northwest of the LTV Steel lakefill at Indiana Harbor; the site was named for the large numbers of migrating birds seen there in fall and spring. This narrow strip of cottonwoods, shrubs, and piles of fill is particularly valuable for neotropical migrants that rest here before or after long flights along the lakeshore. This parcel also attracts barn owls, short-eared owls, and other raptors; most of this site is now protected by a conservation agreement with the IDNR.

3.4.2.14 Despite the industrial nature of its banks, the Indiana Harbor Canal receives considerable use by wildlife, particularly waterfowl and waterbirds; aquatic plants and brush along the canal between Columbus Drive and the Grand Calumet River provide habitat; the largest block of habitat on the canal is a wetland on the east bank between Chicago Avenue and Columbus Drive.

3.4.2.15 Lesser Scaup - The Grand Calumet/Indiana Harbor Canal complex is an important wintering area for lesser scaup, because of the lack of more suitable habitat in the area. Because the river and canal do not freeze in winter, they offer valuable habitat for a species that would otherwise have to migrate much further south. Numbers of wintering lesser scaup in other parts of the Great Lakes are increasing due to the presence of zebra mussels (USFWS letter date 16 September 1996).

3.4.2.16 Gulls - There are two large gull colonies at Indiana Harbor, on the Inland Steel lakefill and on the LTV Steel parcel.

3.4.2.17 Peregrine Falcon - The Federal-listed endangered (soon to be de-listed) peregrine falcon has nested under the Cline Avenue bridge near the proejct area since 1989.

3.4.2.18 Other Bird Species - State-endangered black-crowned night herons nested in small cottonwoods on the west side of Indiana Harbor on LTV Steel land in 1993-1995; over 80 nests were observed; most reproduction failed as the result of late nesting or as the result of beavers felling the trees. Double-crested cormorants are common along the canal and lakefront year round; this species has been considered extirpated as a nester here, but populations are increasing in the Great Lakes. As recently as the late 1980s the state-endangered black tern nested along the Grand Calumet River in cattail marshes between Roxana Marsh and Cline Avenue. Several state Species of Concern reside or migrate along the Grand Calumet River, including least bittern, marsh wren, sharp-shinned hawk, red-shouldered hawk, and brown creeper.

3.4.2.19 PCB Contamination in Birds - The Grand Calumet River and Indiana Aharbor Canal contain several areas of significant PCB contamination; impacts to birds associated with PCBs have been well documented. It is posible that the hatching success of peregrine falcon eggs has been impaired due to PCBs in the canal under existing conditions, without the proposed project. PCB residue data for birds in the Indiana Harbor area include herring gull eggs, great blue heron embryos, barn swallow embryos and nestlings, black-crowned night heron embryos and nestlings, and peregrine falcon eggs (USFWS letter dated 16 September 1996).

3.4.2.20 Oil Contamination in Birds - There are many surface seeps of petroleum products (crude or waste oil in pools resembling miniature "tar pits") at the proposed disposal site (the ECI site); sheens of petroleum also appear on the canal whenever sediments are disturbed. Oil-related deaths have been documented for several bird species in the canal. Flight impairment resulting from oiling has also been observed in bird species on the canal; flight-impaired, oil-contaminated birds are a potentially significant pathway of oil transfer to peregrine falcons and their eggs. Falcons have been observed chasing oil-impaired prey; capture of such prey would expose the falcons to the effects of petroleum and PCBs (USFWS letter dated 16 September 1996).

3.4.2.21 PAH Contamination in Birds - Falcons may also ingest PAHs by eating lesser scaup. PAHs have benn detected in failed peregrine eggs; it may be reasonably

assumed that the falcons have already been affected by PAHs (USFWS letter dated 16 September 1996).

3.4.2.22 Mammals - Mammals known to occur within the Hammond-East Chicago-Gary urban area include white-tailed deer, coyote, gray fox, red fox, mink, raccoon, beaver, muskrat, opossum, gray squirrel, Franklin's ground squirrel, thirteen-lined ground squirrel, eastern cottontail, chipmunk, woodchuck, big brown bat, red bat, mice, and voles. Franklin's ground squirrel is state-threatened, and is occasionally seen in nature preserves, along railroads, and as a roadkill on city streets.

3.4.3 Threatened and Endangered Species

3.4.3.1 The U.S. Fish and Wildlife Service was contacted concerning potential impacts to Federally listed species (letter dated November 22, 1988, and April 11, 1989). They provided informal comments in their Draft Coordination Act Report (dated January 30, 1989). The project area lies within the general range of the Federally endangered Indiana bat (Myotis sodalis), endangered peregrine falcon (Falco perigrinus) and the threatened pitcher's thistle (Cirsium pitcheri). In addition, Lake County, Indiana, is within the range of five Federal endangered candidate species: forked aster (Aster furcatus), heart-leaved plantain (Plantago cordata), beach (fragrant) sumac (Rhus trilobata arenaria), prairie fame flower (Talinum rugosperum), and karner blue butterfy (Lycaeides melissa samuelis). Due to the concerns raised, a biological assessment was prepared in accordance with Section 7 of the Endangered Species Act, and sent to the Bloomington Field Office, U.S. Fish and Wildlife Service for review on March 8, 1989. This biological assessment is included as Appendix D, Biological Assessment. Since the biological assessment was prepared, new information concerning the presence of the peregrine falcon within the project area has become available. Due to re-introduction efforts within Wisconsin, Michigan, and Illinois, two pairs of peregrine falcons have successfully nested on buildings within East Chicago and Gary (USX steel plant), Indiana between 1989 and 1991 (Randall, 1991). By letter dated July 14, 1994, the U.S. Fish and Wildlife Service (USFWS) indicated that the presence of the peregrine falcon in the project area needs to be further addressed under the requirements of Section 7 of the Endangered Species Act of 1973. In subsequent informal discussions (July and August 1995), the Fish and Wildlife Service indicated that a pair falcons nest on the underside of the Riley Road up-ramp of the Cline Avenue (Route 912) high-rise bridge located 1/4-mile north of the Indiana Harbor and Canal and 1/2-mile east of the ECI site. Based on these discussions, the USFWS indicated that these falcons are probably suffering from an accumulation of PAHs and PCBs.

3.4.3.2 The U.S. Fish and Wildlife Service lists 26 species that are considered endangered, threatened, or of special concern by the State of Indiana and are found in Lake County. Of these species, biologists of the U.S. Fish and Wildlife Service have observed Blanding's turtle (Emydoidea blandingi), American Bittern (Botaurus lentiginosus), Broad-winged Hawk (Buteo platypterus), Black-crowned Night Heron (Nycticorax nycticorax), mudpuppy (Necturus maculosus), and Franklin's ground squirrel (Spermophilus franklinii) in the general vicinity of the project area (Draft Coordination Act Report, dated January 30, 1989). In addition, Brock (1986) notes that four other state-listed species utilize the southern shoreline area of Lake Michigan during migration. These four species include the Double-breasted Comorant (Phalacrocorax auritus), Common Loon (Gavia immer), Osprey (Pandion haliaetus), and Forster's Tern (Sterna forsteri).

3.4.3.3 The Indiana Department of Natural Resources was contacted concerning the potential presence of state-listed species (letters dated November 22, 1988, and April 11, 1989). The IDNR provided no comments with respect to state-listed species in correspondence dated September 12, 1990, but did provide information on the presence of Pitcher's thistle in the project area for inclusion into the biological assessment by letter dated February 21, 1989.

Table EIS-10 Bird Surveys Along the Lake Michigan Shoreline Offshore of Jeorse Park Near Inland Steel Company, 1985-1986 [1/]

	1985								1986				
Common Name	Sep. 11	Oct. 17	Oct. 24	Nov. 4	Nov. 13	Nov. 20	Nov. 27	Dec. 11	Mar. 12	Mar. 24	Mar. 31	Apr. 7	Total
Common Loon						1	2						3
Horned Grebe				6		3	1			12			22
Eared Grebe				1									1
Lesser Scaup				136	500		107	70					813
Common Goldeneye					4		5	1	5				15
Common Merganser					3								3
Merganser sp.						1							1
Ruddy Duck		8	3										11
American Kestrel		3											3
Killdeer											1		1
Sanderling	15												15
Bonapartes Gull			5	3									8
Ring-billed Gull			75	3							3	2	83
Common Tern				1									1
Gull sp.					2				1			10	13
Tree Swallow												2	2

[1/] Surveys conducted by biologists of the Chicago District, U.S. Army Corps of Engineers.

Table EIS-11 Plant Species Observed at the ECI Site During September 1991

Common Name	Scientific Name
Jerusalem artichoke	Helianthus tuberosus
Common ragweed	Ambrosia trifida
Aster	Aster sp.
Foxtail	Setaria sp.
Cottonwood (seedlings)	Populus deltoides
Thistle	Cirsium sp.
Goldenrods	Solidago spp.
Wild carrot	Daucus carrota
Perennial ryegrass	Lolium perenne
Common evening primrose	Oenothera biennis
Clover	Trifolium sp.
Big bluestem	Andropogon gerardii
Switchgrass	Panicum virgatum
Smartweed	Polygonum sp.
Barnyard grass	Echinochloa Crus-galli
Sedge	Carex sp.
Iris	Iris sp.
Softstem bulrush	Scirpus validus
Common reed	Phragmites communis
Swamp milkweed	Asclepias incarnata
Common milkweed	A. syriaca
Dock	Rumex sp.
Timothy	Phleum
Bur dock	Arctium minus
Cocklebur	Xanthium strumarium
Cyperus	Cyperus sp.

3.4.3.4 The U.S. Department of the Interior, Fish and Wildlife Service issued a Biological Opinion on 21 May 1996 determining that the project is not likely to jeopardize the continued existence of the peregrine falcon. However their impact analysis indicated the likelihood of an increased in short term adverse impact on nesting falcons along the Indiana Harbor Canal.

3.4.3.5 The issues of concern include the release of additional oil to the water column due to dredging and the sublethal and acute toxicity impacts of this oil on the falcons, the operation of the confined disposal facility, the design and management of the Wildlife Exclusion Plan and disturbances to nesting during dredging. The Fish and Wildlife Service has prepared an incidental take statement pursuant to Section 7(b)(4) of Act, which is included in Appendix A, Coordination. Discussions are ongoing about mandatory terms and conditions contained in the incidental take statement.

3.4.4 Natural Areas and Public Lands

3.4.4.1 No natural areas occur immediately along the Indiana Harbor and Canal or at any of the disposal sites (Indiana Department of Natural Resources, 1976). There are a number of publicly owned parks in the general vicinity of the project area. These are discussed in paragraph 3.6.5.

3.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES

3.5.1 Indiana Harbor and Canal

3.5.1.1 The Federal channels comprising Indiana Harbor and Canal are completely man-made. They were excavated and periodically dredged between 1888 and 1972. They contain no archaeological or historic material of significance.

3.5.2 141st St. Site

3.5.2.1 This site (referred to as 14b in earlier reports) is a flat expanse of modern fill. It has been graded flat. The site was a wetland in 1929; between then and 1981 it was filled with gravel, slag, and refuse. It contains no significant cultural material.

3.5.3 J-Pit Site

3.5.3.1 This is an open borrow pit (a former sand mine), about 40 feet deep, excavated between 1900 and 1980 (probably after 1968). It has been partially filled with construction debris and contains no significant cultural material.

3.5.4 Inland Steel Site

3.5.4.1 The site is an active lakefill, begun in the early 1960s on the bed of Lake Michigan. Its boundaries are formed by a bulkhead enclosing 780 acres of former lakebed. It has been partially filled with steel mill slag and dredged material. Much of the site has been disturbed by filling and construction; the remaining unfilled lakebed could conceivably contain historic shipwrecks.

3.5.5 ECI Site

3.5.5.1. This site was formerly an industrial area (rail lines, tank farm, refinery, dikes, buildings) containing structures built after 1911. The site operated as an oil refinery between about 1918 and 1983. The structures were demolished in the late 1980s. The site has been thoroughly disturbed by filling and construction; it is not likely to contain any significant archaeological material.

3.5.6 Generic Clean Upland Site

3.5.6.1 No specific site has been identified as the Generic Clean Upland Site. Therefore, no statement can be made concerning archaeological or historic properties at this site.

3.6 SOCIAL SETTING

3.6.1 Indiana Harbor and Canal Area/Inland Steel Site

3.6.1.1 This area (including the Inland Steel site) is a large steel production and processing center. The immediate vicinity is entirely industrialized. The LTV steel plants and docks are along the northwest side of the outer harbor area and the main stem of the Indiana Harbor Canal. The docks and plants of the Inland Steel Company are on the southeast side of the outer harbor and on the main stem of the Canal. Major petroleum companies including Mobile and Shell are along the inner portion of the Canal's main stem, and along the Lake George and Grand Calumet River Branches. Information on waterborne commerce and related economic factors are in Appendix B, Economic Analysis.

3.6.1.2 The harbor is within the corporate limits of the City of East Chicago, Indiana. Surrounding communities include Gary to the east and Hammond and Whiting to the west. Because of the industrial nature of northwestern Indiana, the fiscal well-being of these communities is heavily dependent upon industry. The area economy has been and continues to be closely associated with the steel industry. As a result, it is sensitive to fluctuations in the steel industry's employment and production patterns. Past declines in the manufacturing industry hurt the Indiana Harbor area, but the range of industries there (which includes oil refineries) provided some relief. In addition to the economic downturn which precipitated heavy out-migration, a declining birth rate has also contributed to population decreases. Population figures for the surrounding communities are in Table EIS-12.

3.6.1.3 According to estimates of the U.S. Bureau of Labor Statistics, in July

1991 the Lake County unemployment rate was 7.2%. The two-county metropolitan area (Lake and Porter Counties) had an unemployment rate of 6.6%. By comparison, the State of Indiana rate was 5.7% and the U.S. rate was 5.5%. The average rate for 1990 was 6.2% in Lake County and 5.7% in Porter and Lake Counties combined; the U.S. rate was 5.5%, and the Indiana rate was 5.3%. The area unemployment rate had been declining in the late 1980's, but this could have reflected the substantial loss of residents since the 1980 Census of Populations, many of whom may have left to seek employment elsewhere. From 1980 to 1990, Lake County lost 9% of its population, declining from 522,965 to 475,594.

Table EIS-12 Population Statistics for Cities within the Indiana Harbor Project Area

City	1970	1980	1990
East Chicago	46,928	39,786	33,892
Gary	175,415	151,953	116,646
Hammond	107,983	93,714	84,236
Whiting	7,054	5,630	5,155

Sources: U.S. Bureau of the Census, 1981; 1991.

3.6.1.4 Losses in manufacturing in Lake and Porter Counties from 1979 to 1985 were substantial. Manufacturing employment experienced a loss of 43,000 jobs, reflecting a 41.8% decline. In recent years, employment in area industries has stabilized. Inland Steel Company, located at Indiana Harbor, employed 14,700 persons in 1990. It reached a high of 23,000 employees in 1974. Losses are attributable to past declines in steel production in the U.S. and shifts toward automation and mechanization. In the late 1980's the steel industry, including the Inland Steel Company, posted record profits after suffering net losses from 1982 to 1985. The current recession (1990's) has had an adverse effect on the steel industry, but slow, steady growth is projected. Despite this, Inland Steel announced in late 1991 future layoffs of 700 or more employees.

3.6.1.5 According to the East Chicago Chamber of Commerce, the two harbor-based steel companies (Inland Steel and LTV Steel) represented, in 1986, 60 percent of the total assessed valuation of all principal taxpayers in East Chicago. Property on the Indiana shoreline west of the harbor is a mixture of industrial use, public recreation use, and public buildings and related lands. The shoreline extending for about 10 miles east of Indiana Harbor consists of well-protected industrial lakefills. The only non-industrial use consists of a recreational boat harbor and small beach immediately east of the Inland Steel Company landfill at Jeorse Park. More public recreational lakefront access in the harbor vicinity is available to the west.

3.6.1.6 The potable water intake for Whiting, Indiana, lies about 1.5 miles west of the Indiana Harbor entrance. Hammond's water intake is about 3 miles northwest of the Harbor. The water intake for East Chicago, Indiana, lies about one-half mile southeast of Inland Steel Company's fill area and extends about 1.75 miles into Lake Michigan. A water filtration plant for East Chicago is across the street from lakefront Jeorse Park.

3.6.2 141st St. Site

3.6.2.1 This site lies in a predominately industrial area in Hammond, Indiana. Oil tank farms are in the immediate surrounding area. The southern boundary of the site is 141st Street, a light-duty roadway; the western boundary is the Indiana East-West Toll Road (Interstate 90). Calumet Avenue (U.S. Route 41), a four-lane heavy-duty road, is a major north-south route just west of the site. Several motels are opposite the site, around the nearby toll road interchange. Some residences are within one-half mile of the site.

3.6.3 J-Pit Site

3.6.3.1 This site is within the City of Gary, Indiana. The Gary Landfill is east of the site. Colfax Road, a medium-duty roadway, is along the site's eastern edge, and the E.J.& E. Railroad is along the western border. Cline Avenue, a north-south light-duty road, is also near the site's western edge. 169th St., another light-duty road, provides access to the site from the west. The surrounding area is sparsely settled with the exception of residential developments near the southern edge of the site. This area is part of the Black Oak community of Gary. The dredged material could be moved to this site either by rail or by truck. The haul routes for these two modes of transport are shown on Plate EIS-17.

3.6.4 ECI Site

3.6.4.1 This site is in the City of East Chicago, Indiana. The proposed disposal area is the northern parcel of land formerly occupied by the ECI refinery. The southern parcel (not under consideration for construction of the CDF) is located south of the Lake George Branch. The site is within an industrial area bordered by residential areas and a city park and golf course. East Chicago Central High School and MacArthur Golf Course are located south of the southern parcel. A residential neighborhood is about one-half mile south of the southern edge. Surrounding industrial developments include Amoco Oil to the north and west. Indianapolis Boulevard (U.S. Route 12/20), along the site's eastern border, is a heavy-duty primary roadway.

3.6.5 Recreation

3.6.5.1 There are several city and county parks in the vicinity of Indiana Harbor and Canal. The Indiana Dunes National Lakeshore is about 20 miles east of the project area. These areas provide public access for fishing, boating, swimming, biking, hiking, and bird watching (IDEM, 1988).

3.6.5.2 Marquette Park is on the upstream end of the Grand Calumet River. The nearest public lakefront areas west of the harbor are at Whiting Municipal Park and Wihala Beach County Park, 3 miles west, and at Lakefront Park in Hammond, about 4 miles west. Lakefront Park has a marina with 800 slips and dry dock storage for 200 boats, along with a launching ramp and fueling dock. Shoreline recreational areas are also located at Commonwealth Edison's Stateline Station and NIPSCO's Dean H. Mitchell Station (Indiana Department of Environmental Management, 1988).

3.6.5.3 George Park, east and south of the harbor entrance, is operated and maintained by East Chicago's Park District. This 36-acre park contains a sand beach with 500 feet of lakefront at its southeast end. Adjacent to the park at the northwest end is the Robert A. Pastrick Marina. This marina has launch ramps which are open to the public. The newly renovated boat harbor has 294 moorings and dry storage for 250 boats. A second phase of the renovation project now contains a gambling boat. Four launching lanes are available on two launching piers.

3.6.5.4 A marina has been developed by the City of Hammond, adjacent to the city's water filtration plant, northwest of Indiana Harbor. The marina provides over 1,113 slips, with winter-time dry storage for about 200 boats. The Hammond marina also contains a gambling boat. Buffington Harbor contains two gambling boats.

3.6.5.5 MacArthur Golf Course and a public swimming pool are along Indianapolis Boulevard, south of the Lake George Branch of the Canal and north of 141st Street. The City of East Chicago presently has plans to use a parcel of the ECI property (on the south side of the Lake George Branch of the Canal) to expand MacArthur Golf Course in the near future. To the east of the project area is Todd Park, which has a playground and ball field. This neighborhood park, the golf course,

and the swimming pool are all part of the East Chicago's Park District. Kosciusko Park is also in East Chicago, just north of the West Branch of the Grand Calumet River and west of Route 20. Columbia Park is in Hammond adjacent to and south of the West Branch of the Grand Calumet River and east of Columbia Avenue. A neighborhood park in Hammond is adjacent to the West Branch of the Grand Calumet River and north of Michigan Street.

3.6.6 Agriculture

3.6.6.1 There is little or no agricultural land in the vicinity of the Indiana Harbor and Canal due to the extensive urban and industrial land uses (Indiana Department of Environmental Management, 1988). None of the four proposed CDF sites are currently being farmed or are suitable for farming. These sites were rated with respect to the presence of prime and unique farmland and did not qualify (see section on Prime and Unique Farmland).

4.1 GENERAL IMPACTS

4.1.1 Table EIS-1 summarizes the comparative impacts of the alternatives considered.

4.1.2 Borrow Areas

4.1.2.1 The use of existing commercial sources for borrow materials to construct the CDF dikes and clay liners is not expected to cause significant impacts to physical, biological, archaeological or historic, or social resources of the project area. Potential, minor impacts expected at the borrow areas include increases in dust, noise, hydrocarbon and carbon monoxide emissions (from mining equipment and transport trucks), truck traffic, and the permanent removal of earth/rock materials from the site. If some source other than an existing, commercial source was proposed for use as a borrow area at a later point in time, additional environmental evaluation and documentation would be required.

4.1.3 Harbor Structure Maintenance

4.1.3.1 Structure maintenance activities would include the placement of materials such as concrete, stone, asphalt, or steel sheet-piling onto existing harbor structures to maintain them in adequate structural condition. Work performed above the waterline would have no significant impacts to area physical, biological, archaeological or historical, or social resources. Work performed below the waterline would cause minor, temporary increases in turbidity, burying of any existing invertebrates, and temporary displacement of fish from the area. Work performed above or below the waterline would cause minor, temporary increases in area dust, noise, hydrocarbon and carbon monoxide emissions (from construction equipment and transport trucks and barges), and area truck and barge traffic. This structure repair work qualifies as a categorical exclusion under 33 CFR 230.9 and requires no further NEPA documentation. Repair work performed above the waterline would not be subject to Section 404(b)(1) requirements. According to Section 404(f) of the Clean Water Act, structure repair work performed below the waterline would also be exempt from Section 404(b)(1) requirements.

4.2 PHYSICAL RESOURCE IMPACTS

4.2.1 Geology/Soils Impacts

4.2.1.1 None of the alternatives presented in this document would have any long-term or significant impacts on area geology or soils with the exception of the permanent removal or soils, sands, gravel, or rock from a borrow site to construct a CDF or maintain existing navigation structures.

4.2.1.2 <u>Prime and Unique Farmland</u>

4.2.1.2.1 None of the alternative disposal sites qualified as prime and unique farmland, as defined by 7 CFR 658. Therefore, no such lands would be impacted by any of the alternative disposal plans.

4.2.2 Groundwater Impacts

4.2.2.1 <u>No Action Alternative</u>

4.2.2.1.1 Under the "No Action" Alternative, it is unknown if the contaminated sediments would significantly impact the existing, contaminated groundwater table. Some local industries may continue to reclaim petrochemicals from the shallow groundwater table. These petrochemicals appear to be a much more significant threat to area groundwater.

4.2.2.2 <u>Dredging</u>

4.2.2.2.1 The flow patterns of the shallow Calumet aquifer are very complex, with drainage to the GCR/IHC, Little Calumet River, Lake Michigan, and local sewers (Banaszak and Fenelon, 1988). Waters of the IHC and the shallow groundwater in the area are interconnected, with flow potentially passing both to and from the groundwater table. It is unknown whether the removal of the sediments will alter this pattern of interchange of surface and groundwater. The dredging and confined disposal of contaminated sediments from the IHC will remove a potential source of groundwater contamination, although the significance is unknown.

4.2.2.3 Confined Disposal

4.2.2.3.1 Sediments from the IHC have been tested using the protocols identified in the USACE/U.S. EPA Technical Framework (USACE/U.S. EPA, 1992) and the "Management Strategy for Disposal of Dredged Materials: Contaminant Testing and Controls" (Francingues et al., 1985). These included tests developed to address the potential impacts of dredged material disposal to a CDF on groundwater and design measures to control contaminant seepage. These test methods, and the results of analysis are described in Appendix E, Sediment Quality. The quality of water which percolates through the confined sediments (seepage) is shown in Table EIS-13. These concentrations represent undiluted pore water. Dilution with infiltrating rainwater and surface runoff would substantially reduce these values. This analysis was done only for the ECI, 141st Street, and J-Pit sites.

4.2.2.3.2 An analysis of the seepage potential from the upland CDF sites was conducted using the Hydrologic Evaluation of Landfill Performance (HELP) model developed by the USACE' Waterways Experiment Station for the U.S. EPA. A detailed description of this analysis is provided in Appendix F, Environmental Engineering. This model was used to evaluate the performance of control measures, including barrier systems, caps and cover, and underdrainage systems. A comparison of the model results for these CDFs is shown on Table EIS-14. These results reflect the long-term, annual seepage from the facilities post-closure. This is the volume of water which passes through the CDF into the surroundings. The natural clay formation below the upland sites would attenuate both volume and quality of seepage escaping the CDFs. It should be noted that the seepage from the Inland Steel CDF would be lateral towards Lake Michigan, and not towards the groundwater. The mass flux of contaminants from the CDF alternatives were calculated using the quality (Table EIS-15) and quantities (Table EIS-16), as well as the annual rainwater infiltration determined from the HELP model. These losses are compared in Tables EIS-2 and EIS-3.

Table EIS-13 Quality of Undiluted Seepage from a CDF

Parameter	Concentration (mg/l)
Ammonia	300
Arsenic	0.014
Cadmium	0.0050
Chromium	0.060
Copper	0.210
Cyanide	0.190
Iron	4.6
Lead	0.089
Manganese	0.021
Mercury	0.00020
Nickel	0.18
Nitrate + Nitrite	16
TKN	310
Phenols	0.20
Phosphorus	2.0
Zinc	0.33

Table EIS-14 Long-term Seepage Losses from Upland CDFs (Post-Closure Conditions)

	Alternative CDF Site			
Item	141st	J-Pit	Inland Steel	ECI
Annual seepage loss (cubic feet)	26,700	35,100	32,400	Negligible[1/]

[1/] ECI plan includes maintenance of an inward gradient.

4.2.2.3.3 141st St. Site. The conceptual design for a CDF at this site includes a bentonite slurry wall tied into the underlying natural clay formation, enclosing the shallow groundwater table. Additional environmental controls include a three-foot clay liner on the CDF dike, underdrainage system, and a graded clay cap. These environmental controls would essentially eliminate the migration of any contaminants from the CDF into the surrounding groundwater. Existing groundwater contamination within this cutoff area would be removed and treated with the return water from the CDF. Additionally, the geophysical properties of dredged materials (fine-grained materials with high binding affinity for contaminants) will further limit their potential impacts on groundwater quality.

4.2.2.3.4 J-Pit Site. The conceptual design for a CDF at this site includes a clay liner, a bentonite slurry wall tied into the underlying natural clay formation to enclose the shallow groundwater table, an underdrainage system, and a clay cap. These environmental controls would essentially eliminate the migration of any contaminants from the CDF into the surrounding groundwater. Additionally, the geophysical properties of dredged materials (fine-grained materials with high binding affinity for contaminants) will further limit their potential impacts on groundwater quality.

4.2.2.3.5 Inland Steel Site. No information is available which suggests that nearshore Lake Michigan is a source for recharge of the shallow groundwater table around the GCR/IHC. The conceptual design for a CDF at this site includes a synthetic fabric liner on the dike with an intrinsic permeability exceeding 10^{-15} cm/sec and a graded clay cap. Additionally, the geophysical properties of dredged materials (fine-grained materials with high binding affinity for contaminants) will further limit their potential impacts on groundwater quality. Any loss of contaminants through the bottom of the CDF would be greatly minimized by the lack

of a constant positive hydraulic head.

4.2.2.3.6 ECI Site (Dredging Alternatives 1, 2, and 3). Under Alternatives 1, 2, and 3 a slurry wall would be constructed around the perimeter of the CDF to isolate the groundwater under the CDF. The slurry wall would extend from the ground surface down approximately 33 feet and be tied into the stiff clay which underlies the proposed CDF site. Facilities to create an inward hydraulic gradient within the slurry walls would also be constructed. These facilities would include installation of wells with appropriate pumps to provide for gradient control. Additionally, the geophysical properties of dredged materials (fine-grained materials with high binding affinity for contaminants) will further limit any potential seepage impacts on groundwater quality.

4.2.2.3.7 Generic Clean Upland Site. Groundwater resources at a generic clean upland site would be protected by use of a CDF "bathtub" design. This design would include construction of several separation liners and monitoring layers on the bottom of the CDF tied into clay-lined dikes. The liners and monitoring layers would be placed on top of the existing ground surface to completely separate the dredged material and its water content from the groundwater below and adjacent to the CDF site.

4.2.2.4 Treatment Technologies

4.2.2.4.1 The implementation of any treatment technology requires the construction and operation of a CDF. All technologies considered would require the use a CDF or a similar structural facility for the storage and dewatering of dredged materials. None of the technologies studied were able to completely destroy all of the contaminants present or render them completely immobile or unleachable. Therefore, all technologies would produce a solid residue requiring long-term confinement in a CDF.

4.2.2.4.2 The short-term impacts of a treatment technology on groundwater will be similar to the impacts discussed above for confined disposal due to the relatively long-term storage time required to dewater the sediments in many of the treatment technologies.

4.2.2.4.3 The long-term leachability of treated residues produced by these technologies is not well understood. Solid residues of incineration, extraction, and oxidation may have some remaining contaminants in forms which are as leachable or more so than the original sediment. These residues may require additional treatment (solidification) because of their physical properties or in order to reduce the leachability of remaining contaminants. Solidification has been shown to reduce the leachability of some metals in dredged materials. The impacts of solidification on the leachability of organic contaminants in dredged materials is not well understood (Environmental Laboratory, 1987; Fleming et al., 1991).

4.2.2.4.4 The long-term impacts of treatment technologies on groundwater may be less than those of confined disposal alone, but it is impossible to say how much less without considerable additional research and demonstration.

4.2.3 Sediment Quality Impacts

4.2.3.1 No Action Alternative

4.2.3.1.1 Under the "No Action" Alternative, the maintenance dredging of the IHC would not occur. The shoaling of the canal and harbor would continue to interfere with ship traffic and require vessels to move through existing deposits. Additionally, existing deposits are continually disturbed by currents during storms and continuous bioturbation by aquatic organisms. These disturbances would continually renew the surface sediment contaminant levels in the IHC by redistributing deeper sediments upward and laterally over an extended time period (many years).

4.2.3.1.2 The discharge of contaminated sediments from the GCR/IHC into Lake Michigan would continue to degrade the quality of bottom sediments in the near shore and open lake. It is estimated that 182 million pounds of contaminated

sediment are discharged from the GCR/IHC to Lake Michigan each year. The sediment contaminant losses to Lake Michigan under the No Action alternative are detailed in Appendix C, "No Action" Alternative and summarized in Table EIS-15. Approximately 67,000 pounds of chromium, 100 thousand pounds of lead, and 420 pounds of PCBs are associated with sediments discharged annually to Lake Michigan from the GCR/IHC.

4.2.3.1.3 The implementation of more stringent source controls through the RAP process would reduce future sediment contamination in the GCR/IHC. The GCR/IHC would remain a source of sediment contamination to Lake Michigan because of the large amount of in-place sediment contamination capable of being transported to Lake Michigan. If the proposed CDF were not constructed, the lack of an acceptable disposal facility would impair the progress of remedial efforts in the GCR/IHC, including enforcement-based sediment remediation actions and the overall implementation of the remedial action plan. As a result, the benefits from the proposed project and remedial actions by others on water and sediment quality would be diminished or delayed.

Table EIS-15 Annual Sediment Contaminant Losses From GCR/IHC to Lake Michigan (Lbs./Year)

Chemical Parameter	No Action	Maintained Channel 70% Reduction	Maintained Channel 50% Reduction
Total Suspended Solids	182,000,000	55,000,000	91,000,000
Arsenic	6,600	2,000	3,300
Cadmium	2,000	600	1,000
Chromium	67,000	20,000	34,000
Copper	25,000	7,400	12,000
Iron	17,000,000	5,200,000	8,700,000
Lead	100,000	30,000	50,000
Manganese	200,000	60,000	100,000
Mercury	130	38	64
Nickel	13,000	3,900	6,600
Zinc	530,000	160,000	260,000
Ammonia	150,000	46,000	77,000
Phosphorous	470,000	140,000	230,000
Oil & Grease	10,000,000	3,100,000	5,200,000
PCBs	420	110	280

4.2.3.2 Dredging

4.2.3.2.1 Dredging will have long-term beneficial impacts and may have short-term detrimental effects on sediment quality in the Indiana Harbor and Canal and adjacent Lake Michigan. The maintenance dredging will remove a backlog of approximately one million cubic yards of in-place contaminated sediments from the aquatic ecosystem during the early years of dredging. Up to an additional 3.67 million cubic yards would be removed over the project life. This, in turn, will reduce the ability of these in-place contaminants to be resuspended and transported into Lake Michigan. As a result, the levels of contamination in surface sediments in the littoral zone of Lake Michigan will be reduced.

4.2.3.2.2 Restoring the navigation channel to authorized depths will create a sediment trap, capable of capturing between 50,000 and 100,000 cubic yards of future contaminated sediment each year before it can reach the Lake. Routine maintenance dredging would reduce the future loadings of sediment contamination to Lake Michigan from 50 to 70 percent (Table EIS-15). Over the life of the project, this trap would capture an additional two million cubic yards of sediment which would otherwise, under the "No Action" alternative, be deposited into Lake Michigan. This sediment trap is more fully described in Appendix C, "No Action" Alternative. The removal of existing sediment contamination from the IHC and reduction of sediment contamination transported to Lake Michigan would significantly reduce the level of sediment contamination in southern Lake Michigan.

4.2.3.2.3 Sediment resuspension caused by dredging will cause some sediment contamination to be moved downstream. Most resuspended sediment will deposit in other areas of the canal or harbor where they may be removed by future dredging operations. A small percentage of resuspended sediments may be transported to Lake Michigan and contribute to the overall sediment transport from the GCR/IHC. Sediment resuspension will be minimized by the use of the closed-bucket clamshell dredge.

4.2.3.2.4 Dredging will remove in-place sediment down to authorized navigation depths, thus exposing the underlying sediments. The results of sediment sampling show that the contaminant concentration within the Indiana Harbor and Canal does not indicate any significant change with depth, except for PCB levels in two reaches. The sediment in these two reaches are TSCA-regulated because the PCB concentrations are greater than or equal to 50 ppm. The adverse impacts of increased bottom sediment contamination exposure will be short-lived. The restoration of the channel to authorized depths will promote the settling of sediment coming from upstream and local sources. Exposed sediments should be covered by several inches of "new" materials after a few moderate rainfall events.

4.2.3.2.5 "New" sediments which enter and deposit in the recently dredged channel should have levels of contamination comparable with the pre-dredging sediment surface. With the implementation of more stringent source controls and upstream remediation under the RAP, future sediments will become less contaminated than existing surface deposits.

4.2.3.2.6 The short-term adverse impacts of dredging on sediment quality would be offset by the long-term beneficial impacts due to the removal of in-place contamination. The sediment quality impacts of dredging are discussed in more detail in Appendix H, Dredging Technologies and Impacts.

4.2.3.2.7 Dredging is necessary to remove sediments that accumulate in channels in order to maintain adequate depths for navigation. Between 1955 and 1972, nearly 3.5 million cubic yards of bottom sediments were dredged from Indiana Harbor and Canal by the USACE and private industry. Presently there is about 1 million cubic yards of backlog dredging at Indiana Harbor and Canal. An additional 3.67 million cubic yards of sediments will require maintenance dredging over the remaining life of the project.

4.2.3.2.8 The recommended dredging method is by closed-bucket or environmental bucket mechanical dredge. This method can work at high production rates, removes both fine-grained sediment and debris and is able to work in close quarters and around bridges. This method is especially suited to use with an upland CDF, since mechanical dredging can deliver sediments with a minimal amount of water. The less water associated with the sediments, the less water has to be collected and removed from the disposal site. The closed-bucket is designed to reduce sediment resuspension. Environmental controls to be employed around the dredging include the use of an oil boom and adsorbents to contain and remove any surface oil film.

4.2.3.2.9 The impacts of maintenance dredging on sediment and water quality and aquatic life have been described above. Unavoidable adverse impacts include short-term, localized increases in suspended solids, turbidity, and dissolved pollutants (most significantly ammonia), and reductions in dissolved oxygen. However, resuspension caused by dredging is minimal when compared to resuspension which occurs presently due to storm events and ship traffic. Generally during dredging, resuspended sediment will settle out within 500 to 800 feet of the dredge.

4.2.3.2.10 These water quality impacts from maintenance dredging may result in short-term, localized adverse impacts on aquatic biota. However, most of these adverse impacts will be minimized by the use of proper environmental controls (environment-bucket dredge, oil boom, and adsorbents). Benthic organisms currently inhabiting bottom sediment will be removed.

4.2.3.2.11 Dredging will remove in-place sediment down to authorized navigation depth, thus exposing the underlying sediment. Sediment sampling results show that the contaminant concentration within the IHC does not indicate any significant change with depth, except for PCB levels in two reaches. The sediment in these two reaches are TSCA-regulated because the PCB concentrations are greater than or equal to 50 ppm. Because experience in dredging and confined disposal of TSCA-material is limited, leaving the material in-place was considered. However, dredging is likely to impact the nature of the exposed sediment by causing physical movement of sediment due to sloughage. To prevent the potential migration to Lake Michigan, a systematic approach has been established to remove the TSCA-regulated sediment.

4.2.3.2.12 After dredging, the exposed sediments will exert a higher oxygen demand and expose benthic organisms recolonizing the area to higher levels of PCB contamination. These impacts will be short-lived due to the rapid sedimentation in the channel which should cover the exposed sediments with more than two inches of new sediments within one year.

4.2.3.2.13 The proposed dredging will have highly significant, long-term beneficial impacts on the environmental quality of the IHC and adjacent Lake Michigan. Dredging will remove 1 million cubic yards of existing sediments and 3 to 4 million cubic yards of future contaminated sediments from the aquatic

ecosystem. If the channel is not dredged, some of the existing sediments and nearly all of the future sediments would migrate out of the IHC and be dispersed in Lake Michigan.

4.2.3.2.14 Maintenance dredging will prevent the release of hundreds of thousands of pounds of sediment pollutants to Lake Michigan. Continued discharge of sediments from Indiana Harbor and Canal into Lake Michigan under the "No Action" Alternative would have a very long-term, broad adverse environmental impact. However, dredging would cause a very localized short-term impact. The magnitude of the resulting benefits to the lake environment are difficult to measure. However, it is clear that these benefits out weigh the unavoidable, adverse impacts caused by the dredging.

4.2.3.3 Confined Disposal

4.2.3.3.1 141st St. Site. The rehandling and disposal of dredged materials to this CDF site could result in some small spillage of sediments in the Lake George Branch. However, rehandling operations would use splash aprons or other devices to minimize spillage to the canal or adjacent lands. Any spilled sediments would be subsequently removed by dredging operations. No significant impacts on sediment quality are expected.

4.2.3.3.2 J-Pit Site. The rehandling and disposal of dredged materials to this CDF site could result in some small spillage of sediments in the canal. However, rehandling operations would use splash aprons or other devices to minimize spillage to the canal or adjacent lands. Any spilled sediments would be subsequently removed by dredging operations. No significant impacts on sediment quality are expected. Existing sediments in the ponded areas of the site would be buried by the disposal of dredged materials from the IHC.

4.2.3.3.3 Inland Steel Site. The rehandling and disposal of dredged materials to this CDF site could result in some small spillage of sediments in the Inland Steel fill area. However, rehandling operations would be conducted inside of the Inland Steel Company bulkhead and splash aprons or other devices used to minimize spillage. The construction of a CDF at this site would cause some localized resuspension of bottom sediments during the placement of dike materials. This resuspended material would be isolated from the open waters of Lake Michigan by the existing Inland Steel bulkhead. No significant impacts on sediment quality are expected.

4.2.3.3.4 ECI Site (Dredging Alternatives 1, 2, and 3). The rehandling and disposal of dredged materials may result in some small spillage of sediments in the Lake George Branch. Rehandling operations would use splash aprons or other devices to minimize spillage to the canal or adjacent lands. Any spilled sediments would be subsequently removed by dredging operations. No significant impacts on sediment quality of the Lake George Branch are expected.

4.2.3.3.5 Generic Clean Upland Site. Dredged material placed in a CDF at a generic clean upland site would be handled using procedures similar to those proposed for the J-Pit site.

4.2.3.4 Treatment Technologies

4.2.3.4.1 All treatment technologies would require the use of a CDF in one capacity or another. The impacts of a technology implemented at a CDF on sediment quality would be the same as described above for the specific CDF.

4.2.4 Water Quality Impacts

4.2.4.1 No Action Alternative

4.2.4.1.1 The in-place contaminated sediments of the IHC are an existing non-point source of pollution to the water column of the IHC and nearshore Lake

Michigan. These sediments exert an oxygen demand upon the overlying waters, release nutrients and contaminants to the water, and are resuspended and transported by bioturbation, currents, and ship traffic. Transport of resuspended IHC sediment into Lake Michigan contributes to the degradation of water quality in the nearshore Lake. Sediment-water interactions are detailed in Appendix C, "No Action" Alternative.

4.2.4.1.2 Under the "No Action" Alternative, one million cubic yards of in-place contaminated sediments would not be removed from the aquatic ecosystem and an additional two million cubic yards of future contaminated sediments would enter and pass through the IHC into Lake Michigan. This in-place sediment contamination would contribute to the degraded water quality in the Indiana Harbor and Canal. The resuspension and transport of existing and future sediments would limit the water quality potential of nearshore Lake Michigan.

4.2.4.2 Dredging

4.2.4.2.1 The dredging of the Indiana Harbor and Canal and maintenance of this channel at authorized depths would have significant long-term beneficial impacts on the water quality of nearshore Lake Michigan and localized, short-term detrimental impacts on water quality within the IHC. Dredging would remove about one million cubic yards of existing, in-place contaminated sediments and 3.67 million cubic yards of future, contaminated sediments. The maintenance of the channel to authorized depths would prevent the transport of 50,000 to 100,000 cubic yards of contaminated sediments to Lake Michigan each year. It would also reduce the discharge of significant quantities of sediment contaminants, as shown on Table EIS-17.

4.2.4.2.2 The levels of suspended solids in the IHC and nearshore Lake Michigan will be reduced by the "sediment-trap" effect enhanced by channel deepening. These reductions in sediment yield to Lake Michigan would result in reductions to the total and dissolved levels of contaminants in the water of near shore Lake Michigan. These reductions will be most prominent during rainfall events. The reductions in the amount of sediment contamination resident in the littoral zone of Lake Michigan will have long-term benefits on water quality.

4.2.4.2.3 Dredging would cause temporary and localized increases in the levels of suspended solids and turbidity in Indiana Harbor and Canal. Based upon studies at Calumet Harbor (see Appendix H, Dredging Technologies and Impacts) the suspended solids level would be between 50 and 500 mg/l immediately (within 50 feet) near the dredge, but would diminish rapidly downstream. A plume of higher than background suspended solids may extend about 500 to 800 feet downstream of the dredge. The use of a closed-bucket clamshell should minimize the turbidity caused by dredging.

4.2.4.2.4 Sediment resuspension will cause increases in the levels of particulate contaminants proportionate to the levels of suspended solids. Relatively few sediment pollutants are readily released into solution during resuspension. The levels of dissolved nitrogen compounds (predominantly ammonia) may be increased to five or more times the background level immediately around the dredge. Some metals (manganese and iron) and trace organics (phenol) may exhibit smaller increases in dissolved concentrations. Dissolved concentrations should rapidly diminish downstream of the dredge.

4.2.4.2.5 The dredging may increase the oxygen demand upon the water column in two ways. Sediments that are uncovered by dredging to authorized navigation depths may exert a higher sediment oxygen demand than the existing surface sediments. This impact will continue until the new surface sediments are oxidized or are covered by cleaner sediments. Sediment resuspension will increase oxygen demand in the vicinity of the dredge, which may result in localized dissolved oxygen reductions.

4.2.4.2.6 A small amount of the oil and grease in the sediments will be released by resuspension during dredging and form a film or sheen on the water surface. Hydrophobic contaminants, such as PAHs and PCBs will be dissolved in this oil and grease. The migration of this oil film will be minimized by the use of controls, which could include an oil boom and adsorbents, to remove the contained oil and dissolved contaminants. Any products used to adsorb oil containing PCBs in concentrations of 50 ppm or greater will be disposed of in a TSCA-approved incinerator or chemical waste landfill. There are no TSCA-approved incinerators or chemical waste landfills in the project area. The closet incineralor is in Kansas and the closest landfills are in New York and Alabama.

4.2.4.2.7 Dredging will remove in-place sediment down to authorized navigation depths, thus exposing the underlying sediments. The results of sediment sampling show that the contaminated concentration within the Indiana Harbor and Canal does not indicate any significant change with depth, except for PCB levels in two reaches. The sediments in these two reaches are regulated for disposal because the PCB concentrations are greater than or equal to 50 ppm. This exposure could cause short-term low level decreases in water quality caused by a higher rate of contaminant release. This exposure would be short lived since these deposits would be covered over by a few inches of new, less contaminated, sediment after the first few moderate rainfall events.

4.2.4.2.8 Long-term water quality impacts would be dependent upon the contaminant level of future sedimentation. With the implementation of the RAP and more stringent source controls, future IHC sediments would be less contaminated than existing surface materials. The short-term adverse impacts of dredging on water quality would be fully offset by the long-term beneficial impacts of the removal of in-place sediment contamination and the sediment trap effect of channel deepening to authorized depths. The water quality impacts caused by dredging are discussed further in Appendix H, Dredging Technologies and Impacts.

4.2.4.3 Confined Disposal

4.2.4.3.1 Sediments from the IHC have been tested using the protocols identified in the USACE/U.S. EPA Technical Framework (USACE/U.S. EPA, 1992) and the "Management Strategy for Disposal of Dredged Materials: Contaminant Testing and Controls" (Francingues et al., 1985). These included tests developed to address water quality impacts of dredged materials disposal to a CDF and design controls to treat CDF effluents. These tests include:

Settling tests	Modified elutriate tests
Coagulation tests	Runoff tests
Filtration tests	Leachate tests

These test methods and the results of analysis are described in Appendix E, Sediment Quality.

4.2.4.3.2 The USACE has developed and applied computer simulation models to predict the quantity and quality of water discharged from CDFs using the results from the above laboratory tests. The results of this computer simulation were used to evaluate a number of alternate treatment and control systems for the CDF effluent. The mass flux of chemical constituents discharged from the CDFs in their untreated effluents, and in seepage leaving the site boundaries were also calculated, and compared in Tables EIS-2 and 3. It should be noted that these losses represent the mass loadings discharged from the CDF. For all upland CDF's, this discharge was routed to a municipal wastewater treatment facility for further treatment. The water quality analysis conducted for the Indiana Harbor confined disposal alternatives is detailed in Appendix F, Environmental Engineering.

4.2.4.3.3 141st St. Site. Dredged materials disposed to the CDF at this site would be dewatered by evaporative drying and using an underdrainage system. Water

pumped from the underdrain would be pretreated, if needed, using sand filtration and carbon sorption then discharged to the Hammond Sanitary District sewer system. The USACE would have to obtain a pretreatment permit from the Hammond Sanitary District for this discharge. This water would receive further treatment at the Hammond wastewater treatment plant and be discharged to the Grand Calumet River.

4.2.4.3.4 The pumpage of water from the CDF would occur mainly during disposal operations, with intermittent pumpage at other times. The quantity and quality of this pumpage following pretreatment is shown in Table EIS-16. Table F-13 in Appendix F provides the water quality prior to pretreatment of the pumpage. The pumpage to the Hammond Sanitary District would not impact NPDES compliance or the quality of the effluent from this treatment facility. As a result, the CDF operations would have no significant effects on water quality.

Table EIS-16 Quantity and Quality of Pre-treated Discharges from Upland CDFs

Item	CDF Site		
	141st	J-Pit	ECI
Quantity			
Peak flow (gpm)	26	39	42
Average flow during disposal (gpm)	13	21	22
Average flow at other times (gpm)	6	8	8
Quality			
Total suspended solids (mg/l)	15	15	15

4.2.4.3.5 J-Pit Site. Dredged materials disposed to the CDF at this site would be dewatered by evaporative drying and using an underdrainage system. Water pumped from the underdrain would be pretreated, if needed, using sand filtration and carbon sorption then discharged to the Gary Sanitary District sewer system. The USACE would have to obtain a pretreatment permit from the Gary Sanitary District for this discharge. This water would receive further treatment at the Gary wastewater treatment plant and be discharged to the Grand Calumet River.

4.2.4.3.6 The pumpage of water from the CDF would occur mainly during disposal operations, with intermittent pumpage at other times. The quantity and quality of this pumpage following pretreatment is shown on Table EIS-16 and Table F-15 of Appendix F. The pumpage to the Gary Sanitary District would not impact NPDES compliance or the quality of the effluent from this treatment facility. As a result, the CDF operations would have no significant effects on water quality.

4.2.4.3.7 Inland Steel Site. The quantity and quality of water discharged from the CDF at this site would be greatly different from that at the upland CDF sites. The primary reason is the presence of a permanent pond. The water within the area enclosed by the CDF dikes would gradually be displaced by dredged materials. This entire volume of water, plus some of the water associated with the dredgings, would eventually be discharged.

4.2.4.3.8 The presence of the CDF pond would provide long retention times for settling of suspended solids and dilute the concentrations of dissolved pollutants released from the dredged materials. Dredgings would be disposed to one of three cells, each connected by adjustable overflow weirs. Water would be pumped out of another cell, providing maximum detention time. As the CDF filling progressed, the pond would shrink, and detention times would decrease. Concurrently, the volume of water needing to be pumped out would decrease as there was less pond water displaced by the dredgings. The result is that there is an inverse relation between the quantity and quality of water pumped out of the CDF. In the early stages, large volumes of nearly clean water would be pumped. In the last filling

operations, there would be smaller volumes of water with higher levels of pollutants being pumped.

4.2.4.3.9 The water pumped out of the CDF would be treated by sand filtration and carbon sorption (when needed) and discharged into the ponded area of the Inland Steel fill which would act as a mixing zone. From there, this water would enter Lake Michigan. The quantity and quality of the effluent from this CDF during different disposal operations is summarized in Table EIS-17. Table F-11 in Appendix F provides the water quality prior to any treatment of the effluent. This effluent would exceed state water quality standards for total dissolved solids, ammonia nitrogen and PCBs. The mixing of this effluent with water in the Inland Steel lakefill area would reduce
these levels such that ammonia nitrogen would meet state standards and PCBs would approach background concentrations. As a result, the operation of the CDF would have no significant impacts on Lake Michigan water quality.

4.2.4.3.10 The construction of the CDF would fill approximately 120 acres along the southeastern side of the Inland Steel lakefill. Construction activities would have short-term, localized impacts on water quality. The stone placement would cause increases in suspended solids and turbidity. These increases would be greatest immediately around the construction area and diminish rapidly with distance. The stone placed will be graded limestone and be inert and free of contaminants.

Table EIS-17 Quantity and Quality of Treated Discharge from Inland Steel CDF

Quantity	Filling Stage (Per Cell) Early	Middle	Late
Average flow during disposal (gpm)	800	800	100
Total suspended solids (mg/l)	10	12	15

4.2.4.3.11 ECI Site (Dredging Alternatives 1, 2, and 3). Dredged materials placed in a CDF at this site would be dewatered by progressive trenching and by evaporation. Water collected from the progressive trenching would be pretreated, if needed, and then discharged to the East Chicago sanitary sewer system. This water would receive further treatment at the East Chicago wastewater treatment plant and be discharged to the Grand Calumet River. The pumpage to the East Chicago Sanitary District would not impact NPDES compliance or the quality of the effluent from this treatment facility. As a result, the CDF operations would have no significant effects on water quality.

4.2.4.3.12 ECI Site Dredging Alternative 3 Modified (Selected Plan). In the draft CMP/EIS the effluent from the CDF was to be routed to the East Chicago Sanitary District for treatment and discharge to the Grand Calumet River as discussed in paragraph 4.2.4.3.11. Under the current selected plan, the effluent is treated in a new on-site treatment plant and discharged directly into the Indiana Harbor Canal. An effluent treatment system is currently under development by the Chicago District, Corps of Engineers. Phase I, which has been completed, evaluated a wide variety of water treatment technologies and methods to determine which methods and technologies were feasible for treatment of the effluent. Phase 2, which is currently underway, is the execution of a treatability study designed in Phase 1. This study will evaluate and define operating parameters for the treatment system. In conceptual terms, the treatment system evaluated will likely include equalization and settling, oil/water separation, filtration, cyanide removal, metals removal, pH adjustment, a biological treatment unit, and tertiary treatment for ammonia and residual solids from the biological unit. The plan envisions that effluent will be treated to at least water quality levels

comparable to the water quality in the Indiana Harbor Canal, and the maximum flow is estimated to be <0.25 million gallons per day. The discharge location would be in near proximity to the CDF. The need for a mixing zone and flow rates in the receiving water may ultimately play a role in locating the discharge.

4.2.4.3.13 Generic Clean Upland Site. Water from dredged material placed in a generic clean upland site would be collected and discharged to a wastewater treatment plant. Pumpage from the treatment plant would not impact NPDES compliance or the quality of effluent from the plant. CDF construction and operation there would have no impacts.

4.2.4.4 Treatment Technologies

4.2.4.4.1 All treatment technologies would require the use of an upland CDF in one capacity or another. The drainage, treatment, and discharge of water from the CDF could be done using the same methods described above. Some changes in CDF operations may alter the quantity and quality of water discharged. With incineration and wet air oxidation, the dewatered sediments would be re-excavated and processed over a considerable period of time. Capping of the site would be delayed until the solid residue was returned to the CDF, possibly receiving post-treatment by solidification. This delay could increase the total quantity of water collected by the underdrain system.

4.2.5 Air Quality Impacts

4.2.5.1 No Action Alternative

4.2.5.1.1 Under the "No Action" alternative, the air quality within the project area would continue to be degraded by industry, power plants, vehicle emissions, and other sources, including volatilization of contaminants from area sediments and the overlying water bodies. With the implementation of the Remedial Action Plan by the IDEM, discharges by non-mobile sources may be reduced.

4.2.5.2 Dredging

4.2.5.2.1 The operation of dredges, barges, and trucks that are required to dredge and haul sediments would cause limited increases in hydrocarbon, carbon monoxide, and lead concentrations in the air within a localized area. This would not be a long-term or significant impact. Volatile organic chemicals (VOCs) such as PCBs and PAHs could be released into the air in increased quantities during dredging due to sediment resuspension and transporting exposed sediments. This would be a short-term impact of low significance. The use of a closed-bucket mechanical dredge would minimize resuspension and reduce potential air quality impacts. The long-term impact of sediment removal from the canal would be a long-term reduction in VOCs entering the air from the harbor and canal water surface. This is accomplished by removing the contaminant source (i.e., sediment) resulting in long-term benefits to the immediate air quality.

4.2.5.3 Confined Disposal

4.2.5.3.1 Construction of any of the alternative CDFs would cause increases in area dust (particulate matter), hydrocarbons, carbon monoxide, and lead concentrations in the air within a localized area due to the operation of heavy construction machinery, barges, and trucks. Similar equipment would be present as part of unloading, rehandling, disposal, grading, and capping operations.

4.2.5.3.2 The sediments from the IHC contain elevated levels of a number of VOCs. Volatilization is the loss of a contaminant from the sediment or water surface to the atmosphere. As part of the implementation of the USACE' management strategy, the potential for volatilization of PCBs during confined disposal has been examined, and control measures evaluated. A mathematical model was developed to predict this volatile loss. The analytical methods for quantifying volatilization from sediments is in the very early stages of development. Much of this analysis is only at the theoretical stage, and standard protocols have not been developed. The analysis was limited to PCBs because of the regulatory concern for this contaminant and because there was some limited laboratory experimental results available. The factors and controls influencing volatile loss of PCBs should have similar effects on other VOCs. The mass flux of PCBs from the confined disposal alternatives is compared in Tables EIS-2 and EIS-3. The volatilization model and modeling results are discussed in greater detail in Appendix F, Environmental Engineering.

4.2.5.3.3 141st St. Site. The volatile loss of PCBs from this CDF site would be greatest from freshly disposed sediments which were wet and without vegetation. As the sediments dry and "age" the potential for volatile loss decreases. After the sediments became vegetated, the volatile loss would be even less significant. The average annual loss of PCBs from the CDF is calculated to be 4 pounds in the first five years which represents heavier PCB contaminated backlog material and 0.5 pounds in the last five years (years 20 to 25). Assuming a 5 mph wind, at a distance of 100 meters from the site the concentration of PCB in the air is expected to increase by a factor of two, whereas at a distance of 200 meters the PCB concentration is expected to return to ambient conditions.

4.2.5.3.4 Two types of controls would be implemented to minimize volatile loss from this CDF: operational controls (those used during or in-between disposal operations) and long-term controls. Operational controls may include rapid covering of sediments containing the highest levels of PCBs, allowing dense vegetation to develop that has little value to wildlife, and use of a wind fence to reduce wind velocities. The long-term control would be the final cap and a short, vegetated cover (for erosion protection), which would essentially eliminate volatile losses.

4.2.5.3.5 J-Pit Site. The air quality impacts from this CDF site would be similar to those for the 141st Street site. Similar controls would be used to minimize volatile loss of PCBs and other VOCs.

4.2.5.3.6 Inland Steel Site. The in-lake CDF would allow for less volatile losses of PCBs than a comparably sized upland CDF. PCBs and many other organic hydrophobic contaminants have a high affinity for organic matter and fine grained sediments and would partition strongly to the solid phase when surrounded by water. The in-lake CDF by the nature of its design would allow for a substantial volume of dredged material to be place in a submerged state. Therefore, an operational control for the in-lake CDF would be to place the maximum amount of material (and the most contaminated material) under water before allowing a delta to form above the water line. The average annual loss of PCBs from the CDF is calculated to be 0.9 pounds in the first five years and 0.2 pounds in the last five years (years 35 to 40). The long-term controls would be the same as the upland sites.

4.2.5.3.7 ECI Site (Dredging Alternatives 1, 2, and 3). The air quality impacts from this CDF site would be similar to those for the 141st Street site. Similar controls would be used to minimize volatile loss of PCBs and other VOCs. Alternate 1 would have approximately 14% more mass flux loss of PCBs over the project life compared to the other upland sites due primarily to the differences in CDF filling and capping strategies. The details for the modeling of this volatile loss is included in Attachment F-2 of Appendix F. Alternatives 2 and 3 would have an expected additional volatile loss of PCBs of about 50%.

4.2.5.3.8 Generic Clean Upland Site. Air quality impacts at a generic clean upland site would probably be similar to those expected at the J-Pit site.

4.2.5.4 Treatment Technologies

4.2.5.4.1 Since the implementation of any treatment technology would require the construction and use of a CDF as a holding facility, the impacts on air quality from treatment of dredged material would begin with the impacts from a CDF as described above. These impacts could be aggravated by the amount of time the materials to be treated are exposed to the air and allowed to dry. Uncapped, dried dredged materials would be more susceptible to blowing and volatilization of contaminants could be increased during longer periods of exposure. The magnitude of these impacts would vary with the type of technology used, as discussed below.

4.2.5.4.2 Incineration. Efficient combustion of contaminated materials requires them to be fed into the incinerator with as little moisture content as possible. Extensive drying of dredged materials would be required, including long periods of air exposure in the holding facility. The dried materials would have to be rehandled into the incinerator, allowing for additional release of airborne particulates. The incineration process itself may be susceptible to process upsets, due to the non-homogeneous composition of the feed material into the incinerator. Process upsets can cause combustion to take place below optimum temperatures, which can lead to the production of undesirable emissions in the exhaust gases, such as dioxins and dibenzofurans. These undesirable byproducts may be controlled by a scrubber system.

4.2.5.4.3 Chemical Extraction. Chemical extraction processes such as those considered for use at the IHC do not require the extensive drying times that are necessary for incineration. The extraction process itself would take place in a

closed system of reactors, with any gaseous emissions being scrubbed and/or filtered before release. The chemical solvent used by a particular extraction process may require special containers and special handling to prevent releases to the atmosphere.

4.2.5.4.4 Wet Air Oxidation. Like the chemical extraction processes, moisture content is not a major concern when feeding materials into a wet air oxidation unit. The dredged materials would most likely be removed from the holding facility and reslurried before inputting them to the treatment unit. The treatment unit would be a closed system, with any gaseous emissions properly treated before release.

4.2.5.4.5 Solidification/Stabilization. Some amount of moisture is necessary in the mixing process that combines the dredged materials with portland cement and the other setting agents that may be used in the solidification process. The rehandling and mixing of dried dredged materials may result in the release of volatile contaminants or particulates. The final form of the solidified materials may also influence the impacts to air quality. Solidification can produce a product that ranges in composition or consistency from a solid, hardened mass like concrete to a fine dust-like powder. The finer the particle size of the product the more likely particulate releases would be greater.

4.3 BIOLOGICAL RESOURCE IMPACTS

4.3.1 Aquatic Community Impacts

4.3.1.1 No Action Alternative

4.3.1.1.1 The aquatic organisms that inhabit or visit the IHC and nearshore vicinity of Lake Michigan are subject to a number of impacts due to the contamination of water and sediments in this area. The mechanisms by which sediment-bound contamination can escape into the water and biota are discussed in Appendix C, "No Action" Alternative. The toxicity and bioaccumulation impacts of sediment contamination on biota are exposure-dependent phenomena. Acute toxicity is generally measured as death caused by a short-term direct exposure. Chronic toxicity is measured as a weakened health, cessation of growth, or impaired reproduction caused by a long-term direct or indirect exposure. Bioaccumulation is the result of the uptake of contaminants into the body of an exposed organism through various routes (food, water, skin contact). Some contaminants (e.g., PCBs) accumulate because they are not readily excreted or degraded.

4.3.1.1.2 "Exposure" is the key variable controlling the level of aquatic impacts due to IHC contaminants. Exposure to sediment contamination is far more complex than exposure to water or airborne contamination. Sediment contamination can contact an organism directly (some animals forage or live in sediments) or indirectly (contaminants released to water or accumulated in prey organisms).

4.3.1.1.3 The presence of sediment contamination alone, does not insure that contaminant exposure will occur or that an organism will be impacted. Similarly, the assumption that larger concentrations of a contaminant (e.g., 10 ppm vs. 1 ppm PCBs) automatically implies a greater level of exposure is not always true. The real contaminant exposure potential to aquatic organisms is dependent on a number of factors, including: (1) Physical factors (time, temperature and surface area), (2) Chemical factors (water hardness/alkalinity, oxygen, sediment co-pollutants), and (3) Biological factors (biological diversity, food web effects, and bioturbation).

4.3.1.1.4 The effects of the above factors on defining the aquatic community's exposure to sediment contamination are also described in Appendix C. To summarize, in-place contamination contained in the IHC sediments is acutely toxic to some organisms, chronically toxic to others. Aquatic organisms inhabiting or visiting the IHC can and do accumulate some sediment contamination and these effects can be transported to Lake Michigan in a number of manners. Contaminated sediment that is transported to the Lake is widely dispersed. Contaminated organisms that exit the IHC may also disperse across a great area of the Lake's

southern basin.

4.3.1.1.5 The impacts of this widely dispersed contamination on the Lake ecology are widespread and subtle. However, these impacts are cumulative with other contamination sources. The cumulative impact of PCB contamination from a large number of small sources has been widely detected in fish tissue samples over the last two decades. The significance of the PCB contamination of fish and other biota to the ecology of the Lake and to human health is still not known.

4.3.1.2 Dredging

4.3.1.2.1 Maintenance dredging will remove a backlog of approximately one million cubic yards of in-place contaminated sediments from the IHC and prevent the transport of 50,000 to 100,000 cubic yards of future contaminated sediments to Lake Michigan each year. The result of this action would be a significant beneficial impact. The overall exposure level of the aquatic life of nearshore Lake Michigan to sediment contaminants should be significantly reduced. The adverse impacts of no action which are reduced by maintenance dredging are more fully described in Appendix H, Dredging Technologies and Impacts.

4.3.1.2.2 The excavation of bottom sediments will permanently remove existing benthic organisms from the IHC. This benthic community is generally composed of pollution-tolerant organisms in high abundance and low diversity. Recolonization of the newly exposed sediments and the future deposition would occur within a few years. With implementation of the Remedial Action Plan (RAP), future deposits will be less contaminated and be able to support more pollution-sensitive benthic organisms. This may enable the harbor and canal benthos to achieve a higher diversity of aquatic species.

4.3.1.2.3 The physical operation of the dredge (noise and increased turbidity) may disturb the activities of local fish populations, attracting some species, and dispersing others. In particular, Carp and Gizzard shad (most common and dominant species) may be attracted to the food particles resuspended by dredging operations. Some fish may be captured, injured or killed by physical contact with the dredging equipment. Turbidity alone is not a significant stress to the fish species commonly found in the IHC. The resuspension of sediment and food particles will increase the availability of contaminants to visiting and local fish populations and subsequently increase the potential for bioaccumulation and toxic effects.

4.3.1.2.4 Localized degradation of water quality around the dredge may be severe enough to cause death of some fish. In particular, increased levels of ammonia and reduction of dissolved oxygen may cause acute toxicity effects to some fish. However, those fish more likely to be attracted to the dredging activity are more pollution-tolerant. Less pollution tolerant fish are likely to avoid the disturbances of the dredge and its localized water quality impairments.

4.3.1.2.5 Oil released by sediment disturbance will cause some surface slicks. These slicks would not be thick, but would be a thin film (monolayer) and should be contained in the immediate area encircled by the oil boom. Fish should not be affected by these slicks to any significant degree and the removal of the oil by the use of adsorbents should minimize effects on other organisms.

4.3.1.2.6 Dredging to authorized navigation depths will expose underlying sediments. Sediment sampling results show that the contaminant concentration within the Federal channel area does not indicate any significant change with depth, except for PCB levels in two reaches. Benthic organisms that recolonize these sediments may accumulate higher levels of PCBs. This impact will be extremely short-lived for a number of reasons. Exposed sediments should be rapidly covered with a thin layer (inches) of "new" sediments within one year. The ability of benthos to recolonize the exposed sediments and accumulate contaminants in such a short time is limited. With the implementation of the RAP, future sediment deposits should have less contamination. Benthos and fish populations in the IHC should be less exposed to toxic and bioaccumulative sediment contaminants.

4.3.1.2.7 Dredging would have some minor short-term adverse impacts on the local

aquatic community, but these would be fully offset by major long-term beneficial impacts due to the removal of contaminated sediments from the IHC and the enhanced sediment trap created by a deepened navigation channel.

4.3.1.2.8 In summary, the proposed project has potential to provide tremendous long-term benefits to fish and wildlife of the Grand Calumet River, Indiana Harbor and Canal, and nearshore Lake Michigan. Direct adverse impacts to fish and wildlife (during dredgin, for example) are expected to be minor and short-term; secondary impacts, however, could include fish kills due to increased ammonia and decreased dissolved oxygen during dredging. Dredging may also cause short-term increases in PAH bioavailability and food chain transport. Resuspension of contaminated sediments during dredging could result in a short-term increase in oiling incidents involving waterfowl, waterbirds, and other wildlife (USFWS letter dated 16 September 1996).

4.3.1.3 Confined Disposal

4.3.1.3.1 Contaminant losses to surrounding water from the alternative CDFs are fairly comparable over time (Table EIS-2). The Inland Steel site has the greatest potential for contaminant loss directly to Lake Michigan due to its location. However, all CDF's would significantly reduce the total amount of contaminants entering the aquatic environments within the project area.

4.3.1.3.2 141st St. Site. The aquatic communities of the existing pond on this site and adjacent wetlands have not been studied. These communities are not expected to be significant due to the highly disturbed and degraded conditions of the site. Therefore, the loss of these aquatic communities due to CDF construction and filling activities would not be significant.

4.3.1.3.3 J-Pit Site. The aquatic communities at this site have not been studied, but are not expected to be of great abundance or diversity due to the highly disturbed condition of the site and the lack of a nearby recruitment source. Therefore, the loss of the existing aquatic communities at this site due to CDF construction and filling activities would not be significant.

4.3.1.3.4 Inland Steel Site. Use of this site as a CDF would result in the permanent loss of approximately 70 acres of nearshore, lake-bottom habitat and associated aquatic communities. This loss is not be considered significant with respect to the remaining available Lake Michigan nearshore habitat. The site would be filled by private interests under "no action" conditions. Therefore, mitigation for habitat losses are not justified.

4.3.1.3.5 ECI Site (Dredging Alternatives 1, 2, and 3). There are no aquatic communities on the portion of the ECI property where the CDF will be located. Therefore, none would be impacted by CDF construction and filling activities of any ECI site plan.

4.3.1.3.6 Generic Clean Upland Site. CDF construction and operation at this site would not affect any aquatic communities.

4.3.1.4 Treatment Technologies

4.3.1.4.1 The application of any of the four treatment technologies, by themselves, would not be expected to impact existing aquatic communities in the project area. However, a CDF would still be required to implement a treatment technology. The impacts associated with CDF construction were discussed previously.

4.3.2 Terrestrial Community Impacts

4.3.2.1 No Action Alternative

4.3.2.1.1 Under the "No Action" Alternative terrestrial communities in the project area would remain in their current state. The potential for the uptake of contaminants from the aquatic food chain would still be present throughout the basin and would continue into the foreseeable future.

4.3.2.2 Dredging

4.3.2.2.1 The dredging operation would occur within the aquatic environment and, therefore, have little or no direct, adverse impacts on terrestrial communities. Dredging would temporarily resuspend sediments and associated contaminants into the water column where they would be more bioavailable to aquatic organisms. Birds or other terrestrial animals that feed on aquatic organisms could potentially bioaccumulate more contaminants during this time. The exact magnitude of this impact cannot be estimated. However, due to the relatively temporary nature of the dredging activity, this impact is expected to be temporary and localized. No long-term terrestrial impacts are expected as a result of dredging.

4.3.2.3 Confined Disposal

4.3.2.3.1 Potential Impacts. To determine the potential for contaminant uptake by various organisms in an upland CDF environment, the USACE of Engineers Waterways Experiment Station conducted bioassays of a plant and animal species exposed to Indiana Harbor sediments (Environmental Laboratory, 1987). Three sprouted tubers of yellow nutgrass (Cyperus esculentus), a weedy species commonly found in agricultural fields and moist soils, were placed into a container with a dried sample of Indiana Harbor sediment. Four replicate samples were grown over a 45-day period. Plants were watered daily. The results were compared with four replicate samples that were grown under a continually flooded environment (such as in an in-lake CDF) and four replicate control samples (clean sediments). Originally, the above ground biomass was to be clipped and each sample split into two sub-samples. One sub-sample was to be analyzed for heavy metals while the other sub-sample was to be analyzed for organic compounds. However, the four samples growing under simulated upland conditions did not produce enough biomass to allow for individual sub-sample analysis. Consequently, the four samples were pooled to create one composite sample which was then divided into two sub-samples.

4.3.2.3.2 Organic compounds, including PCBs, PAHs, and pesticides were not detected in the plant tissue which indicates that these contaminants were not being mobilized into the environment by plant uptake. However, heavy metals were mobilized into the plant tissues and in higher concentrations than in the flooded sediment samples. The upland sediment samples did not produce nearly as much biomass as the flooded sediment samples. Neither upland or flooded samples produced as much biomass as the control sediment samples. Plant growth on the upland sediment samples may have been inhibited more by water availability than by contaminant effects.

4.3.2.3.3 Animal bioassays were conducted using the terrestrial earthworm (Eisenia foetida) to determine the potential impacts to the food chain of Indiana Harbor sediments exposed to various types of treatment (representing upland conditions) for a 28-day period (Environmental Laboratory, 1987). The treatment types consisted of no treatment, ashing in a muffled furnace, drying in sunlight for seven days, drying in sunlight for 21 days, drying in the sunlight for 21 days and mixing with manure, and aging outdoors in the shade for six months. The earthworms were placed into Plexiglass cylinders with the sediment samples. Adequate survival of earthworms (in order to have enough tissue to perform a bioassay analysis) was recorded only in the case of the aged sediment treatment.

4.3.2.3.4 After 28 days, 95% of the specimens were retrieved from the aged sediment sample and the tissue analyzed for metals, PCBs, and PAHs. The concentrations of arsenic, cadmium, copper, lead, and nickel increased significantly while chromium, mercury, and zinc did not. PCB uptake was significant. The earthworms accumulated concentrations that were approximately 25% of those found in the aged sediment. PAH uptake was significant for five of the 16 compounds examined. Those that were detected (pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-c.d)pyrene) were found in concentrations equal to 50% of the concentrations found in the sediments. The results of these bioassays indicate that, initially, when Indiana Harbor sediments are placed upland they have a high acute toxicity to earthworms and potentially to other soil invertebrates, primarily due to the presence of volatile organic

compounds (particularly naphthalene). Over time, these compounds decrease in concentration due to volatilization, microbial activity, and photodegradation and the sediments become habitable by terrestrial organisms. As organisms immigrate into this material they are capable of uptaking significant amounts of some heavy metals, PCBs, and PAHs. As these organisms are eaten by larger organisms the contaminants are capable of moving up the food chain.

4.3.2.3.5 As a result of a field reconnaissance and subsequent discussions with the Animal Control Office of the Department of Agriculture (USDA), it is proposed to implement the following plan of action with regard to use of the selected CDF site by birds and mammals once dredged materials are deposited on the site:

- Make a final assessment of the degree of potential hazard to wildlife posed by the types and levels of pollutants in the dredged materials.

- Complete a one-year baseline survey of bird and small mammal use of the selected site and surrounding area before dredged material deposition begins. This survey should include about 3 to 4 one-day bird censuses per month, classifying birds by species, numbers, habitat and activity so that the annual cycle of bird use can be monitored. Small mammals would be monitored by snap trapping in the various habitats for consecutive nights, once in summer and once in winter.

- Depending on the degree of potential hazard to wildlife and the types and numbers of birds and mammals observed during the one-year baseline study, a plan of action would be developed, in conjunction with the USDA, to keep wildlife from feeding in the CDF as dredge material is deposited Wildlife Exclusion Plan [WEP]). This WEP could include such strategies as the minimization of standing water at the site; the seasonal timing of dredge material disposal; the use of cover materials (e.g., ConCover), chemical repellents, and scare devices; and the use of bird harassment patrols such as used at airports.

4.3.2.3.6 141st St. Site. Most of this site does not contain significant terrestrial habitats or communities. However, several acres of wetlands would be filled along the western and northern site boundaries as a direct result of CDF construction. These wetlands are considered to be of sufficient quality to require mitigation on an acre for acre basis. However, mitigation would have to be performed off-site.

4.3.2.3.7 The exposed, drying sediments may attract foraging terrestrial animals such as gulls, waterfowl, and shorebirds. The site could create an attractive nuisance that may allow more contaminants to be passed up the food chain. This impact would be greatest after the completion of each dredging operation and would occur until the individual cells were filled and capped. This impact would be controlled by implementing a wildlife exclusion plan as discussed in paragraph 4.3.2.3.5. Once capped, this facility would effectively retain contaminants and keep them from reentering the aquatic and terrestrial environments. The CDF cells would be seeded following capping with shallow-rooted grasses. This would stabilize the CDF cap, decrease the potential for erosion, but provide minimal wildlife habitat.

4.3.2.3.8 J-Pit Site. Much of this site contains man-made/disturbed wetlands. Several acres of wetlands would be filled by the construction of the CDF. These wetlands are considered to be of suitable quality to require mitigation on an acre for acre basis. This mitigation would have to be performed off-site. The placement of wet sediments inside this facility, coupled with adequate rainfall, may provide suitable conditions for the reestablishment of wetland or moist-soil plants. Subsequent drying and disposal operations would make conditions less favorable for wetland vegetation over time. The presence of sparse vegetation and aquatic invertebrates in the sediment could create an attractive nuisance area by providing cover and foraging areas for such terrestrial animals as raccoons, opposum, gulls, waterfowl, and shorebirds. The "attractiveness" of the area would be controlled by implementing a wildlife exclusion plan as discussed in paragraph 4.3.2.3.5.

4.3.2.3.9 Inland Steel Site. With the exception of the existing breakwater to the east, north, and south and adjacent fastland to the west, there is no terrestrial habitat in the immediate area of CDF construction. Water birds do rest and forage in and around this protected aquatic site. These birds would be disturbed by CDF construction activities and would probably avoid the area for most of the two to three year construction period. Such birds would probably move back into the area following the completion of the CDF, but would be temporarily disturbed by future fill operations. Birds that forage on invertebrates and fish within the CDF following fill operations would have a potential for uptake of contaminants. This impact would be present over most of the 30 to 40 year design life, but would be greatest as the material fills a cell to the point of almost breaking the waterline. As the material begins to break the waterline conditions may become favorable for the establishment of wetland vegetation. Waterfowl and shorebirds may be especially attracted to the site during this time. However, it should be noted that there has not been a significant problem with the update of contaminants by waterfowl and shorebirds at the numerous in-lake CDFs located around the Great Lakes. Potential adverse impacts would be controlled by implementing a wildlife exclusion plan as discussed in paragraph 4.3.2.3.5.

4.3.2.3.10 In the plant bioassay experiment conducted by the Waterways Experiment Station yellow nutgrass was also grown under continuously flooded environment to simulate conditions in an in-lake CDF (Environmental Laboratory, 1987). Four replicate samples were grown, divided, and analyzed as described previously for the upland plant bioassay. Sufficient tissue biomass was available for individual sample analysis. As was the case under the upland plant bioassay organic compounds were not taken up by the plant tissue. Heavy metals were taken up into the plant tissues, but in less concentrations than the upland plant bioassay. This indicates that plants are less likely to uptake contaminants under saturated soil conditions. Eventually, in an in-lake CDF the dredged material deposits would break the waterline. At this point in time the facility and potential impacts would be similar to an upland CDF. Once a cell is filled and capped, the facility would effectively retain contaminants and keep them from reentering the aquatic and terrestrial environments. The CDF cells would be seeded with shallow-rooted grasses following capping. This would stabilize the CDF cap, decrease the potential for erosion, but provide minimal wildlife habitat.

4.3.2.3.11 ECI Site (Dredging Alternatives 1, 2, and 3). No significant terrestrial habitats or wildlife communities exist at this site. The construction and subsequent filling of a CDF under Dredging Alternative 1 would result in the permanent loss of approximately 88 to 90 acres of early old field habitat. Under Alternatives 2 and 3, approximately 136 to 138 of early old field and potentially 1 to 2 acres of highly disturbed wetlands would be permanently lost. Early old field habitat is relatively common within the region.

4.3.2.3.12 During the filling time of the CDF, the exposed drying sediments may attract wildlife such as gulls, waterfowl, shorebirds and small mammals to the site to forage on invertebrates. Potential adverse impacts would be controlled by implementing a wildlife exclusion plan as discussed in paragraph 4.3.2.3.5. Once capped, the CDF cells would effectively retain contaminants and keep them from reentering the aquatic and terrestrial environments. The CDF cells would be seeded with shallow-rooted grasses following capping. This would stabilize the CDF cap and decrease the potential for erosion, but provide minimal wildlife habitat.

4.3.2.3.13 Generic Clean Upland Site. No specific site has been identified as the Generic Clean Upland Site. Therefore, no specific statement can be made concerning impacts to terrestrial habitats or wildlife communities. In general, the exposed, drying sediments may attract foraging terrestrial animals such as gulls, waterfowl, shorebirds and mammals. The site could create an attractive nuisance that may allow more contaminants to be passed up the food chain. This potential impact would be greatest after the completion of each dredging operation and would occur until the individual cells were filled and capped. Potential adverse impacts would be controlled by implementing a wildlife exclusion plan as discussed in paragraph 4.3.2.4

4.3.2.4 Treatment Technologies

4.3.2.4.1 The application of any of the treatment technologies would not expected to have any significant impact on terrestrial resources or communities. However, a CDF would be required to implement a treatment technology. Impacts at the alternative CDF sites were discussed previously. The attractiveness of a given CDF site (where a treatment technology was being implemented) to wildlife would be diminished to some degree due to the nearly continuous amount of activity that would be on-going (i.e. operating equipment, noise, dust and other disturbances).

4.3.3 Threatened and Endangered Species Impacts

4.3.3.1 A Biological Assessment was prepared on the proposed project in accordance with Section 7 of the Endangered Species Act (Appendix D, Biological Assessment). However, subsequent to completion of the assessment, the U.S. Fish and Wildlife Service reported the presence of a nesting pair of peregrine falcons in the project area, near the proposed ECI disposal area. Based on this new information, a supplemental Biological Assessment was prepared on these falcons (see attachment to Appendix D).

4.3.3.2 No state-listed threatened or endangered species would be impacted by any of the considered alternatives. The Indiana Department of Natural Resources was consulted concerning potential impacts to such species (letters dated November 28, 1988, and April 11, 1989; phone conversation on July 14, 1989) and provided no comments in subsequent correspondence (letter dated September 12, 1990).

4.3.3.3 The peregrine falcons nesting to the east of the ECI disposal site should not suffer any adverse impacts from project-related dredging or CDF construction and operation activities. These falcons are already exposed to considerable noise activities in the area, and feed on waterfowl along the canal which are already contaminated with PCBs and PAHs. Dredging activities could release toxic "oils" from the sediments which would be toxic to peregrine falcon eggs. The likelihood of this exposure is considered quite remote, however. Therefore, the project is not expected to have any incre-mental adverse impacts on these peregrine falcons. It is more likely that the project will actually improve the environmental conditions by removing toxic substances from the canal, thereby reducing the long-term potential for adverse impacts to peregrine falcons that nest and feed in the project area.

4.3.3.4 The U.S. Department of the Interior, Fish and Wildlife Service issued a Biological Opinion on 21 May 1996 determining that the project is not likely to jeopardize the continued existence of the peregrine falcon. However their impact analysis indicated the likelihood of an increased in short term adverse impact on nesting falcons along the Indiana Harbor Canal.

4.3.3.5 Possible impacts to nesting peregrine falcons have been addressed through the Section 7 process of the Endangered Species Act; a Biological Opinion (USFWS letter dated 21 May 1996) was provided by the U.S. Fish and Wildlife Service.

4.3.3.6 The issues of concern include the release of additional oil to the water column due to dredging and the sublethal and acute toxicity impacts of this oil on the falcons, the operation of the confined disposal facility, the design and management of the Wildlife Exclusion Plan and disturbances to nesting during dredging. The Fish and Wildlife Service has prepared an incidental take statement pursuant to Section 7(b)(4) of Act, which is included in Appendix A, Coordination. Discussions are ongoing about mandatory terms and conditions contained in the incidental take statement.(Note: At the time this final EIS was being finalized, the Chicago District, Corps of Engineers was in formal consultation with the USFWS on the peregrine falcon issue.)

4.3.4 Natural Areas and Public Land Impacts

4.3.4.1 There are no natural areas or public lands within the project area that would be impacted by any of the considered alternatives.

4.4 ARCHAEOLOGICAL AND HISTORIC RESOURCE IMPACTS

4.4.1 No Action Alternative

4.4.1.1 The "No Action" Alternative would have no adverse impacts on any significant archaeological or historic properties in the project area.

4.4.2 Dredging

4.4.2.1 Maintenance dredging would have no adverse impact on any significant archaeological or historic properties provided no structures are demolished or removed. The Indiana state historic preservation officer (SHPO) was consulted and concurred with this determination (letter dated January 24, 1989).

4.4.3 Confined Disposal

4.4.3.1 141st St. Site

4.4.3.1.1 Disposal would have no impact on archaeological or historic properties. The Indiana SHPO has concurred with this determination (letter dated December 8, 1981).

4.4.3.2 J-Pit Site

4.4.3.2.1 Disposal within the existing pit would have no adverse impact on archaeological or historic properties. The Indiana SHPO was consulted and concurred with this determination (letter dated January 24, 1989). If disposal involved disturbance of the remnant beach ridges between the pit and West 15th Street, an archaeological survey would be performed to assess impacts. At the present time, this ridge area is not part of the considered alternative.

4.4.3.3 Inland Steel Site

4.4.3.3.1 Construction of a confined disposal facility at this site would probably have no impact on archaeological or historic properties. The Indiana SHPO reviewed several possible CDF configurations at this site and commented that no historical or archaeological resources would be impacted by disposal at this site (letter dated January 19, 1989).

4.4.3.4 ECI Site (Dredging Alternatives 1, 2, and 3)

4.4.3.4.1 Disposal of dredged materials at the ECI site would not affect any significant archaeological or historic properties. The Indiana SHPO was consulted and concurred with this determination (letter dated May 12, 1989).

4.4.3.5 Treatment Technologies

4.4.3.5.1 There would be no impacts to archaeological or historic resources as the result of the use of any treatment technology.

4.4.3.6 Generic Clean Upland Site

4.4.3.6.1 No specific site has been identified as the Generic Clean Upland Site. Therefore, no specific statement can be made concerning impacts to archaeological or historic properties.

4.5 SOCIAL SETTING IMPACTS

4.5.1 No Action Alternative

4.5.1.1 Continued postponement of maintenance dredging of Indiana Harbor and Canal would impact those industries dependent on deep-draft navigation facilities for delivery or shipment of raw materials. If the Federal navigation channel were not dredged, deep-draft commercial vessels would continue to carry lighter, less economical loads. Additional portions of the channel would silt in to the point of being unnavigable. The loss of commercial shipping would negatively impact the area's industries and local economy.

4.5.1.2 The proposed dredging and disposal project is considered to be an integral part of the Remedial Action Plan (RAP) for the Grand Calumet River system. If the project were not implemented it could seriously jeopardize the implementation of the RAP and other potential remedial action measures.

4.5.1.3 If the harbor were not dredged, there would be no need to construct a CDF. The 141st Street site would probably remain vacant for the immediate future but has the potential for commercial or industrial development at some later point in time. The Inland Steel site would continue to be filled by the Inland Steel Company until either it was completely filled or their permit expires. The J-Pit site could be developed as a sanitary landfill by the present owner (Waste Management, Inc.). RCRA closure/corrective actions would have to be completed at the ECI site.

4.5.2 Dredging

4.5.2.1 Dredging and maintenance activities at Indiana Harbor would result in various adverse impacts to the aesthetic quality of the surrounding area. Operation of the dredge and construction equipment would temporarily degrade air, water, and visual aesthetic quality. Increases in noise levels should generally be minor, relative to the background industrial activity. Temporary increases in turbidity would occur during dredging, as discussed in Section 4.2.4.2. Water quality would be monitored as part of the proposed water quality monitoring program (see Appendix N, Monitoring Plan). Any aesthetic impacts would be largely temporary and limited to the immediate vicinity. The relative absence of residences in the vicinity of the harbor and the restriction of work to the daytime would tend to minimize social impacts associated with dredging.

4.5.2.2 The presence of maintenance vessels in the navigation channels would cause temporary inconveniences and potential safety hazards to water craft, which would have to avoid work areas. These potential impacts would be minimized by the issuance of a local notice to navigation interests by the USACE of Engineers and a local notice for mariners by the U.S. Coast Guard. Any bridge openings required during dredging could temporarily disrupt street and/or rail traffic. The continued maintenance of the harbor would have a long-term beneficial effect by preserving the use of the harbor and channels as a man-made resource for commercial navigation.

4.5.2.3 The continued maintenance dredging of the harbor would have an indirect long-term beneficial effect of medium magnitude on the local labor force, employment, tax revenues, property values, and business and industrial activity, due to the continued influence of harbor activity on the local economy. Community and regional growth would also be supported. The proposed dredging and maintenance activities would not affect any agricultural land or residential structures; thus no farms or people would be displaced. There would be no significant adverse impacts on community cohesion or public services.

4.5.3 Confined Disposal

4.5.3.1 <u>141st St. Site</u>

4.5.3.1.1 If materials associated with construction, dredging, and capping are hauled by truck to this site, there would be some interference with normal traffic flow. Potential truck routes are principally over four-lane, primary and secondary roads. Construction and capping materials would probably be delivered to the site via the Indiana Toll Road (Interstate 90) to 141st Street. Dredged material would be transported via Indianapolis Boulevard south to 145th Street then west to Calumet Avenue. Access to the site would be from 141st Street. Industrial and commercial establishments line most of the route. A residential area is located along a two-lane portion of 145th Street. The most congested area along the haul route is Indianapolis Boulevard, which is the main street through downtown East Chicago. Approximately 82,000 round trips would be need for CDF construction material. An average 205 trips per day on a total of 400 days would be needed during the construction period. Dredging would require an average of 515 trips per day during the initial two-month dredging period. Capping would involve 205 truck trips per day on a total of about 200 days during a 9- to 10-month period.

4.5.3.2 J-Pit Site

4.5.3.2.1 As with the 141st St. Site, hauling construction, dredged, and capping material to this disposal site would affect area traffic patterns. Construction and capping materials would most likely be hauled to the site over the Indiana Toll Road or Tri-State Highway (Interstate 80/94) to Cline Avenue, then local roads would be used to gain access to the site. Dredged material would be taken over Indianapolis Boulevard (U.S. Route 20) through downtown East Chicago. Trucks would continue east on 169th Street to the site; 169th Street is a four-lane road through residential areas and becomes a two-lane road through an industrial area near the site. Construction material would involve about 7,200 round trips (an average 103 trips on 70 days) during the construction period. The initial two-month dredging period would involve an average of 515 trips per day. Capping would require 205 truck trips on about 200 working days over a 9- to 10- month period. The disposal facility would be near the Black Oak community, and area residents could experience some minor social impacts such as changes in the aesthetic character of the area.

4.5.3.3 Inland Steel Site

4.5.3.3.1 Localized traffic congestion and related impacts would be expected if capping material came overland by truck, rather than by barge. Approximately 44,000 round trips would be required over a 310 day period if all the material came by truck. An average 205 trips per work day would be used. Transport routes would probably be over multi-lane highways and roadways which service the surrounding area. The Indiana Toll Road, Indianapolis Boulevard, and Cline Avenue (State Route 912) are heavy and medium duty roadways which could serve as primary access routes. Construction stone and dredged material would come by barge and be unloaded at the site.

4.5.3.4 ECI Site (Dredging Alternatives 1, 2, and 3)

4.5.3.4.1 Construction and capping materials would probably come by truck over the Indiana Toll Road to 141st Street, then north on Indianapolis Boulevard to the ECI site. Approximately 72,000 round trips would be required to transport construction materials to the site, averaging 205 trips per day on 350 days during the construction period. Capping material would involve 205 truck trips per day on 250 working days over a 12 month period. Dredged material would be taken to this site by barge and unloaded directly onto a rehandling area on the site before going into the CDF. The Lake George Canal and remaining vacant ECI site parcel to the south of the site portion proposed for the CDF, should provide a buffer between the disposal facility and nearby parks and residential area. However, some changes in the aesthetic character of the area and related conditions would occur.

4.5.3.4.2 The staged construction of the facility under Alternative 1 would require more periods of construction, but would reduce the number of total truck trips required at any one time. All construction phases would involve an average of 205 round trips per days. Almost 60,000 total trips over 300 work days would be required during stage 1 two-year construction period; stage 2 would require 16,300 trips over 80 days during a four month period; and stage 3 would require 25,700 trips over 80 days during four months. Capping the site would involve 205 trips per day on 175 work days in two construction seasons, totaling 36,350 round trips.

4.5.3.4.3 Alternatives 2 and 3 would involve the greatest number of truck trips and would also involve staged construction of the facility. The same number of trips per day (205) would be used. Stage 1 would required almost 92,000 total trips over 450 work days during three construction seasons; stage 2 would involve 28,000 trips over 140 days during a seven month period; and stage 3 would involve 27,000 trips over 130 days during seven months. Capping would involve 205 trips per day on 250 work days in two construction seasons, totaling 51,250 round trips.

4.5.3.4.4 Human Health Risk Analysis - The U.S. EPA completed a risk analysis for the proposed CDF at the ECI site (U.S. EPA, 1994). The study assess human health risks posed by inhalation of potential airborn contaminants released from the CDF.

The analysis was designed to quantify the potential air emissions of pollutants from the CDF and obtain the average annual concentration or pollutants at specific receptors. Due to the exposure of students and faculty to potential airborne contaminants, a receptor of concern is the high scholl immediately south of the proposed CDF site. A copy of the risk assessment is provided in Appendix T, U.S EPA Inhalation Risk Analyses.

4.5.3.4.5 The risk analysis estimates cumulative risk due to air emissions from the CDF operation to the atmosphere. Using modeled contaminant concen-trations and unit risk factors, a 30-year exposure cancer risk was calculated for the CDF emission to the area. The modeled air concentrations and result-ing risks were compared to recent monitored concentrations and resulting risks. The results of a U.S. EPA air study conducted in southeast Chicago in 1989 were used for the monitored concentrations. The risk analysis is intended to be conservative and protective, and thus probably overestimates the actual risk. The results of the risk analysis show that the additional risk from the CDF, estimated at 2.3×10^{-6}, does not contribute to the risk from the existing air quality in the area of 3.1×10^{-4}.

4.5.3.4.6 The risk analysis was limited to air emissions of volatiles, semi-volatiles, and particulates from the CDF. Other potential pathways or con-taminant loss can occur during dredging/disposal operations that were not included in the analysis. However, the air emissions presented in the risk analysis surpass the losses from other pathways. The USACE has estimated the relative losses from a conceptual dredging operation in the IHC for the Assessment and Remediation of Contaminated Sediments (ARCS) program. The relative losses from resuspension during dredging, volatilization during dredging and rehandling, volatilization during CDF operation, and seepage from the CDF were compared. It was shown that the volatile losses during CDF operation were significantly higher than the other loss pathways combined. Therefore, these losses would not affect the results of the risk analysis discussed above.

4.5.3.4.7 During CDF disposal or rehandling operations, air monitoring would be initiated to measure the significance of volatile and particulate contami-nant losses leaving the CDF site. Air monitoring equipment such as high volume samplers would be located at the perimeter of the site. Monitoring data would be evaluated to determine if sediment management practices should be altered or amended. Wind fences, covering the sediment, or operational modifications are examples of common control measures that could be considered.

4.5.3.4.8 At this time, the minimum requirement for workers directly in contact with sediment would be Level C personal protective equipment. Per-sonal air monitors would be worn on site to identify work assignments which pose the highest risk to worker health and safety. Further discussion of the air monitoring plan is included in Appendix N, Monitoring Plan.

4.5.3.4.9 <u>Environmental Justice</u> - The U.S. EPA completed a review of envir-onmental justice issues relating to the proposed dredging and use of the ECI site for location of a CDF in response to Executive Order No. 12898, dated February 11, 1994. The review is contained in Appendix U, Environmental Justice Analysis. It addresses project description; site description; demo-graphic factors; and impacts on the community, including logistics and social impacts, local ecosystem impacts, public health factors, additional exposures, economic impacts and public reach. The analysis concludes that the Compre-hensive Management Plan for the Indiana Harbor and Canal Confined Disposal Facility (CDF) conforms to United States policy of insuring that Federal projects do not disproportionately impact a community's right to a safe and clean environment. The project poses no significant risks to the health of nearby residents or the surrounding environment. Rather, the project is expected to improve long-term environmental conditions in the Canal, bene-fitting both upstream and downstream habitats, and recreational activities that depend on their quality. In summary, the analysis concludes that the inhabitats of East Chicago, which encompass a wide spectrum of income levels and socio-economic backgrounds, will realize cumulative environmental and economic impacts from the dredging of contaminated sediment from the Canal and the siting of the proposed CDF.

4.5.3.4.10 <u>General Conformity Determination/Odors</u> - In accordance with the 1990

amendments to the Clean Air Act (CAA) [42 United States Code 7401 et seq.] a General conformity Determination was completed on this project for Ozone (VOCs or No_x) and PM-10 (particulate matter less than 10 microns). The analysis concluded that this Federal action is below the de minimis levels, and is not considered to be a "regionally significant" activity for ozone or PM-10 generation. A complete discussion of the determination is provide as Appendix V, General Conformity Determination and Odor Analysis. In addition, an odor analysis was completed to address the potential for odors to emanate from the dredging/ disposal operation. The analysis indicates that the odor threshold for Xylene, Naphthalene, and Toluene may be exceeded within the interior of the CDF, however by a distanct of 20 m (within the minimum distance to the fence line) the odor thresholds are not exceeded for any of the chemical compounds. A complete discussion of the odor analysis is also provided as Appendix V.

4.5.3.5 Treatment Technologies - Disposal at any of the proposed disposal areas would not have a significant adverse impact on aesthetic values, community cohesion or growth, tax revenues, property values, public services or facilities, regional growth, employment, or business or industrial activity; no people or farms would be displaced.

4.5.3.5.1 Constructing a treatment facility would cause short-term increases in construction-related employment. Operation of a permanent treatment facility would result in long-term increases in employment, dependent upon the complexity of the technology. Nearby residences may experience nuisances during operation, such as increased noise, odors, and traffic. The magnitude of the impacts would be localized if the facility is constructed at the CDF site, minimizing impacts associating with transporting material between the facility and CDF before and after treatment. The CDF would be used to hold material until it could be treated and would be the permanent containment area for treated material or residues.

4.5.3.6 General Disposal Impacts - Disposal at any of the proposed disposal areas would not have a significant adverse impact on aesthetic values, community cohesion or growth, tax revenues, property values, public services or facilities, regional growth, employment, or business or industrial activity; no people or farms would be displaced.

4.6 IRREVERSIBLE COMMITMENT OF RESOURCES

4.6.1 Implementation of any of the proposed plans would involve the irreversible commitment of Federal funds, energy resources, and construction materials. CDF construction at the upland alternative sites would permanently convert approximately 80 to 140 acres of open, urbanized lands to a disposal facility. CDF construction at the in-lake site would permanently convert approximately 70 acres of nearshore, lake bottom and open water habitats to a disposal facility.

4.6.2 Natural Resources (Trustees) Damages

4.6.2.1 Nothing in this environmental impact statement shall be construed either explicitly or implicity to irreversibly or irretrievably commit natural resources either directly or indirectly associated with the proposed dredging of the IHC beyond those areas outside of the area of dredging.

4.7 UNAVOIDABLE ADVERSE AND SECONDARY IMPACTS

4.7.1 Maintenance dredging would remove sediment deposits from dockage and berthing areas around local industries. This will enable vessels to reach dockside before unloading, reducing the amount of raw materials spilled. Currently, ships and barges must move through sediment deposits to approach docks. This causes significant resuspension of contaminated sediments. Dredging to authorized depths would greatly reduce the amount of sediment resuspension caused by all ship traffic. The dredging operation itself would cause unavoidable resuspension impacts that would be temporary and minor in comparison to the existing conditions.

4.7.2 The maintenance of the navigation channel will restore an important resource to local industries. The existing navigation use of the channel and the value of this resource to local industries is more fully described in Appendix B, Economic Analysis. A secondary impact of the maintenance of this navigation channel is the potential growth and development of new commerce and industry in this area. This additional commerce/industry may create new discharges to the air and the waterway. However, these discharges would have to comply with Federal and state environmental regulations, and should therefore have no significant impact.

4.7.3 Dredging Outside of the Federal Navigation Project

4.7.3.1 Dredging immediately adjacent to or below the Federal navigation project by industries, other agencies, or the USACE of would cause similar impacts to those discussed in this EIS for dredging within the Federal navigation channel.

4.7.3.2 Prior to dredging, these materials would be properly characterized in accordance with State and Federal law. Subsequent to dredging, these mater-ials would be treated as necessary for compliance with applicable State and Federal standards prior to disposal.

4.8 RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM MANAGEMENT OF RESOURCES

4.8.1 If the Federal navigation project is not maintained, the navigation channel would remain silted in and harbor structures would continue to deter-iorate. This would cause commercial ships to carry lighter, less economical loads, as well as, create navigation safety hazards.

4.8.2 Failure to maintain the channel, either by Federal or local interests would eliminate its function as a sediment trap. The present discharge of contaminated sediments from upstream would continue directly into nearshore Lake Michigan. This could result in the long-term degradation of the nearshore water quality and aquatic communities. This would, in turn, impact area water management programs and state fishery programs.

4.8.3 A routine dredging and disposal program would permanently remove contaminated sediments from the Federal channel. This would allow upstream portions of the channel to operate as a large sediment trap, thereby stopping as much as 50% to 70% of such sediments from entering the nearshore of Lake Michigan compared to the "No Action" Alternative or "without project" condition. This would greatly benefit the water quality and aquatic communities of the southern end of Lake Michigan, as well as, area water management and fishery programs.

4.8.4 A maintained navigation project, including maintained structures, would provide a safe, navigable channel for commercial shippers. This would provide long-term economic benefits to the area.

4.9 ENERGY REQUIREMENTS

4.9.1 Most of the alternatives would not involve long-term or permanent expenditures of energy resources. Energy (in the form of fossil fuels) would be required to construct, fill, cap, and maintain a CDF, to perform routine maintenance dredging, and to maintain the navigation structures. The application of sediment treatment technologies would require a long-term commitment of energy (in the form of electricity or fossil fuels). The large quantity of dredged material requiring treatment and the relatively low treatment rate would require an energy source over the entire life of the project (20 to 40 years). The no action alternative would result in an increase in energy use (primarily fossil fuels) by the shipping industry using the harbor. This is due to the need to ship lighter loads or use smaller draft vessels in order to navigate the silted-in channel. They may also be forced to use other, less-efficient means of transporting goods, such as by rail or truck.

4.10 CUMULATIVE IMPACTS

4.10.1 Indiana Harbor and Canal would continue to be a significant source of contaminated sediments to Lake Michigan under the no action alternative. The cumulative impacts of this and other similar sediment sources around the lake would be significant. The cumulative impacts of maintenance dredging would include significant reductions in the amount of sediment contamination reaching southern Lake Michigan. In conjunction with other source controls and remediation planned as part of the RAP, the environmental quality and beneficial uses of the IHC and Lake Michigan would improve over time. The conversion of an upland site to a CDF is not expected to have any significant cumu-lative impact on area land availability or land use practices. There are not expected to be any significant cumulative impacts due to the implementation of any sediment treatment technology.

SECTION 5 - LIST OF PREPARERS

5.1 The following tabulation individuals lists were responsible for the preparation of portions of this draft EIS as indicated.

Name	Expertise	Experience	Sections Prepared
John Cullinane	Civil Engineering	6 yrs. civil engineer, consulting firm; 11 yrs. civil engineer, Waterways Experiment Station.	Treatment Technologies Appendix.
Sue Davis	Environmental Engineering	2 yrs. intern program, Chicago Dist.	Sediment Quality Appendix.
Linda Diez	Environmental Engineering	1 yr. intern program, Chicago Dist.	Sediment Quality Appendix.
Ken Derickson	Ecology/ NEPA Process	21 years environmental assessments and NEPA coordination in public and private sectors.	Supplement to Appendix D.
John Dorkin (U.S. EPA)	Aquatic/ Fisheries Biologist	2 yrs. water quality analysis, 8 yrs. aquatic studies, Metropolitan Sanitary Dist. of Greater Chicago; 3 yrs. environmental studies, Chicago Dist.; 3 yrs. water division, U.S. EPA.	Aquatic communities sections, No Action Appendix.
Sue Elston (U.S. EPA)	Wildlife Biologist	1 yr. ecologist, environmental consulting firm; 1.5 yrs. regulatory functions & 4 yrs. environmental studies, Chicago Dist. 5 years wetland studies, U.S. EPA.	Terrestrial communities sections, Biolgical Assessment & No Action Appendices.
Al Fenedick (U.S. EPA)		3 yrs. environmental protection spec., U.S. EPA.	U.S. EPA issues.
Steve Garbaciak (U.S. EPA)	Environmental Engineering	3 yrs. environmental engineering, Chicago Dist.; 3 yrs. U.S. EPA.	Treatment Tecnologies, TSCA Permit, Sediment Quality Appendices.
Earl Kenzie	Environmental Engineering	6 yrs. operations & 2.5 yrs. environmental engineering, Detroit Water & Sewerage Dist; 1 yr. environmental engineering, Chicago Dist. (no longer with Federal govt.).	Environmental Engineering Appendix.
Tommy Meyers	Civil Engineering	Research civil engineer, Waterways Experiment Station.	Treatment Technologies Appendix.

LIST OF PREPARERS (continued)

Name	Expertise	Experience	Sections Prepared
Jan Miller	Environmental Engineering	2 yrs. research, Center for Great Lakes Studies; 8 yrs. environmental engineering, Chicago Dist.; 3 years environmental engineering, North Central Division	Project Manager, Parts of Sections 1-4, Appendices C, E, F, H, & N.
Mike Neeley	Environmental Engineering	1.5 yrs. materials testing lab; 1 yr. geotechnical/civil engineer intern, 8 yrs. environmental engineering, Chicago Dist.	Environmental Engineering assistance.
Roger Perk (Rock Island Dist.)	Civil Engineering	5 yrs. civil engineering, Chicago Dist.	Civil Design Appendix.
Bill Rochford	Geotechnical Engineering	2.5 yrs. consulting firm; 3.5 yrs. geotechnical engineering, Chicago Dist.	Geology/Soils Sections.
Keith Ryder	Archaeology	0.5 yr. archaeological survey & excavation; 20 yrs. cultural resource management, Louisville, Omaha, & Chicago Dist.	Archaeological & historic resource sections, SHPO coordination.
Jay Semmler	Environmental Engineering	5 yrs., environmental engineering, Chicago Dist.	Environmental Engineering App.
JoEllen Strang (FRA)	Economics	4 yrs. economic studies Chicago Dist.	Waterborne Commerce Appendix.
Elaine Taylor	Environmental Engineering	4 yrs environmental Misc. consulting firm, 1.5 yrs. environ. engr. Chicago Dist.	environmental sections
Dave Wallin	Economics	11 yrs. economic studies, Chicago Dist.	Waterborne Commerce Appendix.
Paul Whitman (BLM)	Wildlife Ecology	1 yr. biological assistant, U.S. Fish & Wildlife Service; 6 yrs. environmental studies, Chicago Dist.	EIS coordinator, agency coordination, terrestrial communities, threatened & endangered species sections, Biological Assessment Appendix.

SECTION 6 - COORDINATION

6.1 REQUIRED COORDINATION

6.1.1 A variety of state and Federal agencies were contacted for comments, data, and other input during the preparation of this environmental impact statement. Numerous meetings have also been held. A chronology of this coordination is included in the general discussion in Section 1.2.2 titled History of Dredged Material Disposal. Coordination letters are contained in Appendix A, Pertinent Correspondence. Comments have been incorporated into the main text as appropriate.

6.1.2 Extensive coordination was completed between the Chicago District, Corps of Engineers, and the U.S. EPA, Region 5 during the preparation of the Comprehensive Management Plan (CMP). Recognizing the importance of the remediation of the Indiana Harbor and Canal sediments, as well as the Grand Calumet River sediments which migrate into the Indiana Harbor and Canal and Lake Michigan, the U.S. EPA Region 5 agreed to participate with the Chicago District as a "cooperating agency" in the preparation of this EIS. The Chicago District, entered into a formal Memorandum of Agreement (MOA) with U.S. EPA Region 5 to prepare this EIS. The MOA is contained in Appendix P,
Memorandum of Understanding, USACE/U.S.EPA.

6.1.3 There is an unresolved issue regarding the possibility of an incidental take of the peregrine falcon. Formal consultation with the Fish and Wildlife Service is occurring on this issue and will be completed prior to any irreversible commitment that would further jeopardize the peregrine falcon. The pertinent Fish and Wildlife Coordination Act Report and Biological Opinion are included in Appendix A.

6.2 PUBLIC INVOLVEMENT, VIEWS, AND COMMENTS

6.2.1 A number of individuals and citizen's groups have participated in meetings or provided input during the preparation of this environmental impact statement. A chronology of this public involvement is included in the general discussion in Section 1.2.2 titled History of Dredged Material Disposal.

6.2.2 On 30 October 1995 a joint media conference was held with EPA in East Chicago to announce the release of the Comprehensive Management Plan and the jointly prepared Draft Environmental Impact Statement. Mr. Valdas V. Adamkus, regional administrator of EPA and LTC Robert E. Slockbower, commander of the Chicago District both stated that the project is critical to improving navigation and cleanup of Indiana Harbor and Canal.

6.2.3 On the afternoons of 28 November 1995 and 10 January 1996 the public was invited to technical sessions consisting of various stations manned by technical experts who responded to questions. Written information in both Spanish and English was available. Approximately 75 people attended these sessions representing the general public, local, state and federal agencies, congressmen, schools, environmental groups, industry, and media.

6.2.4 On the evenings of 28 November 1995 and 10 January 1996 public meetings were held, which consisted of slide presentations followed by questions and answers. Approximately 50 people attended these meetings to express support and concerns about the project. Public comments from the 10 January meeting were recorded as public record for the EIS. In general the questions reflected concerns about safety, health and property values.

6.2.5 Approximately 22 people made comments for the public record at the public meeting on the evening of 10 January 1996. In general comments made at the public meeting reflected concerns about health and safety, property values and the role of the East Chicago Waterway District. A transcript from that meeting with comment responses is included in Appendix V, CMP/EIS Comments and Responses.

6.3 LIST OF RECIPIENTS

6.3.1 A brochure summarizing the proposed project and its impacts was sent to approximately 700 interested parties in connection with the draft EIS. The list of the names and addressses of these parties is on file at the Chicago District Office.

6.3.2 The following agencies, organization, and individuals were sent a copy of this draft EIS:

FEDERAL

Director, Ecology and Conservation Office
U.S. Dept. Of Commerce, NOAA
CS/EC Room 6222
14th Street and Constitution Ave.NW
Washington, D.C. 20230-0001

Commander, Ninth Coast Guard District
1240 E. 9th Street
Cleveland, Ohio 44199-2060

Director, Office of Environmental Review
U.S. Environmental Protection Agency, Room 2119-Mall
401 M Street SW
Washington, D.C. 20460-0001

Director, Office of Energy & Environmental Impact
Federal Maritime Commission
1100 L Street NW
Washington, D.C. 20573-0001

Honorable Richard Lugar
United States Senate,
Senate Hart Office Building
Washington, D.C. 20510

Honorable Peter Visclosky
House of Representatives
2313 Rayburn House Office Building
Washington, DC 20515-1401

Federal Emergency Management Agency
ATTN: Anna Pudlo
Mitigation Division
175 West Jackson, 4th Floor
Chicago, IL 60604

U.S. Dept. of Health & Human Serv.
Public Health Service
Special Program Group, F-29
Center for Disease Control
Atlanta, Georgia 30333

Director, Office of Environmental Compliance (PE-25)
U.S. Dept. of Energy
Room 4G-085, Forrestal Bldg.
1000 Independence Ave. SW
Washington, D.C. 20585-0001

Regional Environmental Officer
U.S. Department of Housing and Urban Development, Rm. 1011
547 W. Jackson St.
Chicago, IL 60606-6606

Advisory Council of Historic Preservation
Suite 803
1100 Pennsylvania Ave. NW
Washington, D.C. 20004-2590

Regional Administrator
U.S. Environmental Protection Agency
ATTN: Office of Scientific Analysis
ME-19J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Honorable Peter Visclosky
Representative in Congress
214 West 35th Avenue
Gary, Indiana 46408

Regional Administrator
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U.S.D.A. Natural Resources/ Conversation Service
Environmental Activities Branch
P.O. Box 2890
Washington, D.C. 20013-2890

Honorable Dan Coats
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Washington, DC 20510-1401

Honorable Dan Coats
United States Senator
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Office of Environmental Policy
Review and Compliance
Room MS2340-MIB
1849 C Street, N.W.
Washington, D.C. 20240
ATTN: Sheila Huff

Honorable Richard Lugar
United States Senator
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10 W. Market St.
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Director, Environmental Programs
Asst. Chief of Staff for
Installation Management
600 Army Pentagon
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STATE

Honorable Frank O'Bannon
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206 State House
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William Fritchley
Dir. Planning
IND Ports Commission
150 W. Market St., Ste 603
Indianapolis, IN 46204

Director, Indiana Department
of Natural Resources
ATTN: Steve Jose,
Outdoor Recreation Division
605 State Office Bldg.
Indianapolis, IN 46204

Division of
Historic Preservation
402 W. Washington
Room 274
Indianapolis, IN 46204
ATTN: Jim Mohow

State Board of Health
State of Indiana
1330 West Michigan Street
Indianapolis, IN 46206

Honorable Dennis Neary
Indiana State Senate
2316 Hazeltine Drive
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Commissioner, Indiana Dept. of
Environmental Management
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Michigan City, IN 46360

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Indianapolis, IN 46204

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Indiana State Senate
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Jasper, IN 47546

Doreen Cary, Exec., Dir.
Grand Cal Task Force
Calumet College
2400 New York Ave.
Whiting, IN 46394

Director, IDEM
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Grainer Bank Bldg., Suite 418
504 N. Broadway
Gary, IN 46402

Mark Reshkin, PH.D.
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Director
E. Chicago Sanitary Dist.
4527 Indianapolis, Blvd.
East Chicago, IN 46312

LOCAL AGENCIES AND INTEREST GROUPS

Lake County Public Library
1919 W. Lincoln Highway
Merrillville, Indiana 46410

Lake County Surveyor
LCGC 2293 N. Main
Crown Point, Indiana 46307

Gary Public Library
220 West 5th Avenue
Gary, Indiana 46402

Hammond Public Library
566 State Street
Hammond, Indiana 46320

Mayor
City of Hammond
5925 Calumet Avenue
Hammond, Indiana 46320

Inland Steel Company
Indiana Harbor Works
3210 Watling Street
East Chicago, IN 46312

Board of Lake County
Commissioners
Lake Co. Govt Center
Crown Point, IN 46307

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City of East Chicago
East Chicago, IN 46312

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Superintendent
Hammond Sanitary District
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Hammond, Indiana 46300

Mayor
City of Gary
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Whiting Public Library
1735 Oliver
Whiting, Indiana 46394

Michigan Area Council of
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Baker Environmental
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Coraopolis, PA 15108

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Chicago, IL 60607

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Highland, IN 46322

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East Chicago, IN 46312

Purdue University Calumet
The Library
Gary, IN 46323-2094

Michigan City Public Library
100 E. Fourth Street
Michigan City, IN 46360

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Ms. Kim M. Lenti
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East Chicago, IN 46312

Mr. Robert E. Ruiz
3921 Deodar Street
East Chicago, IN 46312

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Phillips Pipeline Co.
400 East Columbus Dr.
East Chicago, IN 46312
ATTN: Hodson/Alvarez

U.S. Fish & Wildlife Service
620 S. Walker St.
Bloomington, IN 47403-4273
ATTN: Scott Pruitt

Great Lakes Sport Fishing Council
P.O. Box 297
Elmhurst, IL 60126
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Office of Environmental Policy
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Philadelphia, PA 19106-2904
ATTN: D. Henne

Environ Pipeline Co.
1111 S. 103rd St.
Omaha, NE 68130
ATTN: Jack Guinn

Weaver Boos Consultants
120 N. Michigan Ave.
Chicago, IL 60611
ATTN: John W. Weaver

U.S. Dept. of Commerce
NOAA Region 5 (SR-6J)
77 W. Jackson Blvd.
ATTN: J. T. Goeks

ARCO Products Co.
310 Lindenwood Dr.
Suite 102
Malvern, PA 19355
ATTN: Joe Tully

REFERENCES

Banaszak, K.J. and J.M. Fenelon. 1988. "Water quality in a thin watertable aquifer adjacent to Lake Michigan within a highly industrialized region of Indiana." The Great Lakes: living with North America's inland waters, American Water Resources Association.

Brock, K. 1986. Birds of the Indiana dunes. Indiana University Press, Bloomington, IN. 178 pp.

CDM/Limnetics. 1976. Report on the November, 1976 fisheries study in southern Lake Michigan for Rooks, Pitts, Fullagar, and Poust. CDM/ Limnetics. 15 pp.

Cowardin, L., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. USFWS, Office of Biological Services, Washington, D.C. 103 pp.

Doskey, P. 1978. Transport of airborne PCBs to Lake Michigan. M.S. Thesis. University of Wisconsin, Madison.

Doskey, P. and A. Andren. 1981. Concentrations of airborne PCBs over, Lake Michigan. Journ. Great Lakes Res., 7(1):15-20.

Ecology and Environment, Inc. 1991. Expanded Site Inspection for Energy Cooperative, Inc. For U.S. Environmental Protection Agency.

Eisenreich, S., B. Looney, and J. Thorton. 1981. Airborne organic contaminants in the Great Lakes ecosystem. Env. Sci. Technol., 15:30-38.

Elder, J., D. Miller, R. Ginsberg, K. Millyard, S. Schaftlein, and L. Botts. 1987. Toxic air pollution in the Great Lakes baisn: A call for action. 28 pp.

Environmental Laboratory. 1987. USACE of Engineers wetlands delineation manual. Technical report Y-87-1. USACE, Waterways Experiment Station, Vicksburg, MS.
100 pp.

Environmental Laboratry. 1987. Disposal alternatives for PCB-contaminated sediments for Indiana Harbor, Indiana. 2 volumes, Miscellaneous Paper EL-87-9, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

Environmental Resources Management (ERM). 1984. Final Report, Environmental Hazards at the ECI East Chicago Refinery. For Jay A. Steinberg, Trustee, ECI site.

Federal Interagency Committee for Wetland Delineation. 1989. Federal manual for identifying and delineating juridictional wetlands. Cooperative Technical Publication. USACE, U.S. EPA, USFWS, and USDA Soil Conservation Service, Washington, D.C.

Fleming, E.C., Averett, D.E., Channell, M.G., and B.D. Perry. 1991. An evaluation of solidification/stabilization technology for Buffalo River sediment. Miscellaneous Paper EL-91-11, prepared for the U.S. EPA Great Lakes National Program Office, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Food and Drug Administration. 1987. Action levels for poisonous or deleterious substances in human food and animal feed. FDA, Center for Food Safety and Applied Nutrition, Washington, D.C. 35 pp.

Francingues, N., Jr., M. Palermo, C. Lee, and R. Peddicord. 1985. Management strategy for disposal of dredged material: contaminant testing and controls. Miscellaneous paper EL-87-9, USACE, Waterways Experiment Station, Vicksburg, MS. 40 pp.

Greenwood, R., J. Leach, E. Secora, and K. Multerer. 1984. A detailed report on the biological resources impacted by the proposed modifications at Duluth-Superior Harbor, Indiana Harbor, Astabula Harbor, and the upper St. Mary's River. Draft Fish and Wildlife Coordination Act Report. USFWS, Ecological Services, East Lansing, MI.

Hardy, M. 1984. Chemical and biological quality of streams at the Indiana Dunes National Lakeshore, Indiana, 1978-1988. Water Resources Investigations 83-420. USGS, Indianapolis, IN. 95 pp.

Herdendorf, C., S. Hartley, and M. Barnes, eds. 1981. Fish and wildlife resources of the Great Lakes coastal wetlands within the United States. Volume 5: Lake Michigan. FWS/OBS-81/02-v5. USFWS, Washington, D.C. 1592 pp.

Illinois Environmental Protection Agency. 1988. Illinois annual air quality report, 1987. IEPA, Springfield, IL.

Indiana Department of Environmental Management. 1988. Northwest Indiana environmental action plan. Area of concern remedial action plan. Draft. IDEM, Indianapolis, IN. 183 pp.

Indiana Department of Natural Resources. 1976. Coastal zone management program. Natural resources inventory. Technical report no. 101. IDNR, Indianapolis, IN. vp.

Indiana Department of Environmental Management. January 1991. The Remedial Action Plan for the Harbor Canal, The Grand Calumet River and the Nearshore Lake Michigan - Stage One. IDEM, Indianapolis, IN. 84 pp.

Indiana Department of Environmental Management. March 1995. The Northwest Indiana Environmental Initiative Action Plan. Review Draft. IDEM, Idianapolis, IN.

Indiana Department of Natural Resources. 1979. A priority rating of selected wetlands in the Indiana coastal zone study area. Techn. Rep. No. 303. IDNR, Indianapolis, IN. 1982 pp.

Limnology Work Group. 1976. Appendix 4. Limnology of lakes and embayments. Great Lakes Basin framework study. Great Lakes Basin Commission, Ann Arbor, MI. 441 pp.

Murphy, T. and C. Rzeszutko. 1977. Precipitation inputs of PCB's to Lake Michigan. Journ. Great Lakes Res., 3:305-312.

Murphy, T., D. Galinis, and C. Arnold. 1989. The Activity of PCBs in Sediments and Water from Lake Calumet and Waukegan Harbor. HWRIC RR-039. Savoy Illinois. 51 pp.

Polls, I. and S. Dennison. 1984. Biological and chemical water quality survey in Indiana Harbor, the Indiana Harbor Canal, and southwestern Lake Michigan for the U.S. Army USACE of Engineers, Chicago District. MSDGC, Chicago, IL. 88 pp.

Potos, C. 1981. Environmental regulatory review: Grand Calumet River and the Indiana Harbor Canal. U.S. EPA, Region V, Great Lakes Natl. Prog. Off., Chicago, IL. 62 pp. Randall, P. 1991. Souring hopes. Outdoor Indiana, (Sept./Oct.):12-18.

Rice, C., P. Brian, J. Eadie, and K. Erstfeld. 1982. Enrichment of PCBs in Lake Michigan surface films. Journ. Great Lakes Res., 8(2):265-270.

Risatti, J.B. and P. Ross, eds. 1989. Chemical, biological and toxicological study of sediments from Indiana Harbor, Canal, and adjacent Lake Michigan. Final Rep. for USACE, Chicago District, Chicago, IL. 67 pp.

Rosenshein, J.S. 1961. Groundwater resources of northwestern Indiana: Preliminary report: Lake County. Indiana Dept. Con. Div. Water Res. Bull. 10. 229 pp.

Soil Conservation Service. 1972. Soil survey of Lake County, Indiana. USDA, Washington, D.C. 94 pp.

U.S. Army USACE of Engineers. 1968. Dredging water quality problems in the Great Lakes. USACE, Chicago District, Chicago, IL.

U.S. Army USACE of Engineers. 1976. Ecological evaluation of proposed discharge of dredged or fill material into navigable waters: interim guidance for implementation of Section 404(b)(1) of Public Law 92-500 (Federal Water Pollution Control Act amendments of 1972). Dredge Material Research Program Miscellaneous Paper D-76-17, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

U.S. Army USACE of Engineers. 1983. Indiana Harbor, Indiana. Confined disposal facility. Site selection study. USACE, Chicago District, Chicago, IL. 25 pp.

U.S. Army USACE of Engineers. 1986. Indiana Harbor confined disposal facility and maintenance dredging, Lake County, Indiana. Draft environmental impact statement. USACE, Chicago District, Chicago, IL. 78 pp.

U.S. Army USACE of Engineers. In Prep. Appendix D. PCBs in Lake Michigan fish, 1970-1986. Draft environmental impact statement. Waukegan Harbor confined disposal facility and maintenance activities in Lake County, Illinois. USACE, Chicago District, Chicago, IL. 50 pp.

USACE/U.S. EPA. 1992. Evaluating environmental effects of dredged material management alternatives - a technical framework. EPA842-B-92-008, Washington, DC.

U.S. Environmental Protection Agency. 1977. Guidelines for the pollutional classification of Great Lakes harbor sediments. U.S. EPA, Region V, Chicago, IL.

U.S. Environmental Protection Agency. 1978. Indiana Harbor, Indiana report on the degree of pollution of bottom sediments. U.S. EPA, Region V, Chicago, IL.

U.S. Environmental Protection Agency. 1985. Master plan for improving water quality in the Grand Calumet River/Indiana Harbor Canal. U.S. EPA, Region V, Chicago, IL.

U.S. Environmental Protection Agency. 1987. Wetlands of the Grand Calumet River/Indiana Harbor Canal. U.S. EPA, Region V, Chicago, IL. 4 pp.

Wentsel, R. and A. McIntosh. 1977. Sediment contamination and benthic macroinvertebrate distribution in a metal-impacted lake. Env. Poll., 14:187-193.

Whitman, R., A. Gochee, and M. Holowaty. 1985. Biological stability and survival of plankton in "Lake Inland", Inland Steel Company, East Chicago, Indiana. Prep. for Inland Steel Co., East Chicago, IN. 15

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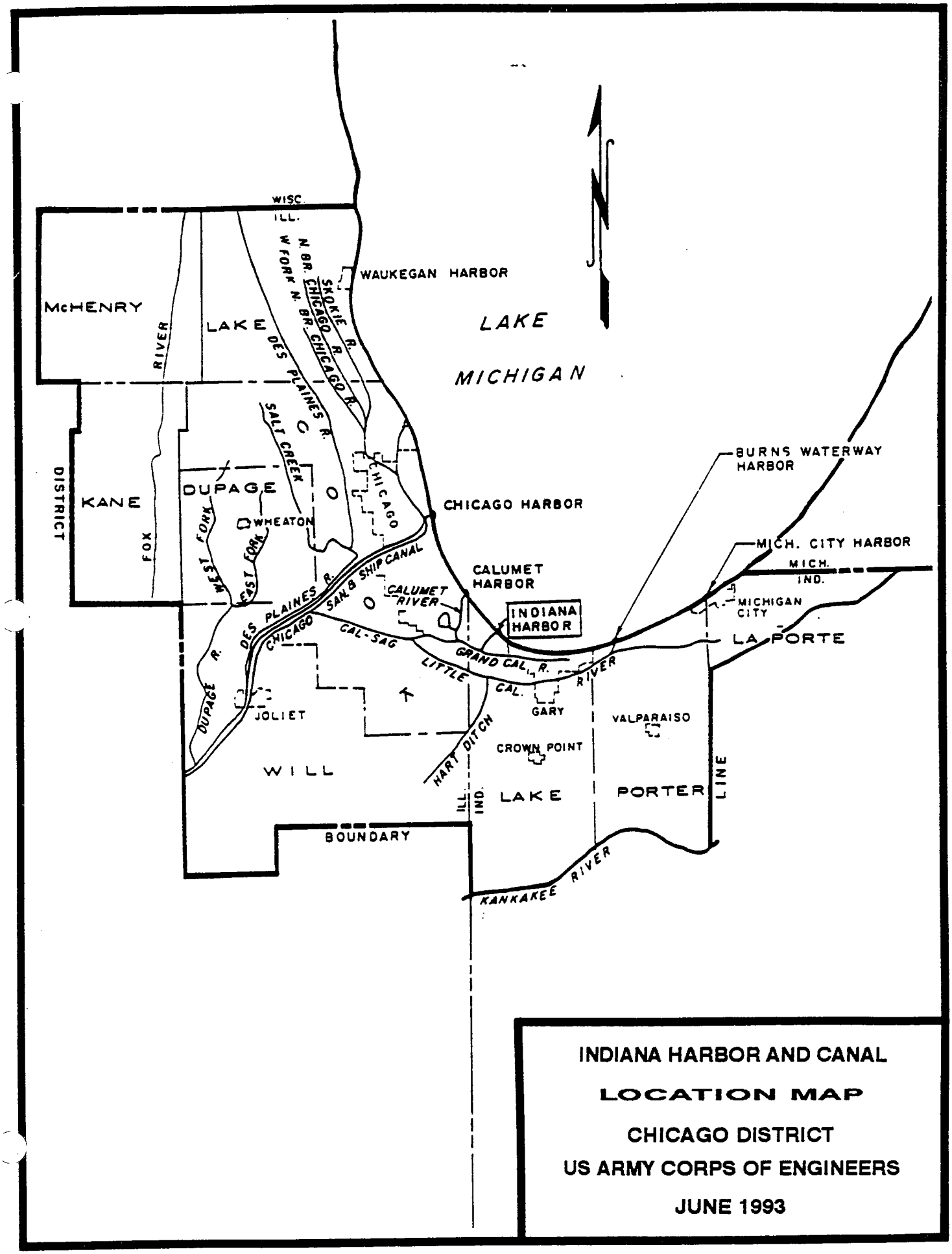


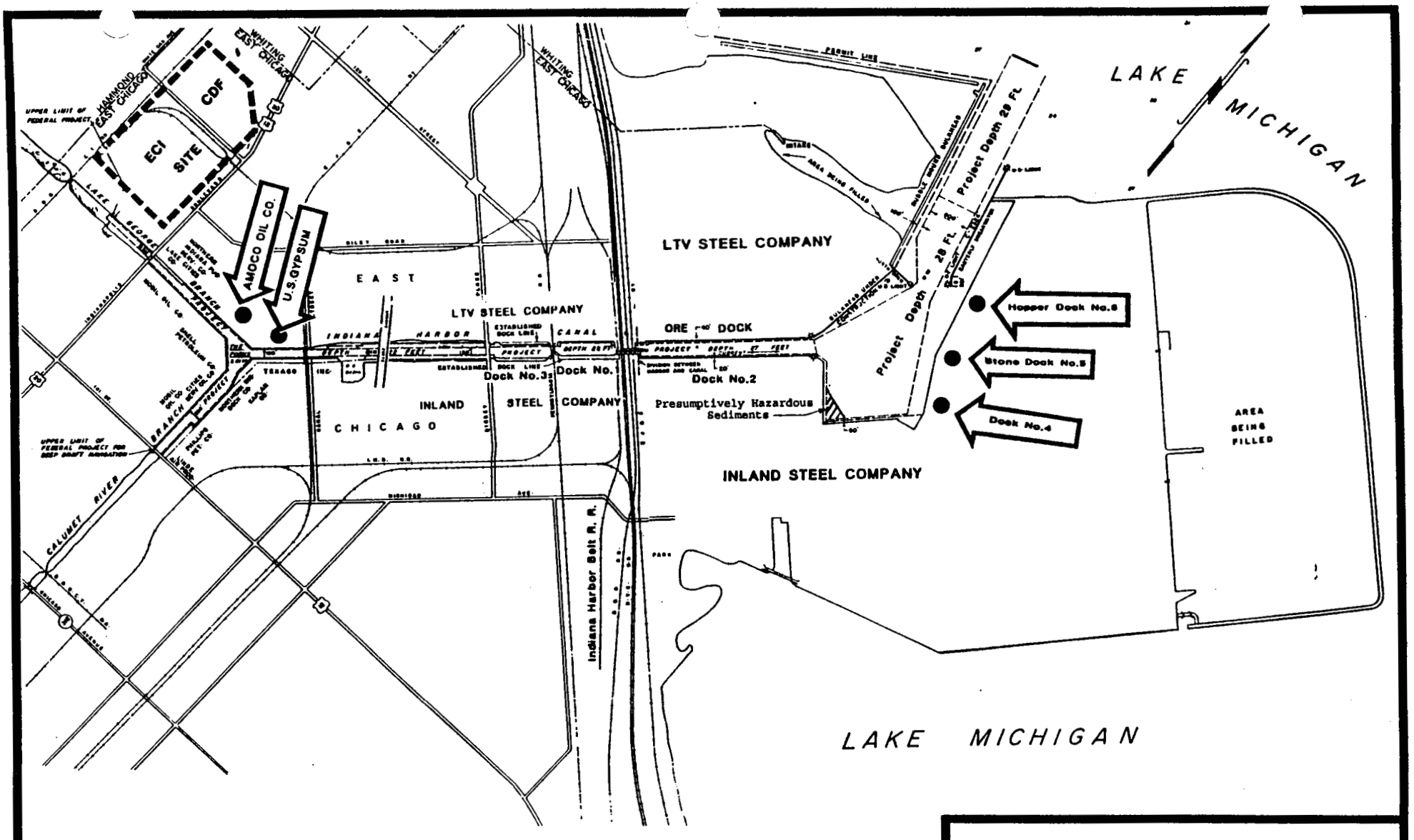
INDIANA HARBOR AND CANAL

LOCATION MAP

CHICAGO DISTRICT

US ARMY CORPS OF ENGINEERS

JUNE 1993



PROJECT DEPTHS AND SOUNDINGS ARE REFERRED TO LOW WATER DATUM 579.8 FEET ABOVE MEAN WATER LEVEL AT FATHER POINT, QUEBEC, I-G-L-D 1968) (INTERNATIONAL GREAT LAKES DATUM)

INDIANA HARBOR AND CANAL

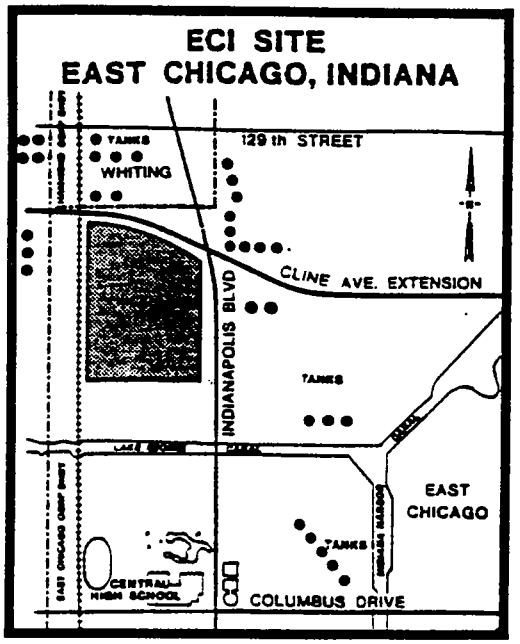
EXISTING FEDERAL NAVIGATION PROJECT

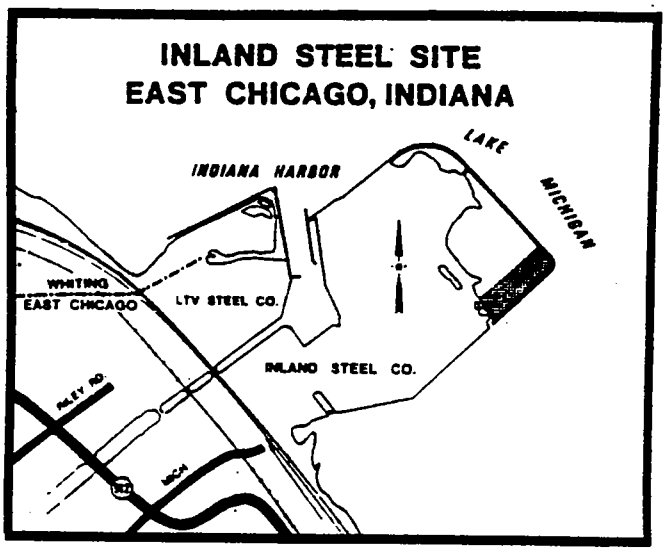
CHICAGO DISTRICT

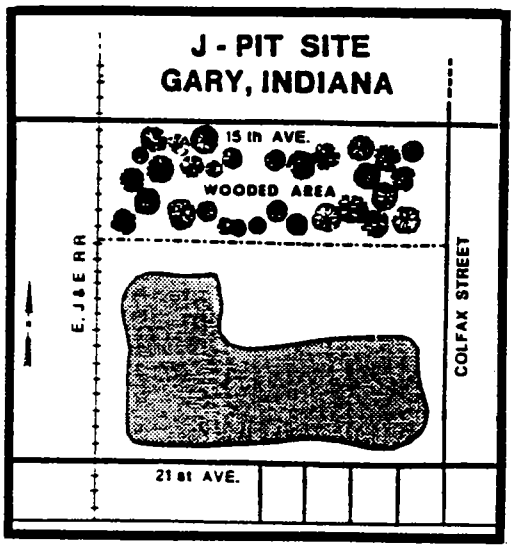
US ARMY CORPS OF ENGINEERS

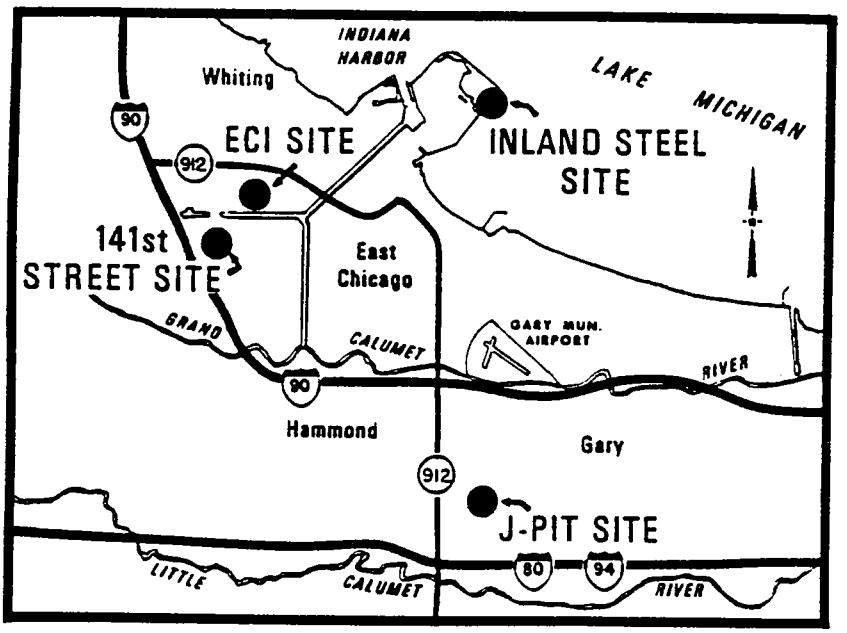
JUNE 1993

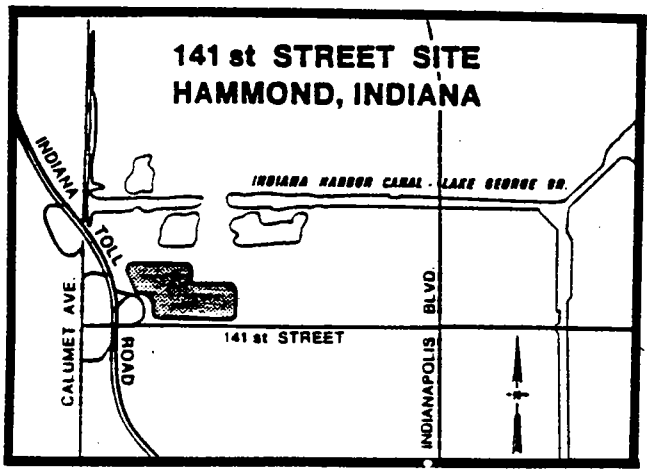
EIS PLATE 2











INDIANA HARBOR
CONFINED DISPOSAL FACILITY

POTENTIAL CDF SITES

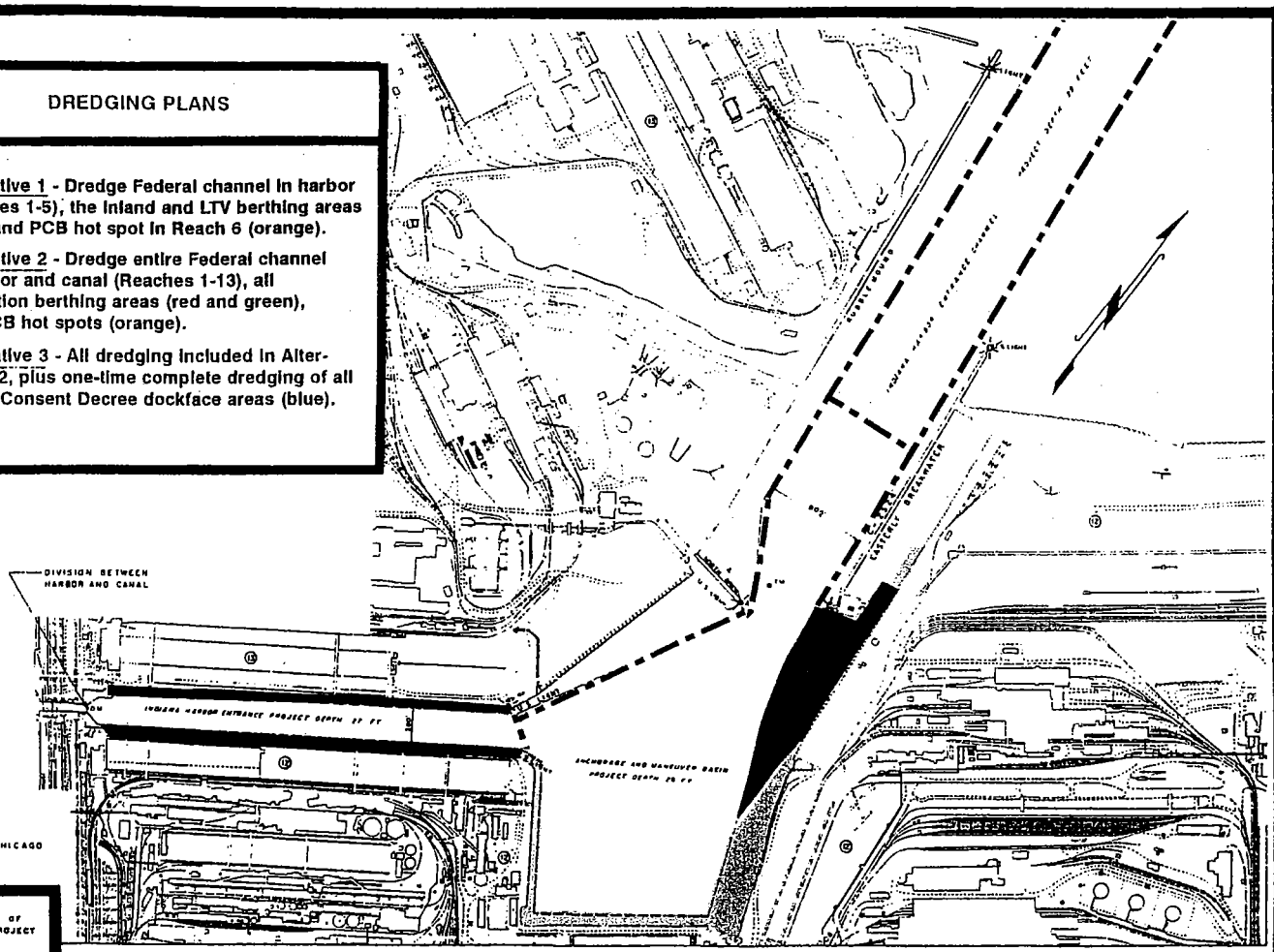
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

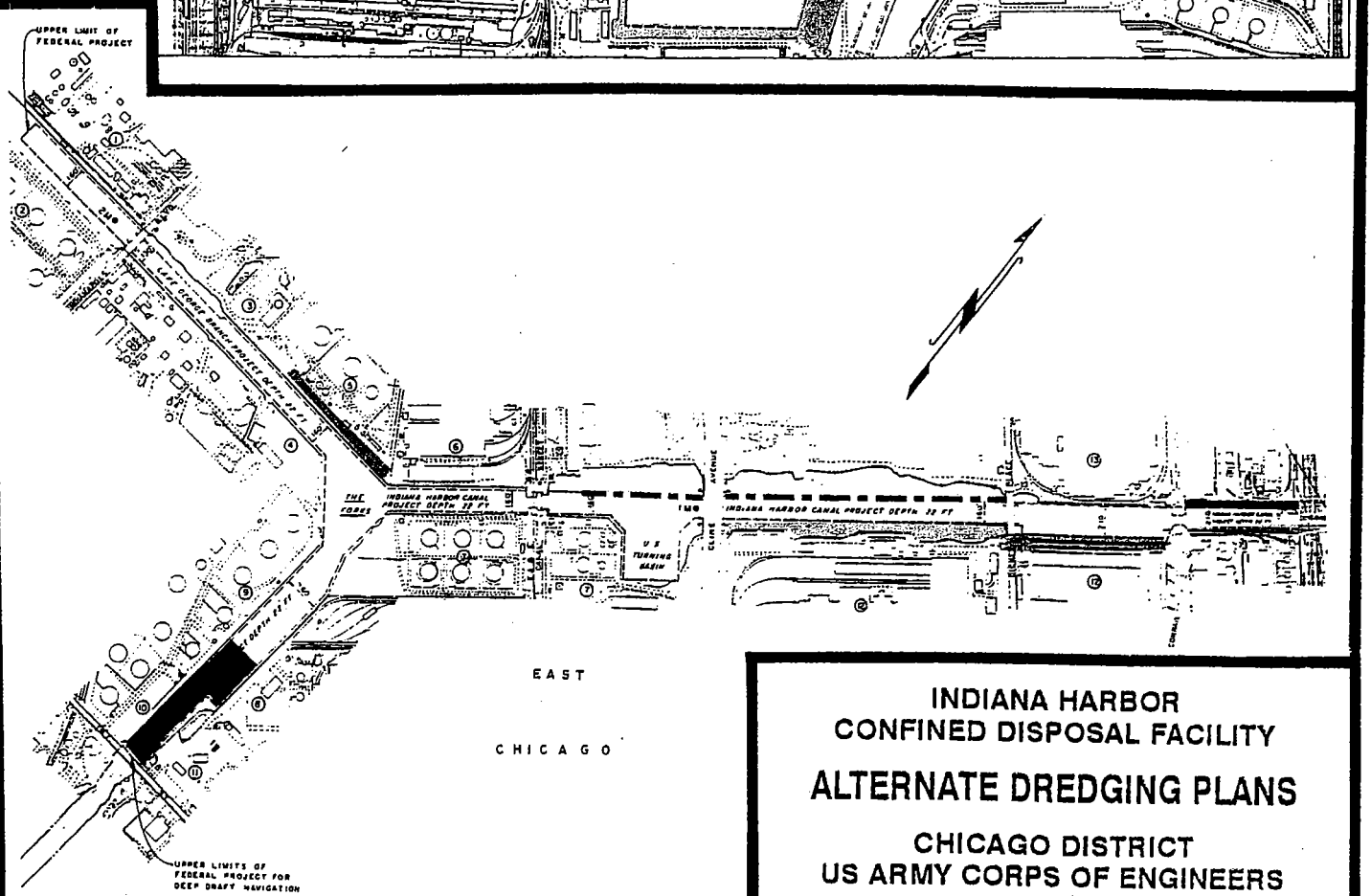
DREDGING PLANS

Alternative 1 - Dredge Federal channel in harbor (Reaches 1-5), the Inland and LTV berthing areas (red), and PCB hot spot in Reach 6 (orange).

Alternative 2 - Dredge entire Federal channel in harbor and canal (Reaches 1-13), all navigation berthing areas (red and green), and PCB hot spots (orange).

Alternative 3 - All dredging included in Alternative 2, plus one-time complete dredging of all Inland Consent Decree dockface areas (blue).

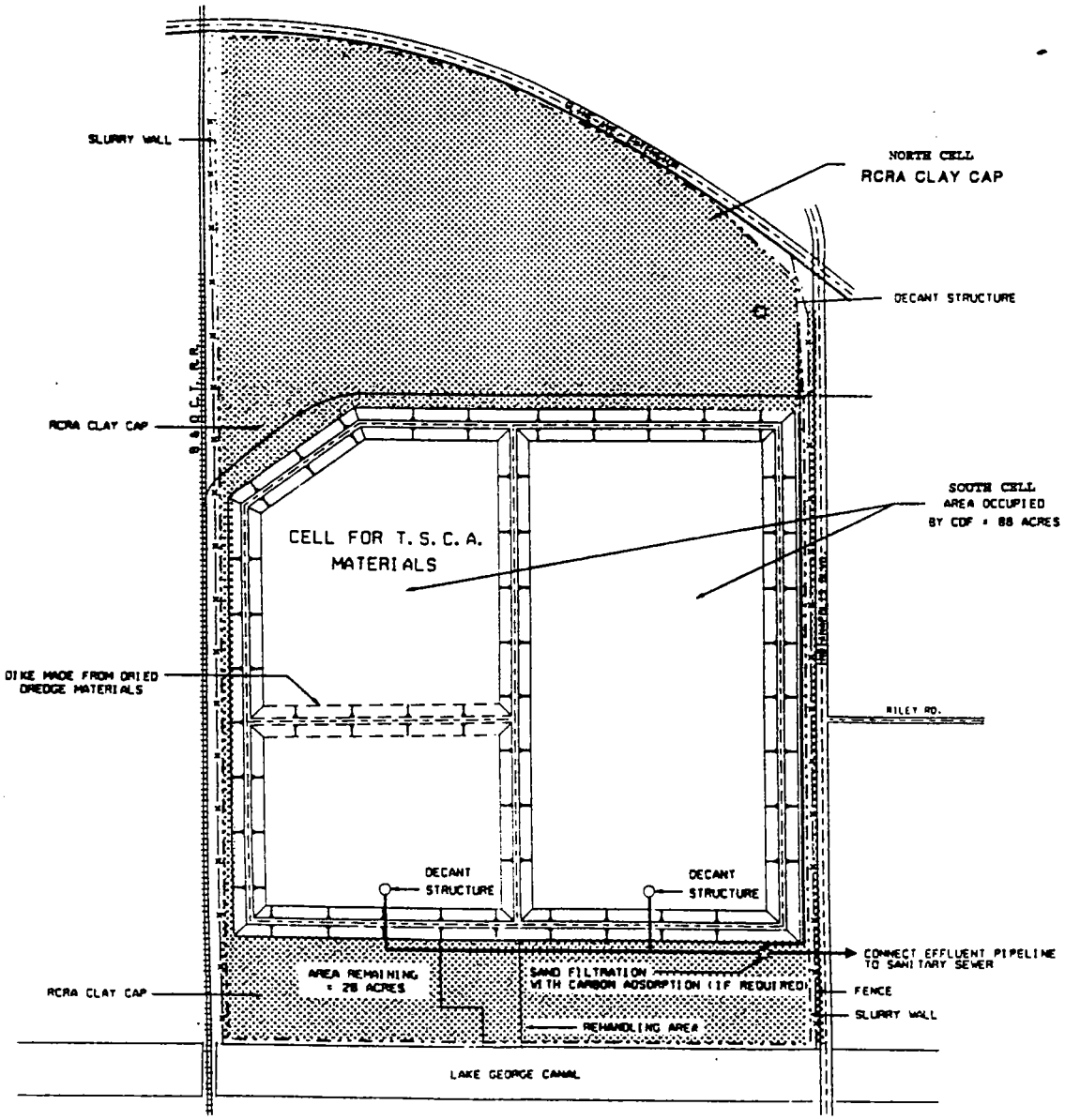


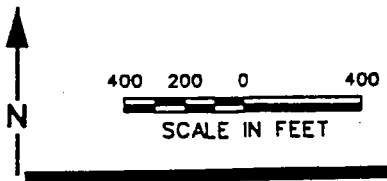


INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ALTERNATE DREDGING PLANS

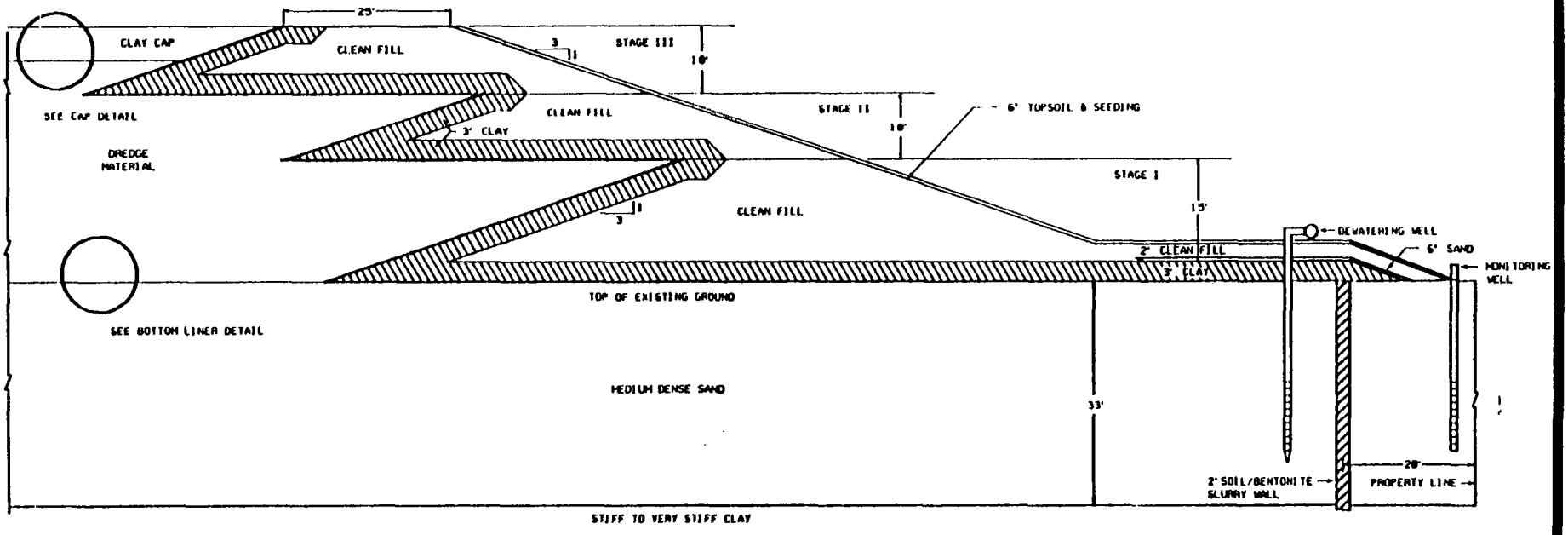
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993





INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
ALTERNATIVE 1
PARTIAL DREDGING
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993



SECTION

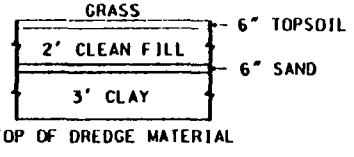
N.T.S.

DREDGED MATERIAL

TOP OF EXISTING SOIL

BOTTOM LINER DETAIL

N.T.S.



CAP DETAIL

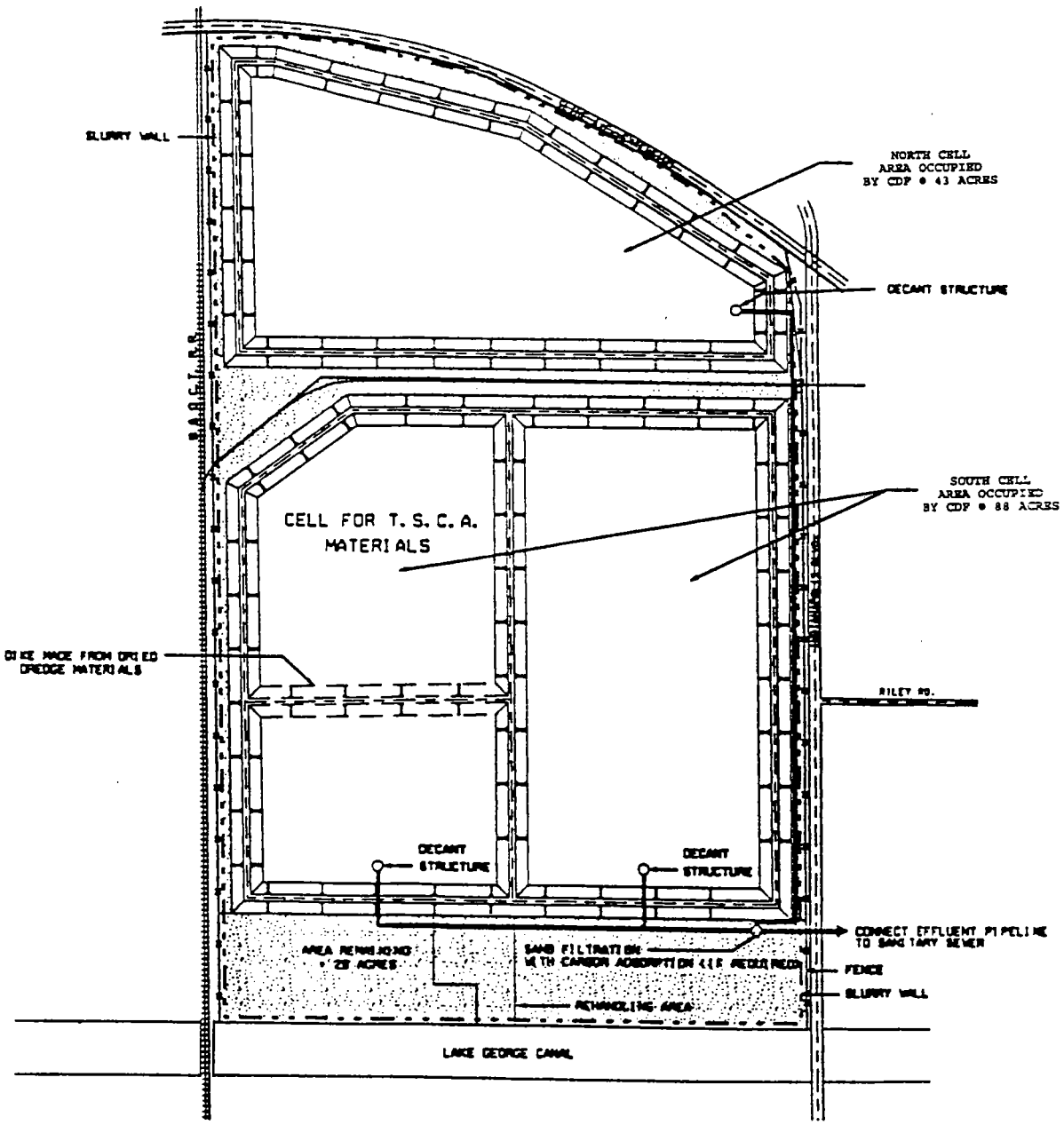
N.T.S.

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITH CDF PROJECT
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993



NOTE: ONLY THE TWO SOUTH CELLS WOULD BE USED IN ALTERNATIVE 1 - PARTIAL FEDERAL CHANNEL DREDGING: THE NORTH CELL WOULD NOT BE CONSTRUCTED. THE NORTH CELL PROPERTY WOULD BE CAPPED WITH CLAY TO COMPLETE RCRA CLOSURE. ALL THREE CELLS WOULD BE USED IN ALTERNATIVE 2 - COMPLETE FEDERAL CHANNEL DREDGING AND ALTERNATIVE 3 - COOPERATIVE DREDGING PROGRAM.

N

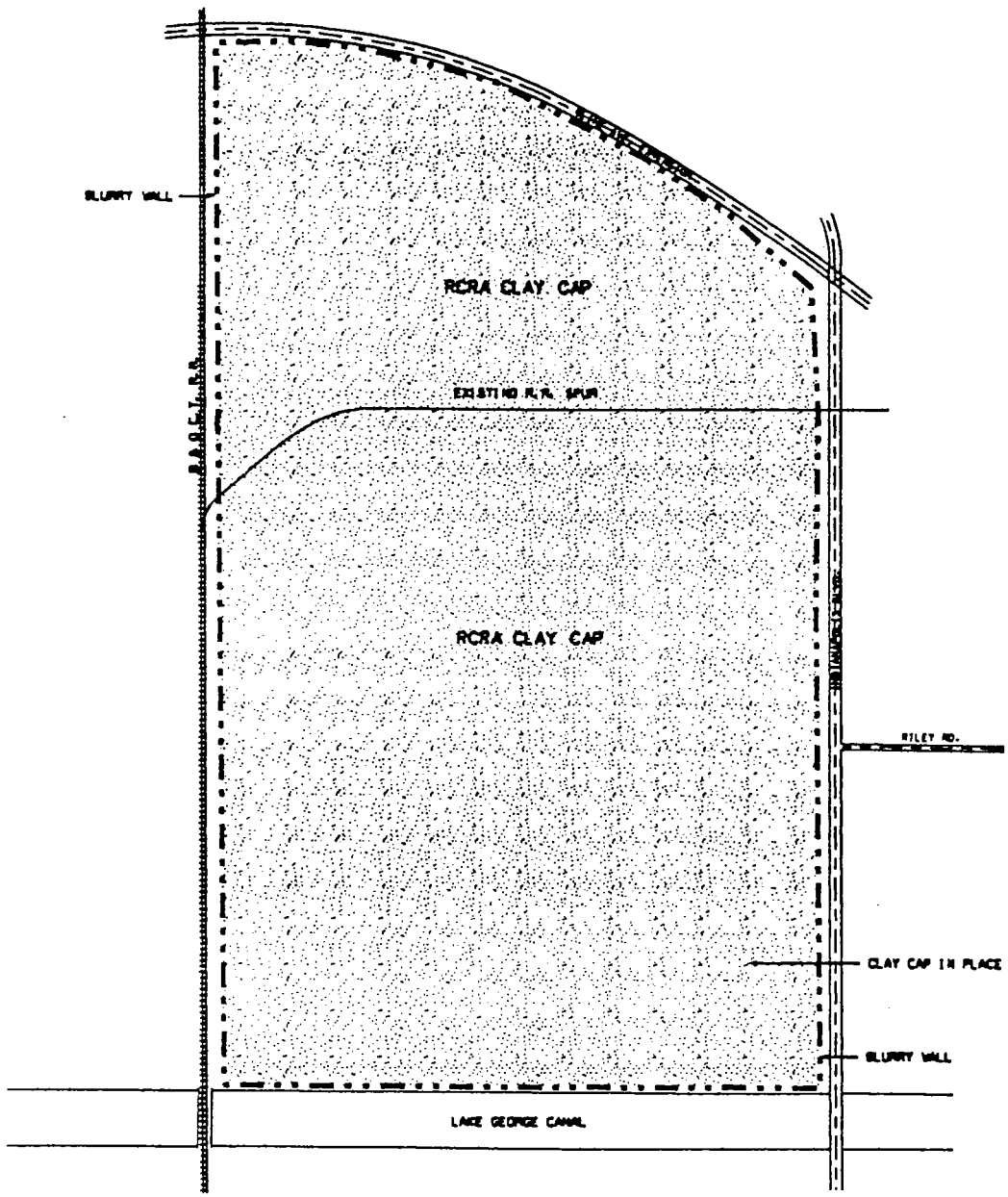
400 200 0 400

SCALE IN FEET

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITH CDF PROJECT
PLAN VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993



400 200 0 400

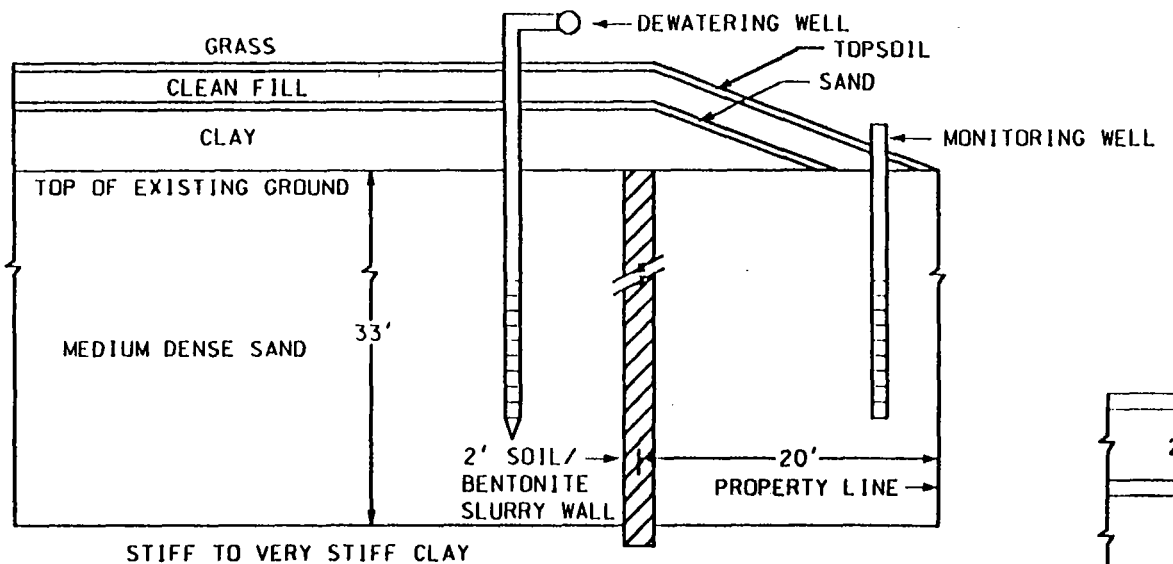
SCALE IN FEET

N

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITHOUT CDF PROJECT
PLAN VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993



SECTION

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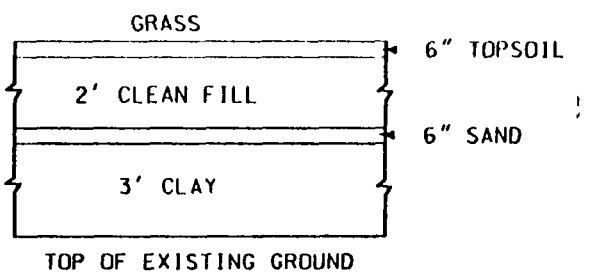


DETAIL

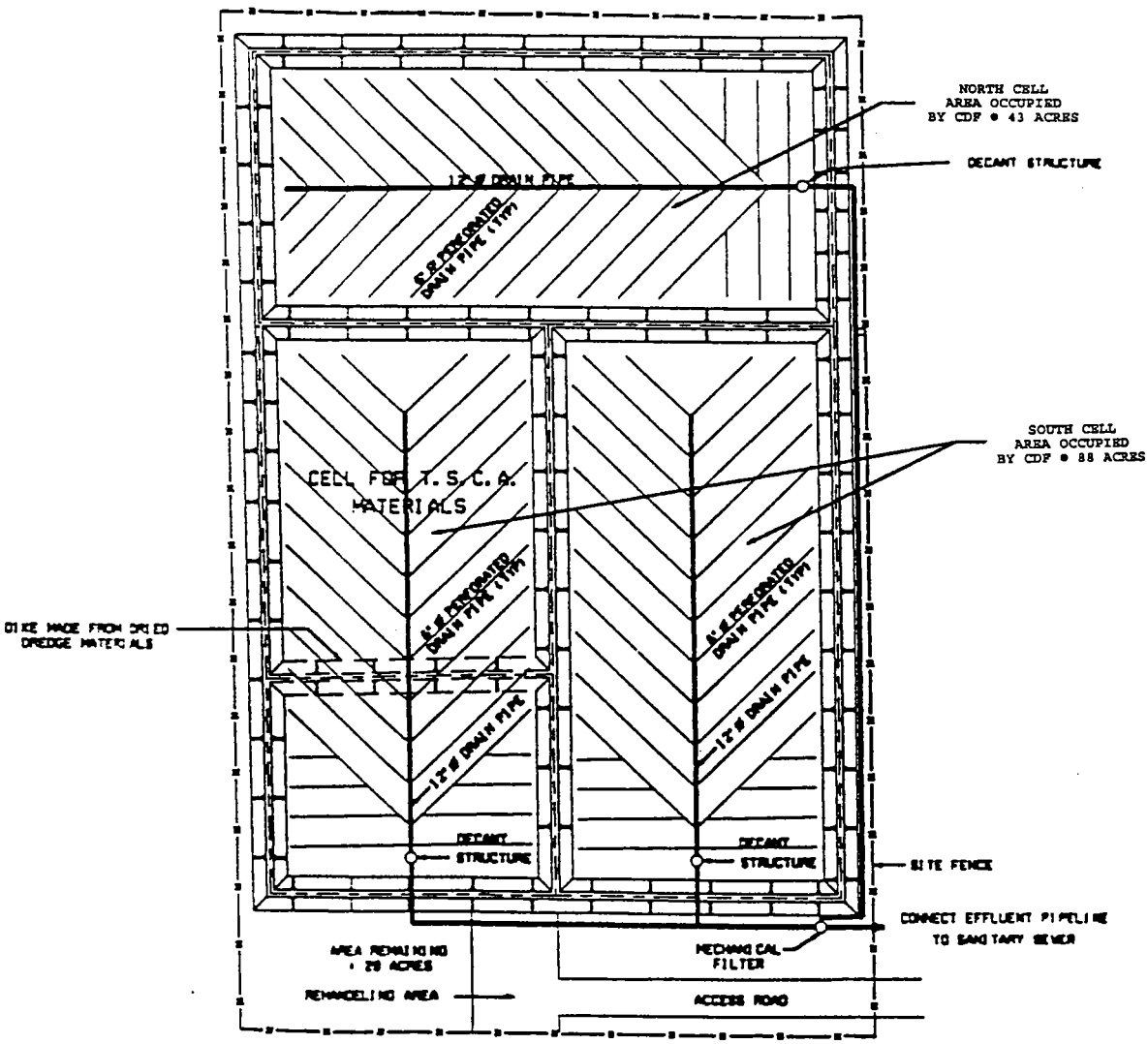
N.T.S.

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

ECI SITE
RCRA CLOSURE/CORRECTIVE ACTION
WITHOUT CDF PROJECT
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993



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SCALE IN FEET

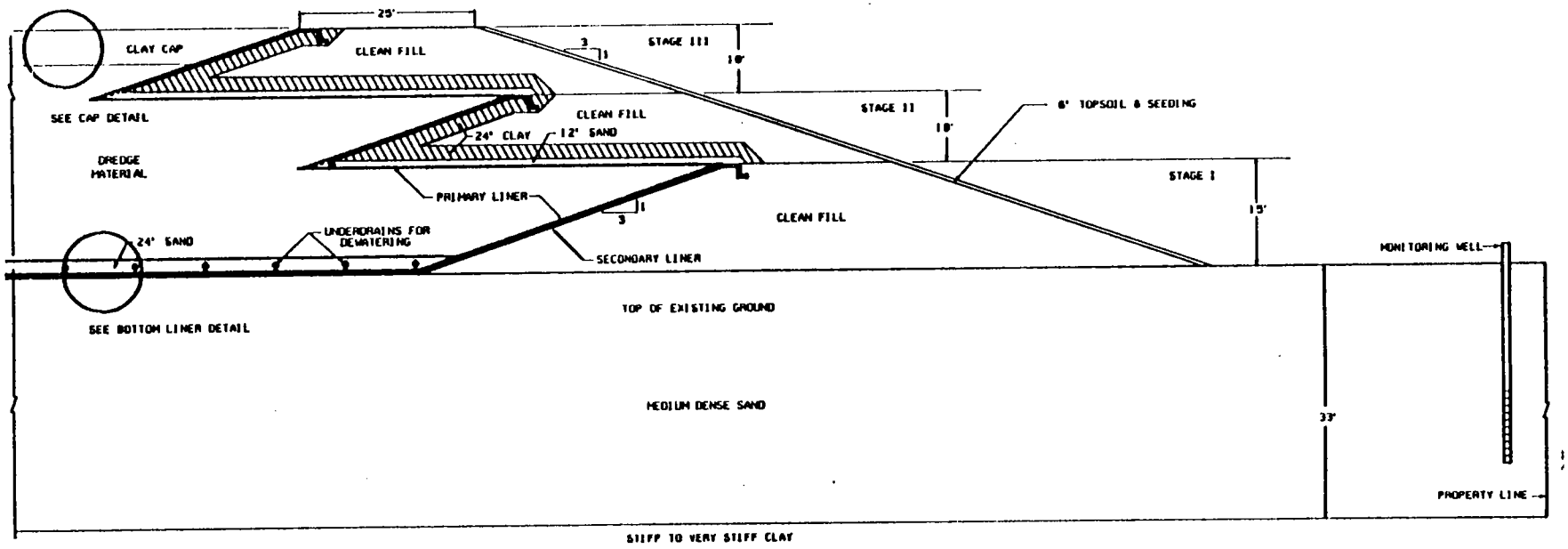
N

INDIANA HARBOR
CONFINED DISPOSAL FACILITY

GENERIC CLEAN UPLAND CDF SITE
PLAN VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993



SECTION

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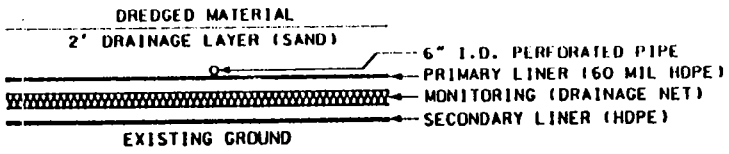
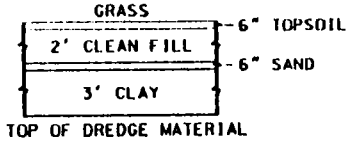


BOTTOM LINER DETAIL

N.T.S.



CAP DETAIL

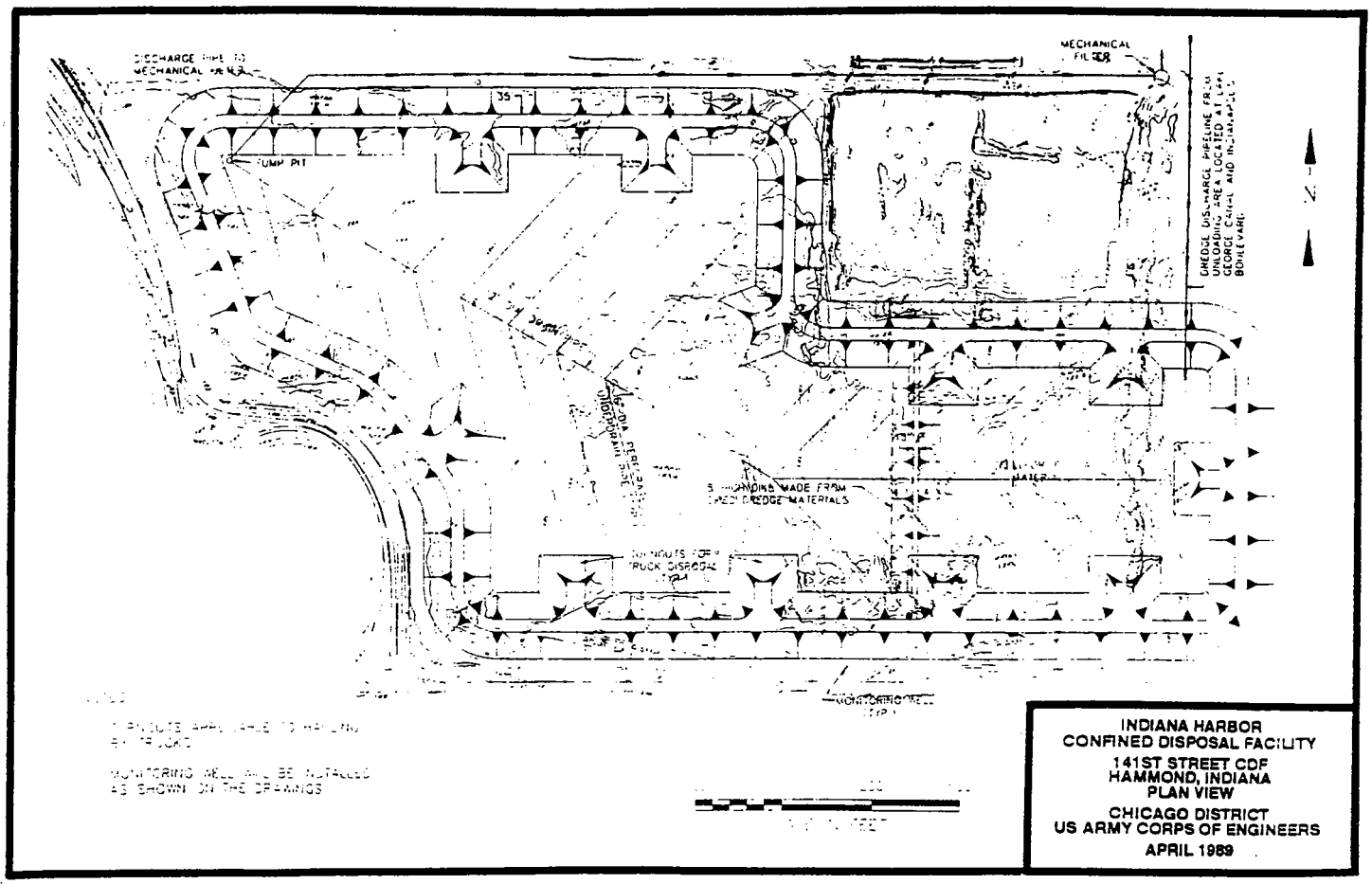
N.T.S.

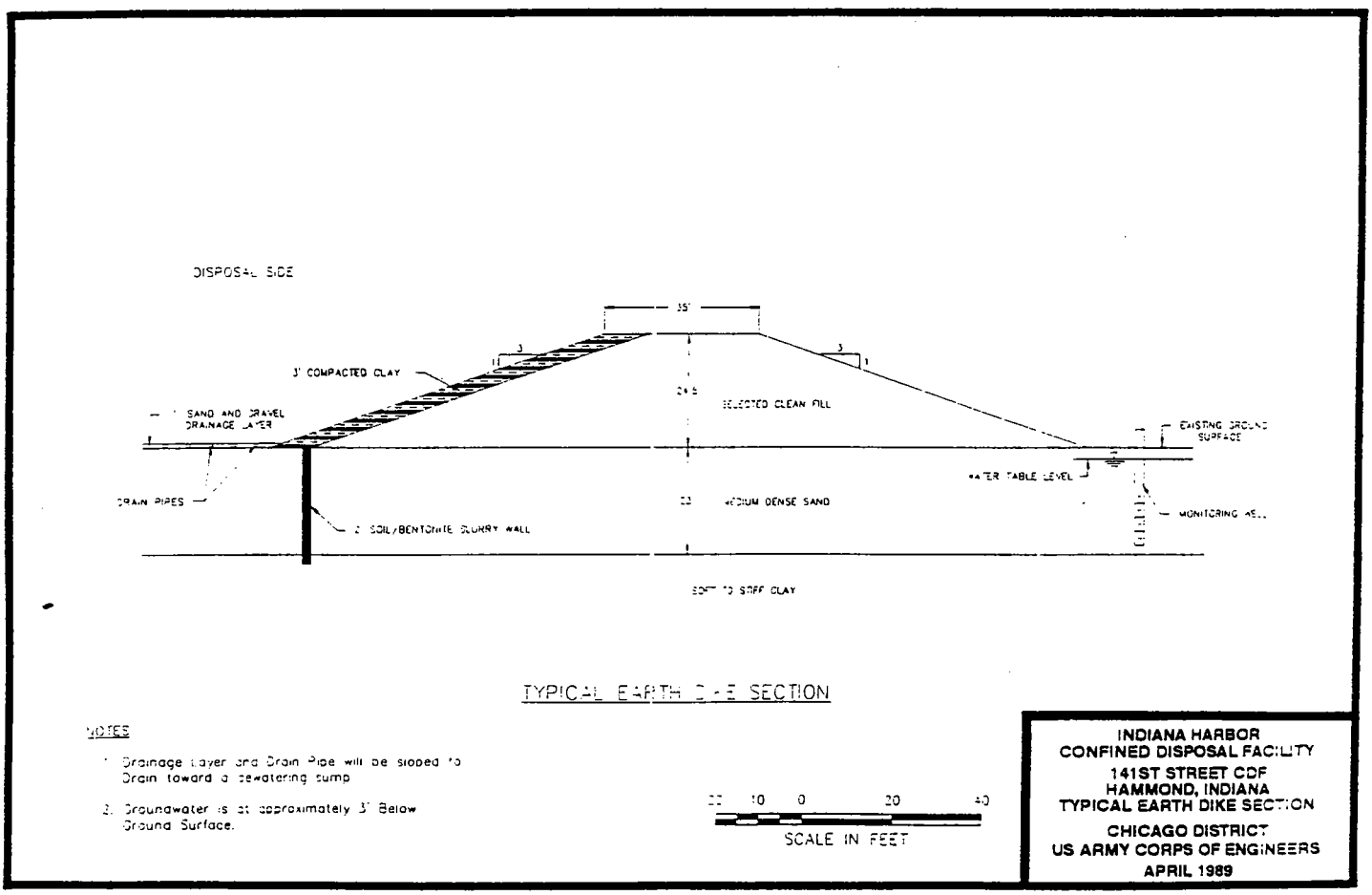
INDIANA HARBOR
CONFINED DISPOSAL FACILITY

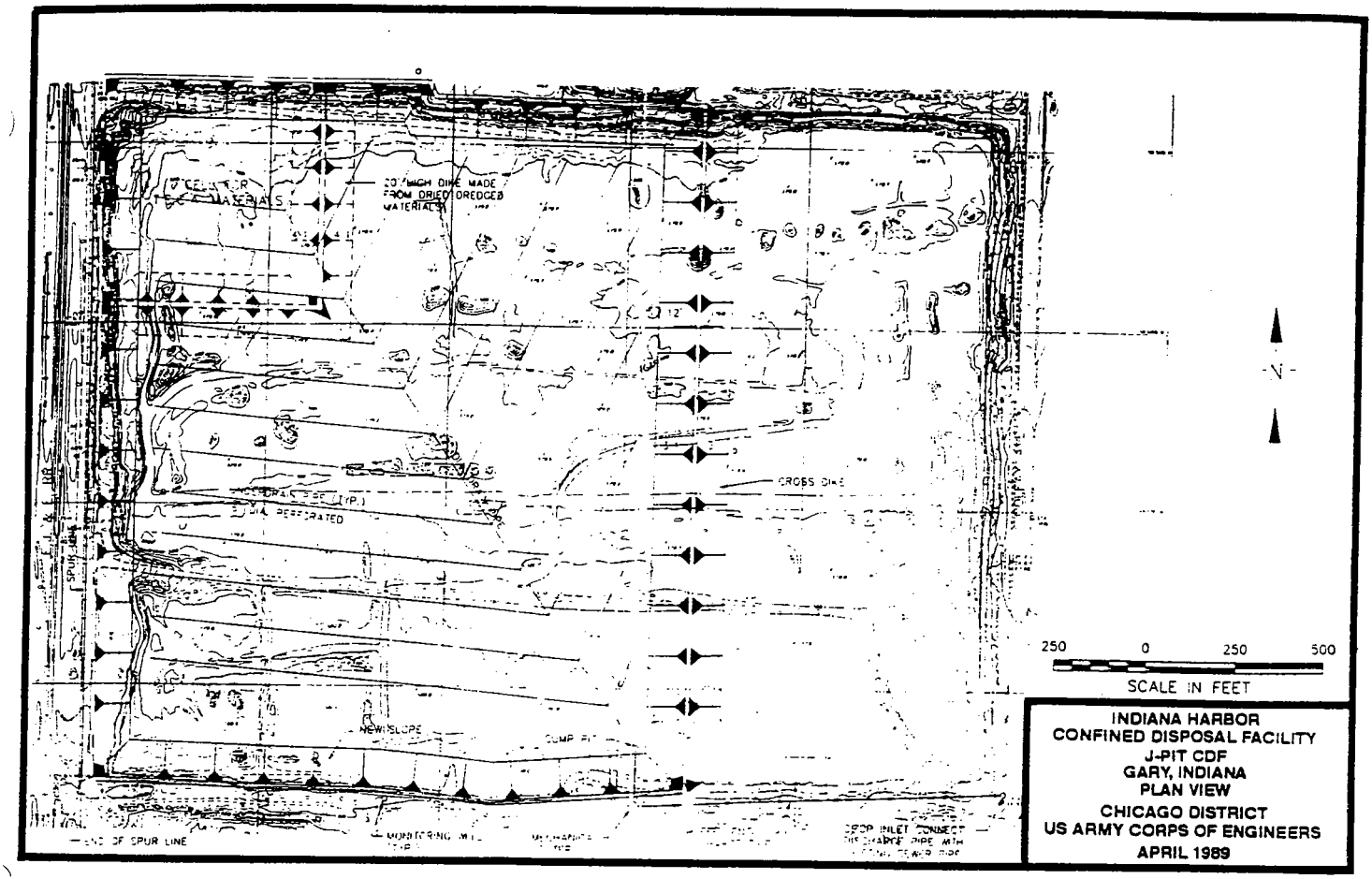
GENERIC CLEAN UPLAND CDF SITE
SECTION VIEW

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

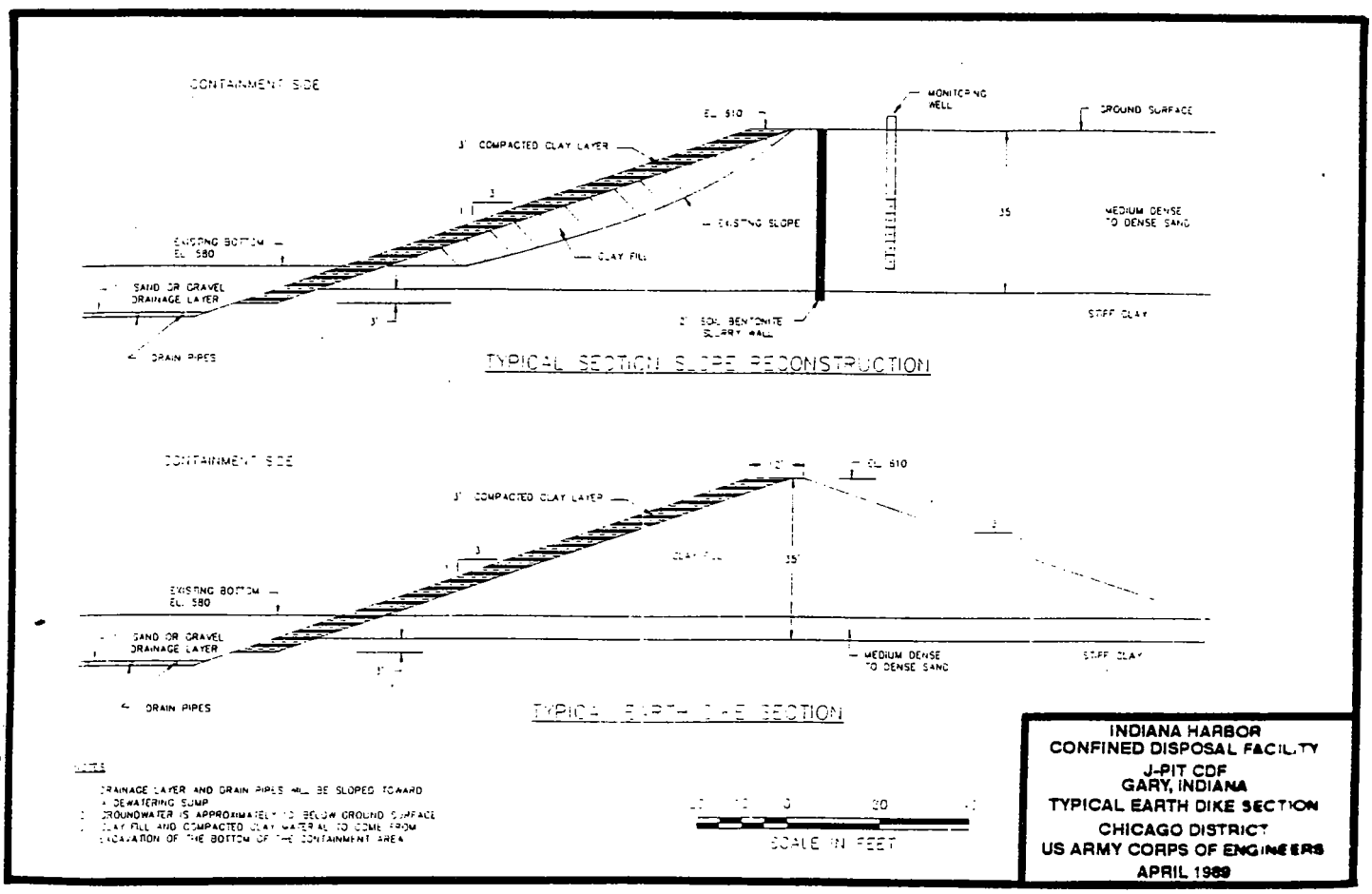
JUNE 1993


MECHANICAL FILTER
SUMP PIT
MONITORING WELL (TYP.)
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
141ST STREET CDF
HAMMOND, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

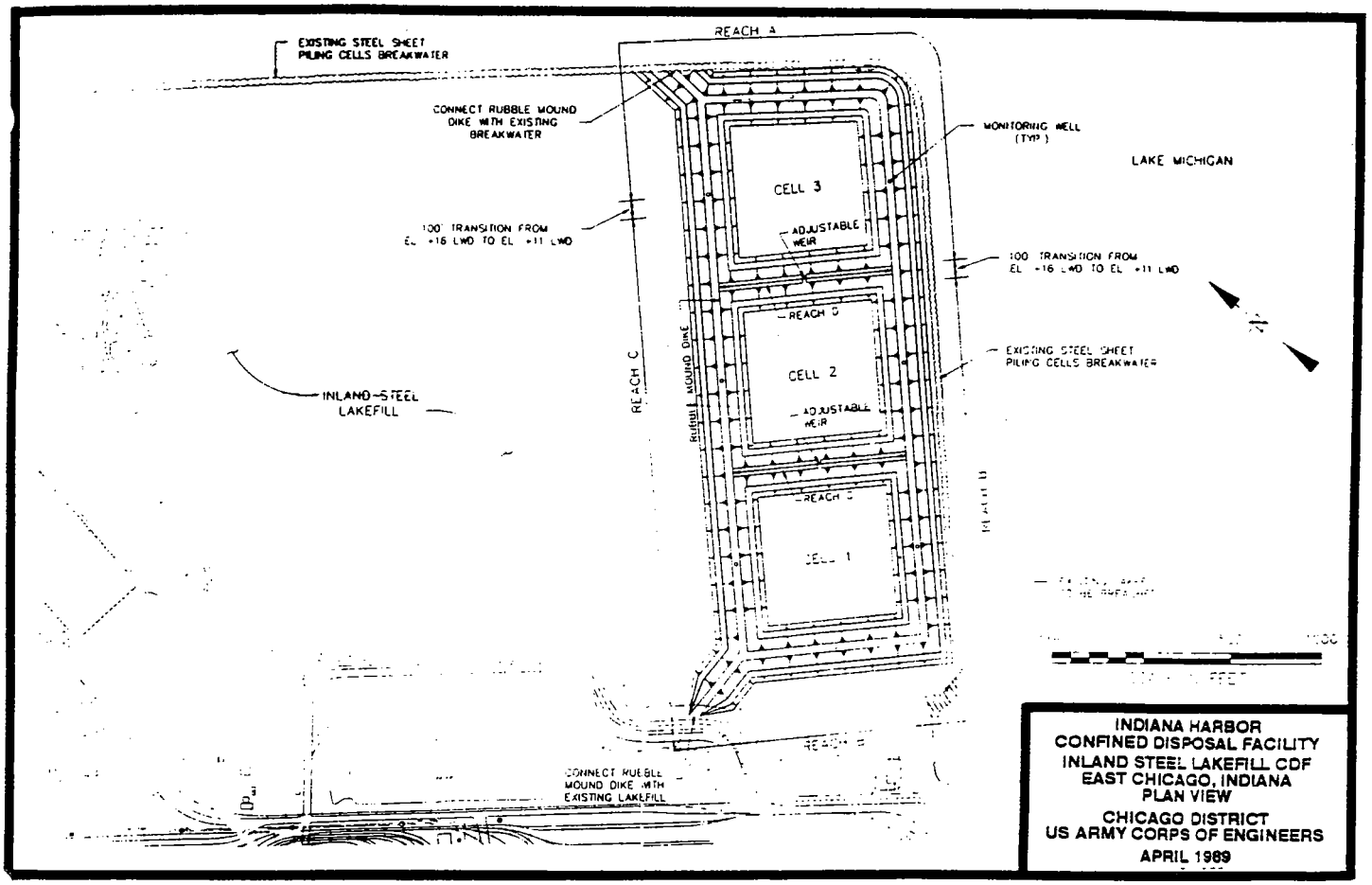

DISPOSAL SIDE
35'
3' COMPACTED CLAY
SAND AND GRAVEL DRAINAGE LAYER
SELECTED CLEAN FILL
EXISTING GROUND SURFACE
WATER TABLE LEVEL
DRAIN PIPES
MEDIUM DENSE SAND
SOIL/BENTONITE SLURRY WALL
MONITORING WELL
SOFT TO STIFF CLAY
TYPICAL EARTH DIKE SECTION
NOTES
Drainage Layer and Drain Pipe will be sloped to Drain toward a dewatering sump
Groundwater is at approximately 3' Below Ground Surface.
SCALE IN FEET
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
141ST STREET CDF
HAMMOND, INDIANA
TYPICAL EARTH DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989



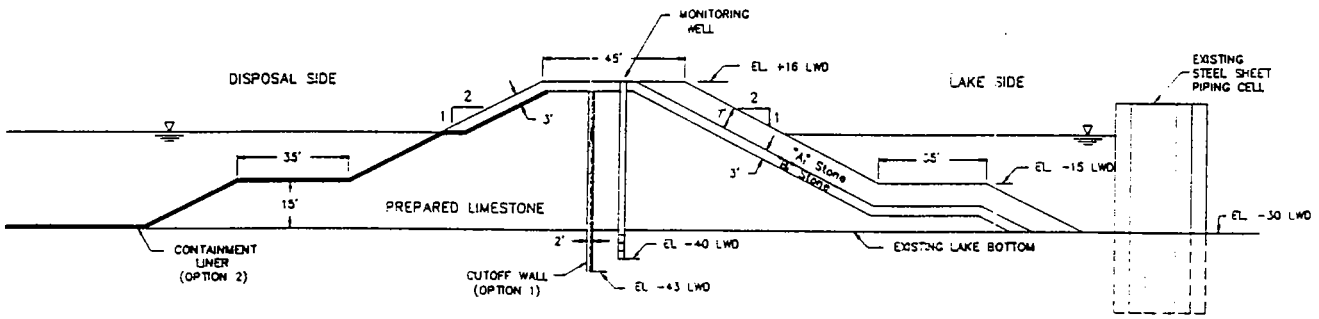
INDIANA HARBOR
CONFINED DISPOSAL FACILITY
J-PIT CDF
GARY, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989



INDIANA HARBOR
CONFINED DISPOSAL FACILITY
J-PIT CDF
GARY, INDIANA
TYPICAL EARTH DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989



INDIANA HARBOR
CONFINED DISPOSAL FACILITY
INLAND STEEL LAKEFILL CDF
EAST CHICAGO, INDIANA
PLAN VIEW
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989



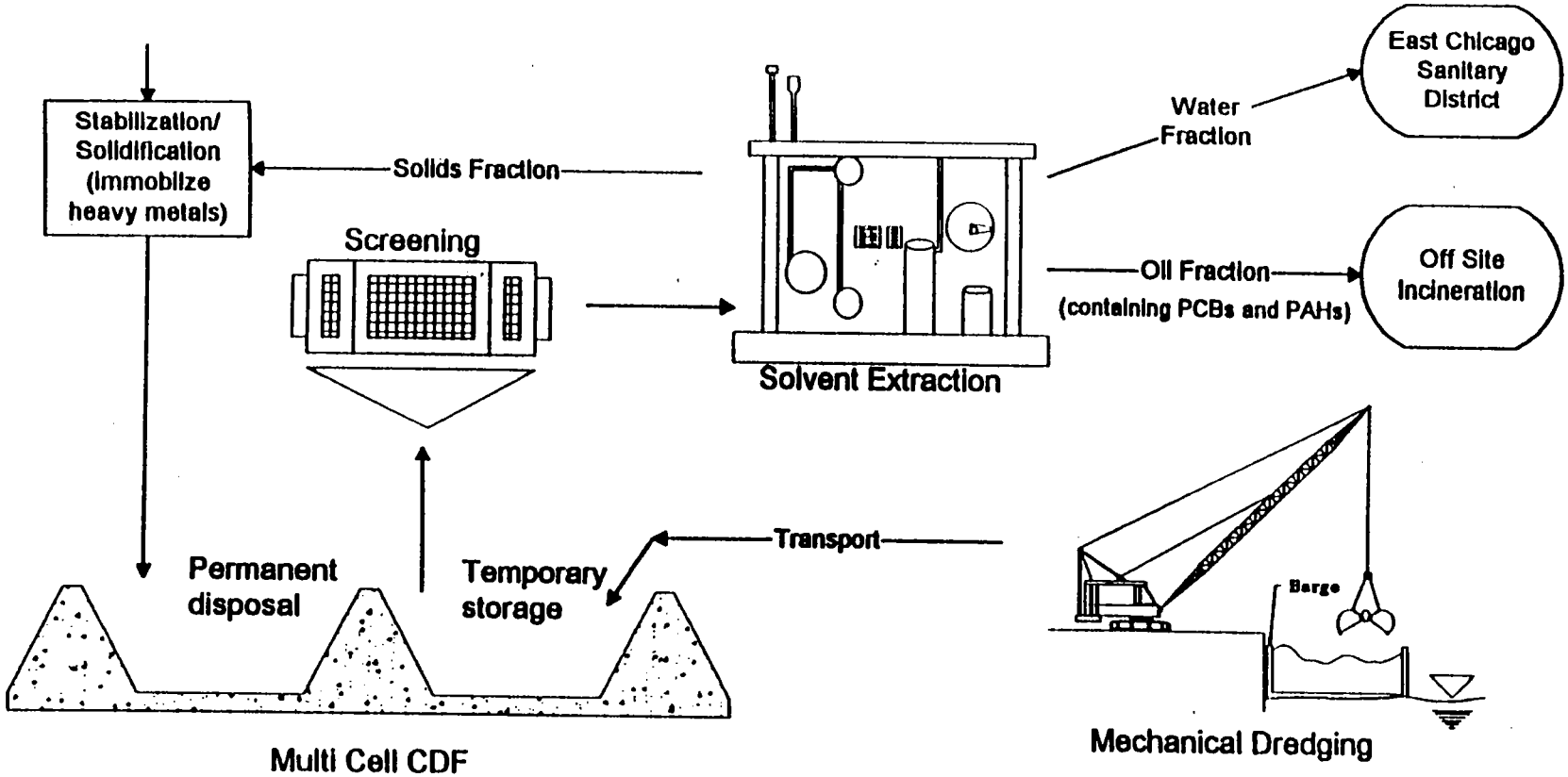
TYPICAL SECTION – REACH A

STONE SIZES

"A" STONE	1.3T	– 3T
"B" STONE	175LBS	– 600LBS

30 15 0 30 60
SCALE IN FEET

INDIANA HARBOR
CONFINED DISPOSAL FACILITY
INLAND STEEL LAKEFILL CDF
EAST CHICAGO, INDIANA
TYPICAL DIKE SECTION
CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
APRIL 1989

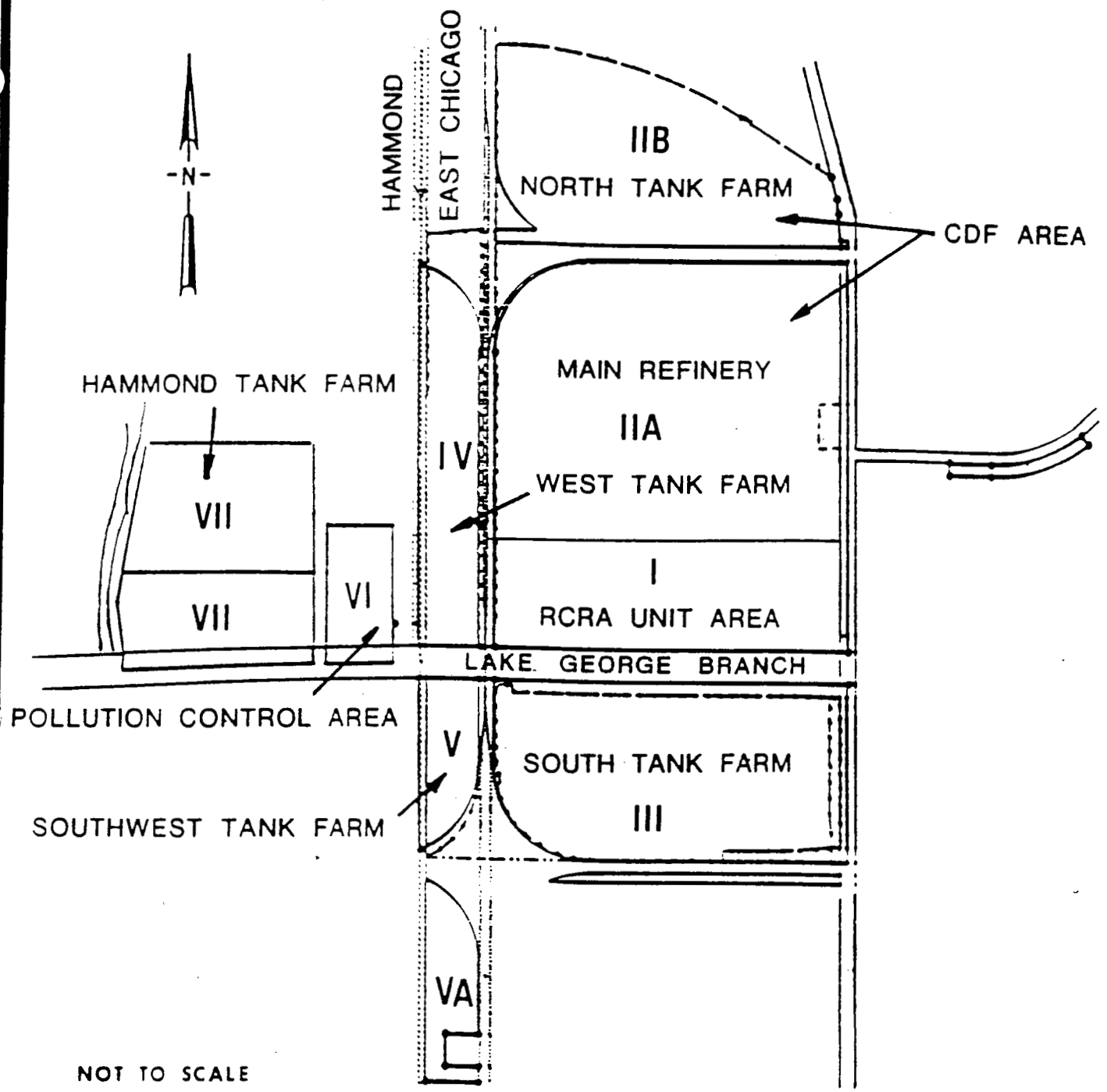


INDIANA HARBOR
CONFINED DISPOSAL FACILITY

CONCEPTUAL SEDIMENT TREATMENT
TECHNOLOGIES PLAN

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

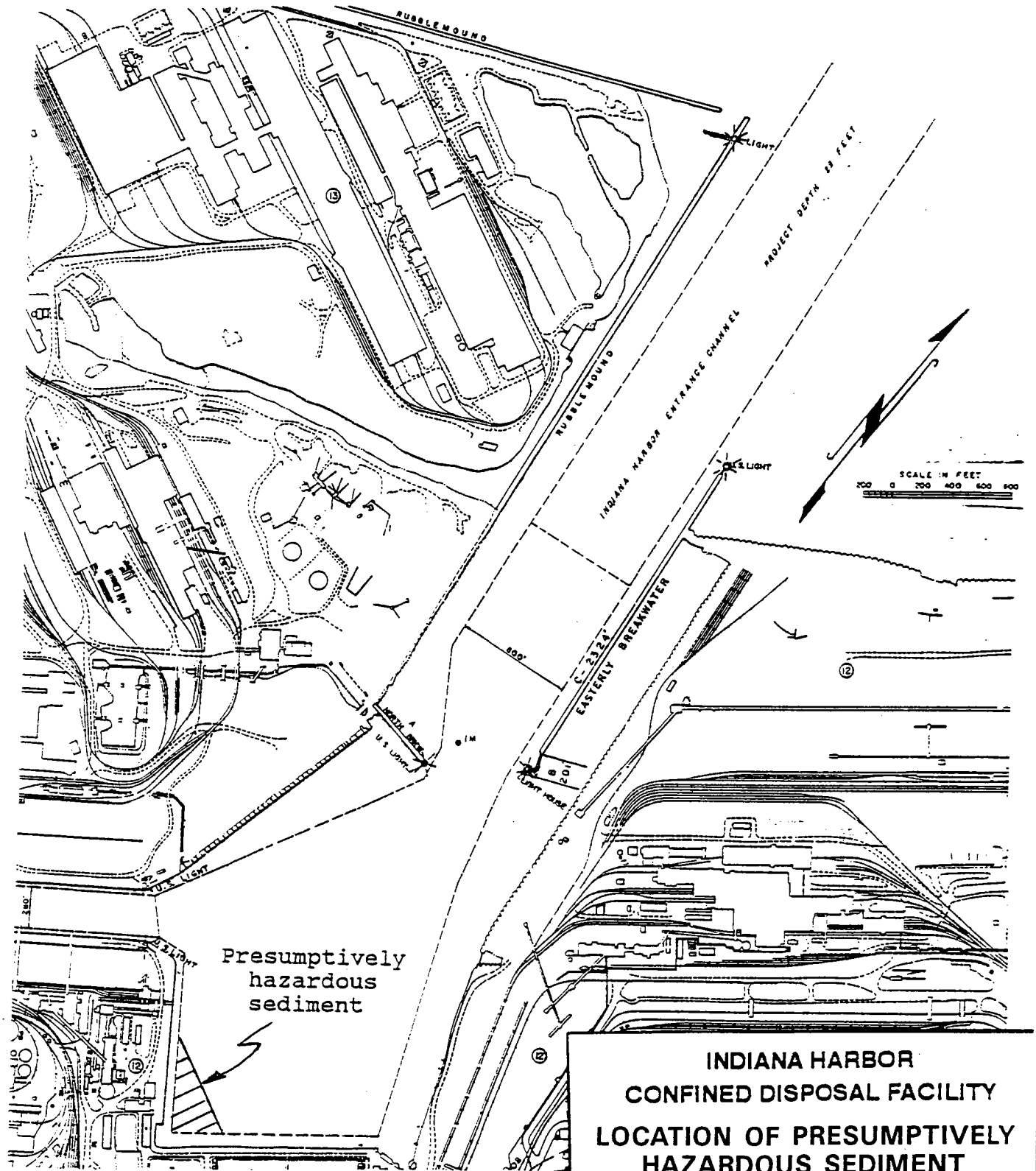
JUNE 1993



INDIANA HARBOR
CONFINED DISPOSAL FACILITY

PROPERTY PARCELS
ENERGY COOPERATIVE, INC. SITE

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS
JUNE 1993



INDIANA HARBOR
CONFINED DISPOSAL FACILITY

LOCATION OF PRESUMPTIVELY HAZARDOUS SEDIMENT

CHICAGO DISTRICT
US ARMY CORPS OF ENGINEERS

JUNE 1993

INDIANA HARBOR AND CANAL
DREDGING AND CONFINED DISPOSAL FACILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT
ATTACHMENT 1-RESPONSES TO DRAFT
EIS COMMENTS

INDIANA HARBOR AND CANAL
DREDGING AND CONFINED DISPOSAL FACILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT
ATTACHMENT 1 – RESPONSES TO DRAFT EIS COMMENTS

Table of Contents

Source of Comments	Page
7 Nov. 1995; Phillips Pipeline Company telephone call regarding questions about dredging limits and schedule pertinent to pipeline near Columbus Avenue bridge.	1
17 Nov. 1995; Marlene Dick telephone call indicating "Alright if this will not affect environment."	2
20 Nov. 1995; Lake Michigan Federation, Grand Calumet Task Force, Save the Dunes Council, Sierra Club Great Lakes Office Bulletin requesting extension of comment period from 90 to 180 days.	3
22 Nov.1995; U.S. Dept. of Commerce (Ecology and Conservation Office) letter recommending review of geodetic control information (diskettes provided) and requesting notification if any geodetic monuments will be affected.	4
28 Nov. 1996; U.S. Dept. of Transportation (Maritime Administration letter supporting the proposed dredging and CDF work.	6
1 Dec. 1995: Indiana DNR telephone call indicating that IDNR comments will arrive after 1 January 1996.	8
5 Dec. 1995; ENRON Pipeline Co. telephone call regarding questions about dredging schedule and location pertinent to pipeline near Columbus Avenue bridge.	9
21 Dec. 1995: Indiana SHPO (IDNR) letter indicating no impact to historic, architectural, or archaeological properties.	10
27 Dec. 1995; U.S. Coast Guard (Cleveland, OH) letter indicating no adverse affects on USCG facilities or operations.	11
9 Jan. 1996; U.S. EPA Region 5 letter indicating no objection to extension of DEIS comment period .	12
12 Jan. 1996; U.S. Dept. of Health and Human Services letter stating no objections and concurring with COE/EPA determinations regarding human health impacts.	14
22 Jan. 1996; U.S. Dept. of Interior (Office of Environmental Policy and Compliance) letter recommending coordination meeting with COE and USEPA to discuss natural resource trustee concerns and FWCA compliance.	15
22 Jan. 1996; U.S. Fish and Wildlife Service (Bloomington, IN) letter indicating biological opinion on impact of project on peregrine falcon to be provided before 22 May 1996.	17

Table of Contents (Cont'd)

Source of Comments	Page
1 Feb. 1996; Phillips Pipeline Co. telephone call regarding questions about dredging schedule and location pertinent to pipeline repairs needed near Columbus Avenue bridge.	18
22 Feb. 1996; Weaver Boos Consultants Inc. letter providing comments regarding CDF design, disposal of industrial waste from private users, and proposed alternative design.	19
19 March 1996; East Chicago Sanitary District letter providing questions and comments regarding 1984 sediment data, choice of CDF construction materials, disposition of effluent, changing pretreatment limits, new NPDES permit, disposition of PCBs, filtering methods, and need for COE to pursue direct discharge via NPDES permit.	24
21 March 1996; Great Lakes Sport Fishing Council letter indicating no objections to the proposed action.	29
28 March 1996; Indiana Dept. of Environmental Management letter indicating that "IDEM supports the Corps' conclusions."	30
28 March 1996; U.S. Dept. of Commerce (NOAA) letter providing questions and comments regarding rights of United States to pursue natural resource damages (as in "natural resource trustee," as discussed by Dept. of Interior and USFWS), comparison of dredging methods, exposure of contaminated sediments below authorized dredging depths, etc.	32
28 March 1996; East Chicago Waterway Management District letter providing questions regarding role of East Chicago Waterway Management District, cost to CDF users, permits, liability, independent review of design and construction, etc.	36
29 March 1996; LTV Steel Company letter indicating disagreement with cost allocation procedure recommended by COE.	42
29 March 1996; Inland Steel Flat Products letter providing question regarding dredging-volume estimates for Inland Steel docks.	44
29 March 1996; U.S. Dept. of Transportation (Maritime Administration) letter concurring with COE/EPA choice of ECI site, and indicating that "dredged materials should under no circumstances be considered solid wastes."	46
29 March 1996; Amoco Petroleum Products (Whiting) letter requesting information on impacts to Amoco's groundwater remediation systems and on dredging schedule.	48
1 April 1996; U.S. Dept. of Interior (Office of Policy and Compliance) letter providing nineteen pages of comments and questions regarding comparison of dredging methods, status of consent decrees, effluent treatment, impacts to water quality, treatment of PCB hot spots, fish and wildlife impacts, endangered species impacts, FWCA compliance, "natural resource trustee" issues, etc.	50
1 April 1996; ARCO Products Company letter containing questions regarding dredging limits, sedimentation rates, sources of contamination, environmental benefits, cumulative impacts, CDF design and construction, CDF operation, and particularly cost allocation.	68

Table of Contents (Cont'd)

Source of Comments	Page
1 April 1996; U.S. EPA Region 2 letter forwarding questions regarding dredging below authorized depths, exposure of contaminated sediments below authorized depths, cumulative impacts, disposition of PCBs, TSCA requirements, recovery of "free phase product" (oil), and RCRA requirements.	75
1 April 1996; Indiana DNR letter regarding questions about construction permit, PCBs. USEPA/COE conflict over status of dredged material, exposure of contaminated sediments below authorized dredging depth, impacts on wildlife and endangered species, need for hazing.	78
1 April 1996; Lake Michigan Federation, Grand Cal Task Force, Save the Dunes Council, Great Lakes Office of Sierra Club letter transmitting 35-page report prepared by a technical advisory committee; several general recommendations; detailed questions about sediment, treatment technologies, dredging techniques, CDF design, the role of the Waterway Management District, cost sharing, local sponsorship; recommendations for public involvement program.	81
16 September 1996; U.S. Fish and Wildlife Service letter transmitting a 117-page Fish and Wildlife Coordination Act report.	87

CONVERSATION RECORD

TIME 10:50 AM DATE 7 NOV. 1995

TYPE [ ] VISIT [ ] CONFERENCE [X] TELEPHONE [X] INCOMING [ ] OUTGOING

ROUTING: NAME/SYMBOL | INT

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Jeff Hodson

ORGANIZATION (Office, dept., bureau, etc.): Phillips Pipeline Company

TELEPHONE NO.: 219-397-6666 rxt. 304

SUBJECT: dredging Indiana Harbor Canal (Grand Calumet Branch)

SUMMARY: Mr. Hodson said that his firm has a pipeline about 50' north of the Columbus Avenue bridge; the pipeline is more or less resting on the bottom; it is actually suspended above the bottom in places. ENRON Pipeline Company has a pipeline (in similar condition) about 60/ north of the same bridge.

Mr. Hodson wanted to know when dredging might be done in his area; I was advised by Rich Carlson that it would be done after 2000, probably after 2004. Mr. Hodson wondered whether he should bother to rebuild the pipeline now, or wait until later.

Mr. Hodson said that there is little or no boat traffic near the Columbus bridge; I sent him a copy of the appendices ; he already had the CMP/DEIS.

ACTION REQUIRED

none

NAME OF PERSON DOCUMENTING CONVERSATION: Keith Ryder CENCC-PD-S

SIGNATURE: Keith D. Ryder

DATE: 7 Nov. 1995

ACTION TAKEN

none

SIGNATURE: Keith D. Ryder

TITLE: archaeologist CENCC-PD-S

DATE: 7 Nov. 1995

50271-101 ☆U.S. G.P.O. 1983-424-378 CONVERSATION RECORD OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

The Federal channel in the area of the Columbus St. bridge extends under the bridge to the centerline of the roadway. In this area the channel extends down to -22 LWD, which is approximately 24 feet below the water surface in the channel. From the description the Phillips pipeline is in the Federal channel. The current plan has dredging scheduled in that area for 2004. However, every effort will be made to avoid relocating this pipeline by limiting the depth of dredging in the vicinity of the pipeline.

Received 19 Nov. 79

In response to
Booklet received
It will be
alright if
this will not
affect
environment

Marlen
Dick

All environmental impacts are documented in the Draft Environmental Impact Statement, Comprehensive Management Plan and appendices.

Bulletin #1
Dredging of the Indiana Harbor and Ship Canal

From the Lake Michigan Federation, Grand Calumet Task Force, Save the Dunes Council and the Sierra Club Great Lakes Office

Position Statement on the Draft Environmental Impact Statement

We commend the Environmental Protection Agency, the Army Corps of Engineers and the Indiana Department of Environmental Management for finally developing a plan and issuing a Draft Environmental Impact Statement (EIS) for this much needed project.. Soon work should begin to remove the largest accumulation of contaminated sediments in the Great Lakes. However, the complicated project is projected to take 30 years, plus another 30 years of monitoring after the Confined Disposal Facility (CDF) is closed. The EIS is 900 pages long!

We feel certain this project will set precedents and serve as a model for other dredging projects throughout the Great Lakes. For these reasons, the Lake Michigan Federation, the Grand Cal Task Force, the Save the Dunes Council, and the Sierra Club Great Lakes Office are working together to make certain that all aspects of the project are thoroughly scrutinized and to encourage maximum public involvement in review of the project as it is described in the EIS. We need your help.

We need your help first to request extension of the public comment period from 90 to 180 days. Such an extension will give our four groups time to assemble a panel of experts that can help us review the proposed plan in detail. It will also give us time to inform you and others about results of our review. The aim is to assist everyone to submit more adequate comments on the EIS.

Send your request for extension of the public comment period to 180 days to the following address:
LTC. Robert E. Slockbower
District Engineer, Chicago District
Army Corps of Engineers
219 S Dearborn St.
Chicago, Ill. 60606

The following principles will be applied in the expert review :

—Public health and the environment should be protected during the dredging and long term disposal and/or treatment of the contaminated sediments that are removed.

—The project should provide lasting benefit to water quality and the environment of the Grand Calumet River, the Indiana Harbor and Ship Canal and Lake Michigan.

—The design, construction and operation of the project should be integrated into long range remediation plans for the entire watershed of the Grand Calumet River.

—Adequate funding should be available for the entire life of the project.

—Flexibility should be provided so that new treatment technologies can be applied that may become available in the future.

—Opportunity should be given for periodic public review of the progress and status of sediment removal and environmental protection throughout the project.

Following are samples of specific questions that will be addressed in the review and comments developed by the four sponsoring groups:

1. How will spillage and release of contaminants into the air, groundwater and surface water be controlled during dredging, transport, and disposal of sediments?

2. How will health be protected for the schools and neighborhood surrounding the disposal site?

3. How will leachate be collected, treated and disposed of?

4. Who will be responsible for monitoring effects on the environment during the project and during the following 30 years after completion of the project?

For more information about the cooperative review project, contact:
Dorreen Carey, Grand Calumet Task Force 219-[illegible]
Tom Anderson, Save the Dunes Council, 219-[illegible]
Steve Skavroneck, Lake Michigan Federation, 312-939-0838
Brett Hulsey, Sierra Club Great Lakes Office, 608-257-4994
To obtain a copy of the summary description of the Dredging Project for the Indiana Harbor and Ship Canal, call: Carol Massar, Army Corps of Engineers Chicago Office 312/353-6400 ex. 1300.

Comment period was extended.

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

November 22, 1995

Mr. Robert E. Slockbower, P.E.
Lieutenant Colonel, U.S. Army
District Engineer, Dept. of the Army
Chicago District, Corps of Engineers
111 North Canal Street
Chicago, IL 60606-7206

Dear Mr. Slockbower:

Enclosed are comments on the Draft Environmental Impact Statement for Proposed Maintenance Dredging and Construction and Operation of a Confined Disposal Facility at Indiana Harbor and Canal, at East Chicago in Lake County, Indiana. We hope our comments will assist you. Thank you for giving us an opportunity to review the document.

Sincerely,

Donna S. Wieting
Acting Director
Ecology and Conservation Office

Enclosure

4

There are no geodetic monuments at the ECI site.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
National Geodetic Survey
Silver Spring Maryland 20910-3282

NOV 16 1995

MEMORANDUM FOR: Donna Wieting
Ecology and Environmental Conservation Office
Office of the Chief Scientist

FROM: for Captain Lewis A. Lapine, NOAA
Director, National Geodetic Survey

SUBJECT: DEIS-9511-01 --Proposed Maintenance Dredging and Construction and Operation of a Confined Disposal Facility at Indiana Harbor and Canal, at East Chicago in Lake County, Indiana

The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

All available geodetic control information about horizontal and vertical geodetic control monuments in Lake County is provided on the diskettes accompanying this memorandum. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project include the cost of any relocation(s) required.

For further information about these monuments, please contact John Spencer, NOAA, NGS, N/NGS, 1315 East-West Highway, Silver Spring, Maryland 20910, telephone 301-713-3169, fax 301-713-4175.

Attachments

There are no geodetic monuments at the ECI site.

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U.S. Department
of Transportation
Maritime
Administration

Great Lakes Region

2860 South River Road
Suite 185
Des Plaines, IL 60018-2413
(708) 298-4535

Robert E. Slockbower, P.E.
Lieutenant Colonel, U.S. Army District Engineer
Chicago District, Corps of Engineers
Planning Division, Environmental and Social Analysis Branch
111 North Canal Street
Chicago, IL 60606-7206

November 28, 1995

Dear Lieutenant Colonel Slockbower:

The Great Lakes Region office of the Maritime Administration-Department of Transportation offers support for your Comprehensive Management Plan, Indiana Harbor and Canal Maintenance Dredging and Disposal Activities.

Comments are noted.

In accordance with the Maritime Administration's mission to promote the development of efficient U.S. ports and enhanced mobility of freight, we embrace your plan to eliminate the present restraining conditions to waterborne commerce. Maritime transit remains a highly efficient mode of transport as highlighted by the following points:

a. Water transit is by far the most fuel efficient form of transportation when compared to haulage of cargo by either rail or highway modes.

b. Water carriers move bulk commodities more safely than on rail or highway by having the fewest numbers of incidents of any surface mode.

c. Cost efficiencies of marine transport provide important economic advantages to the industries utilizing this form of transportation.

d. Air and noise pollution from maritime transit is far less than truck emissions.

e. Transit via water has few congestion problems and seldom adds them to busy urban areas.

Our Washington, D.C., Office of Environmental Activities, will provide a detailed written review of your plan before the February 1 closing date.

Sincerely,

Floyd Miras
Transportation Specialist

CONVERSATION RECORD

TIME ? AM DATE 1 DEC. 1995

TYPE
☐ VISIT ☐ CONFERENCE ☑ TELEPHONE
☑ INCOMING
☐ OUTGOING

ROUTING
NAME/SYMBOL INT

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Keith Poole

ORGANIZATION (Office, dept., bureau, etc.): IDNR (Indiana)

TELEPHONE NO: 317-232-8163

SUBJECT: comments on Indiana Harbor DEIS

SUMMARY: Poole and Steve Josy are circulating DEIS to others for review; their comments should come to us after 1 Jan. 1996.

Comment noted.

ACTION REQUIRED

NONE

NAME OF PERSON DOCUMENTING CONVERSATION: Keith Ryder

SIGNATURE: [signature]

DATE: 1 Dec. 1995

ACTION TAKEN

NONE

SIGNATURE: [signature]

TITLE: archaeologist

DATE: 1 Dec. 95

50771-101 ☆ U.S. G.P.O. 1983-424-378 CONVERSATION RECORD OPTIONAL FORM 271 DEPARTMENT OF COMMERCE

CONVERSATION RECORD

TIME 10 AM DATE 5 DEC. 1995

TYPE
☐ VISIT ☐ CONFERENCE ☑ TELEPHONE
☑ INCOMING
☐ OUTGOING

Location of Visit/Conference:

ROUTING
NAME/SYMBOL INT

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: JACK GUINN

ORGANIZATION (Office, dept., bureau, etc.): ENRON PIPELINE CO.

TELEPHONE NO: 402-398-7715

SUBJECT: INDIANA HARBOR DREDGING

SUMMARY

ENRON has an exposed pipeline in the Grand Calumet Branch of the canal, just north of the Columbus Drive bridge (adjacent to Phillips Pipeline Company's pipeline)

ENRON (like Phillips) wants to re-cover their pipeline. Guinn asked whether COE dredging would necessitate relocation of the pipeline; he asked whether Chicago District would work with ENRON (and Phillips) to coordinate dredging schedule with the need to repair or re-cover the pipelines.

I said that the Corps would try to work this out with ENRON and Phillips.

ACTION REQUIRED

NOTIFY RICH CARLSON;

NAME OF PERSON DOCUMENTING CONVERSATION: Keith Ryder PD-S

SIGNATURE: Keith G. Ryder

DATE: 5 Dec. 95

ACTION TAKEN

CARLSON NOTIFIED; HE'LL HAVE JEFF HEATH CONTACT ENRON.

SIGNATURE: Keith G. Ryder

TITLE: archaeologist

DATE: 7 Dec. 95

50271-101 ☆U.S. G.P.O. 1984-424-178 CONVERSATION RECORD OPTIONAL FORM 271 (...) DEPARTMENT OF DEFENSE

The Federal channel in the area of the Columbus St. bridge extends under the bridge to the centerline of the roadway. In this area the channel extends down to -22 LWD, which is approximately 24 feet below the water surface in the channel. From the description the Phillips pipeline is in the Federal channel. The current plan has dredging scheduled in that area for 2004. However, every effort will be made to avoid relocating this pipeline by limiting the depth of dredging in the vicinity of the pipeline.

INDIANA DEPARTMENT OF NATURAL RESOURCES

PATRICK R. RALSTON, DIRECTOR

Division of Historic Preservation
and Archaeology
402 W. Washington St., Rm. 274
Indianapolis, Indiana 46204
317-232-1646

December 21, 1995

Robert E. Slockbower, P.E.
Lieutenant Colonel, U.S. Army
District Engineers
Department of the Army
Corp of Engineers, Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Mr. Slockbower:

We have reviewed the proposed Comprehensive Management Plan for Indiana Harbor and Canal maintenance and dredging and disposal activities (DNR #5794) in Lake County, Indiana.

As long as the project areas remain within areas previous construction, no known historical, architectural, or archaeological sites listed in or eligible for inclusion in the National Register of Historic Places will be affected by this project.

If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al.) and, additionally, state law (Indiana Code 14-21-1), require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within two (2) business days.

We appreciate the opportunity to be of service.

Very truly yours,

Daniel J. Foguth

Patrick R. Ralston
State Historic Preservation Officer

PRR:SBH:MMD:smg

cc: Steve Jose

Comments are noted.

10

EQUAL OPPORTUNITY EMPLOYER

U.S. Department of Transportation
United States Coast Guard

Commanding Officer
U.S. Coast Guard
Civil Engineering Unit

1240 E. 9th Street
Cleveland, OH 44199-2060
(216)-522-3934

11000
DEC 27 1995

LTC Robert Slockbower, District Engineer
Chicago District, Corps of Engineers
111 North canal Street
Chicago, IL 60606-7206

Dear Colonel Slockbower:

We have reviewed your October 19, 1995 letter that contained an Environmental Impact Statement (EIS) and a Feasibility Report (FR) for maintenance dredging of Indiana Harbor and Canal in Indiana.

These projects should have no adverse affects on Coast Guard facilities or operations in the area.

Comment is noted.

Thank you for the opportunity to comment on your project, EIS, and FR. Should you have any questions please call Gary Nelson at (216) 522-3934 ext 635.

Sincerely,

R. A. KOEHLER
Commander
U. S. Coast Guard

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JAN 09 1998

REPLY TO THE ATTENTION OF

Lieutenant Colonel Robert E. Slockbower
District Engineer
United States Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Lieutenant Colonel Slockbower:

I have received copies of letters to the United States Army Corps of Engineers (ACE) requesting that the comment period for the Draft Environmental Impact Statement (DEIS) for the proposed dredging of the Indiana Harbor and Ship Canal be extended an additional 60 to 90 days.

12 The copies of the letters of request which we have received are from United states Congressman Peter J. Viscloskey, who represents the project area; Mr. Don Penne, Regional Environmental Officer, Office of the Secretary, United States Fish and Wildlife Service and representatives of four environmental activist groups in and around the project area.

The ACE Chicago District and Region 5 executed a Memorandum of Understanding in 1991 to assist in the preparation of the EIS and to establish the United States Environmental Protection Agency (EPA) as a Cooperating Agency. Because of this present agreement, EPA would concur with the ACE if it chooses to extend the comment period to allow the Congressman and his staff, other governmental units, citizen activists and the general public more time to review the DEIS for the proposed project. Please note that my staff and I agree that the comment period be extended for only 60 days.

Comments are noted.

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If you or your staff have any questions about this letter or if you need any additional information please contact Robert Tolpa, the EPA project manager at (312)886-6706.

Sincerely yours,

Valdas V. Adamkus
Regional Administrator

cc: Jeanne M. Fox, Regional Administrator
EPA, Region 2

DEPARTMENT OF HEALTH & HUMAN SERVICES

Centers for Disease Control
and Prevention (CDC)
Atlanta GA 30341-3724
January 12, 1996

Keith Ryder, EIS Coordinator
Chicago District
U.S. Army Corps of Engineers
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Mr. Ryder:

We have completed our review of the Draft Environmental Impact Statement (DEIS) for the Indiana Harbor and Canal Dredging and Confined Disposal Facility. We are responding on behalf of the U.S. Public Health Service.

We note that maintenance dredging will prevent the release of hundreds of thousands of pounds of contaminated sediments into Lake Michigan. Continued discharge of sediments from Indiana Harbor and Canal into Lake Michigan under the no action alternative would have a long-term adverse impact. We concur that the proposed maintenance dredging and construction of a confined disposal facility (CDF) to contain the accumulated sediment and future maintenance dredging will have benefits that outweigh the unavoidable short term local adverse impacts caused by dredging. 14

Comments are noted.

We have reviewed the Draft EIS for potential adverse impacts on human health, and we believe related issues have been adequately addressed in this draft document. We were pleased to note that in addition to the human health risk analysis, sponsors will use air monitoring equipment and monitoring data will be evaluated to determine if sediment management practices should be altered or amended. These procedures should increase the effectiveness of planned mitigative efforts and help ensure occupational and public health and safety.

Thank you for the opportunity to review and comment on this draft EIS. We wish to commend the writers for a concise and informative document. Please ensure that we are included on your mailing list to receive a copy of the Final EIS, and future EIS's which may indicate potential public health impact and are developed under the National Environmental Policy Act (NEPA).

Sincerely yours,

Kenneth W. Holt

Kenneth W. Holt, M.S.E.H.
Special Programs Group (F29)
National Center for Environmental
Health

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Custom House, Room 244
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2904

IN REPLY REFER TO

January 22, 1996

ER 95/798

Lt. Colonel Robert E. Slockbower
District Engineer
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Lt. Colonel Slockbower:

This regards your December 21, 1995 letter granting us a 60-day extension to comment on the Feasibility Report and Draft Environmental Impact Statement (EIS) for the Indiana Harbor Canal Maintenance Dredging and Disposal Activities. We appreciate the Corps extending the deadline, and we hope that additional Federal furlough will not affect our efforts to identify and resolve our concerns. As mentioned in previous letters, the need for a meeting to discuss this project is critical, and coordination within the Department of the Interior (Department) has been necessary to make such a meeting as productive as possible. This letter is intended to categorize the major issues so that collectively we can quickly take actions necessary for resolution. Our staff continues to develop specific comments on the Draft EIS and these should be available soon.

A coordination meeting was held February 14, 1996. (Attendees from COE, DOI, USFWS, and USEPA.)

Let us clearly state that we fully recognize the potential benefits to the environment from a well-conceived dredging project. Our intent is to build upon and expand the benefits through stronger compliance with NEPA, the Fish and Wildlife Coordination Act, the Endangered Species Act, and our authorities as a natural resource trustee under the Oil Pollution Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The Fish and Wildlife Coordination Act Compliance

In fiscal year 1989, the Corps and the Fish and Wildlife Service (Service) entered into an agreement for the Service to prepare a Fish and Wildlife Coordination Act (FWCA) 2(b) report for this project. That report was drafted, but never finalized because the EIS was not completed that year, and the Interagency Agreement expired. In the 7 years that have transpired since the Draft FWCA report was prepared, descriptions of both the project and the biological resources of this area have changed considerably. The Corps has not requested that the 1989 draft FWCA 2(b) report be revised to reflect these changes. Additionally, the FWCA requires that the Service seek the concurrence of the State natural resource agency, in this case the Indiana Department of Natural Resources (IDNR), on the FWCA 2(b) report. We believe updating and completing the draft FWCA 2(b) report would have greatly assisted the Corps in preparing a more complete and accurate EIS, and would have reduced or eliminated many of the comments we now are preparing for the Feasibility Report and DEIS . The Service is willing to be flexible in an arrangement to provide the Corps with an updated and final FWCA 2(b) report. Incorporation of the recommendations of that report would minimize the adverse effects of the project on fish and wildlife resources.

The final FWCA was provided by the USFWS by letter dated September 16, 1996. Information from this report has been incorporated into the final environmental impact statement on this project.

Endangered Species Act Compliance

The Service is coordinating the formal Section 7 consultation for the peregrine falcon with the Corps Planning Division. This consultation was initiated January 8, 1996.

Comment noted.

The Department's Natural Resource Trustee Responsibilities

Under the Oil Pollution Act, CERCLA, and as described in the National Contingency Plan (NCP) at 40 CFR §300.600, the Department is a designated natural resource trustee for certain endangered species, migratory birds, certain anadromous fish, and lands managed by the Department. One of the authorities granted through this legislation is the responsibility to consider Natural Resource Damage Assessments (NRDA) for injuries due to unauthorized discharges of oil or releases of hazardous substances. The Service has taken initial steps in the NRDA process in an area that includes the project activities.

The Department is concerned with the ramifications of the current Corps maintenance dredging project on the federal (and State) government's ability to pursue appropriate compensation for natural resource injuries from the responsible parties. The Department will recommend measures that integrate natural resource trustee concerns into this project to avoid adverse effects on trustee ability to pursue an appropriate damage claim.

Appropriate language has been added in paragraph 4.6.2. of the final environmental impact statement which addresses the comment regarding natural resources injuries.

We suggest a meeting with appropriate staff no later than mid-February to work through these issues. Please call me at (215) 597-5378 to set the meeting date and location or if you have any questions concerning this letter.

Sincerely,

16

Michael Chezik

for Don Henne
Regional Environmental Officer

cc:
Field Supervisor, FWS, Bloomington, IN
T. Martin, OEPC, Washington, D.C.
S. Hall, SOL, Washington, D.C.
Regional Director, FWS, Ft. Snelling, MN

wp51doc\95798mtg.rv2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
620 South Walker Street
Bloomington, Indiana 47403-2121
(812) 334-4261 FAX 334-4273

January 22, 1996

Mr. Philip R. Bernstein
Chief of Planning Division
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Mr. Bernstein:

This acknowledges the U.S. Fish and Wildlife Service's (Service) January 8, 1996, receipt of your letter dated December 11, 1995 requesting an update on your request for formal section 7 consultation under the Endangered Species Act. This consultation concerns the possible effects of your proposed Indiana Harbor Canal Maintenance Dredging and Disposal Activities on the peregrine falcon (*Falco peregrinus*).

As you know, we requested additional information from the Corps via our September 19, 1995 letter. The Draft Environmental Impact Statement (EIS) provided to our office in November 1995 did provide much of the information we had requested. Still missing from the information we requested is relevant information from experts on the species and potential toxicological impacts from pollutants. However, it is apparent from your December 11, 1995 letter that the Corps does not intend to supply that additional information, so we will begin formal consultation with the information that has been provided.

17

Comment noted.

Section 7 allows the Service up to 90 days to conclude formal consultation with your agency and an additional 45 days to prepare our biological opinion (unless we mutually agree on an extension). Therefore, we expect to provide you with our biological opinion before May 22, 1996.

The biological opinion was furnished by the USFWS by letter dated May 21, 1996.

As a reminder, the Endangered Species Act requires that after initiation of formal consultation, the Federal action agency make no irreversible or irretrievable commitment of resources that limits future options. This practice insures agency actions do not preclude the formulation or implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species.

Comment noted.

If you have any questions or concerns about this consultation or the consultation process in general, please contact Elizabeth McCloskey at (219) 269-7640.

Sincerely Yours,

Scott Pruitt, acting

for David C. Hudak
Supervisor

CONVERSATION RECORD

TIME 9:15 AM DATE 1 Feb. 1996

TYPE ☐ VISIT ☐ CONFERENCE ☑ TELEPHONE ☑ INCOMING ☐ OUTGOING

ROUTING

NAME/SYMBOL	INT

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU: Andrew Alvarez

ORGANIZATION (Office dept. bureau etc.): PHILLIPS PIPELINE CO.

TELEPHONE NO: 918-661-6478

SUBJECT: Indiana Harbor dredging at Columbus Avenue bridge

SUMMARY

Mr. Alvarez's firm plans to sandbag or rebury an exposed pipeline in the canal just north of Collumbus Ave. bridge; he wanted to know how dredging by Corps would affect this.

I said I'd have Rich Carlson talk to him; I said the Corps would work out details with Phillips, and Enron, too.

ACTION REQUIRED: INFORM RICH CARLSON

NAME OF PERSON DOCUMENTING CONVERSATION: Keith G. Ryder

SIGNATURE: [signature]

DATE: 1 Feb. 96

ACTION TAKEN: CARLSON INFORMED AT 9:30AM BY CC:MAIL

SIGNATURE: [signature]

TITLE: archaeologist

DATE: 1 Feb. 1996

50271-101 ☆U.S. G.P.O. 1983-424-378 CONVERSATION RECORD OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

The Federal channel in the area of the Columbus St. bridge extends under the bridge to the centerline of the roadway. In this area the channel extends down to -22 LWD, which is approximately 24 feet below the water surface in the channel. From the description the Phillips pipeline is in the Federal channel. The current plan has dredging scheduled in that area for 2001. However, every effort will be made to avoid relocating the pipeline in the vicinity of the pipeline.

Weaver
Boos
Consultants, Inc.

120 NORTH MICHIGAN AVENUE • CHICAGO, ILLINOIS 60611 • 312/670-0041 FAX 670-0044

February 22, 1996
PN6012

Mr. Robert Tolpa
U.S. Environmental Protection Agency
Region V
Mail Code T-17J
77 West Jackson Blvd.
Chicago, IL 60604

RE: Comments on the Environmental Impact Statement
North Lake County Landfill Development Project
and Confined Disposal Facility
ECI Site
East Chicago, Indiana
Proposal No.: PN6012

Dear Mr. Tolpa,

On behalf of our client, Continental Waste Industries, Inc. (CWI), and ourselves, Weaver Boos Consultants, Inc. (Weaver Boos), we have prepared the following comments concerning the proposed plan for the dewatering and subsequent landfilling of dredged materials as set forth in the above captioned Environmental Impact Statement (EIS). Generally, we believe that the proposed plan is too narrow in focus and that a more efficient and less costly option exists which would provide additional benefits to the community. Our concerns and the proposed alternative plan are set forth below

Concerns with the EIS

1. The proposed site development plan does not fully and effectively utilize the real estate. The proposed waste disposal configuration (a relatively thin waste thickness with a large flat cover) does not provide for efficient use of liner systems and does not minimize infiltration and leachate generation.

2. The groundwater monitoring and slurry wall systems proposed in the EIS is not economical given the large perimeter of the site to be monitored and walled in relation to the waste volume.

1. The basis for the design of the CDF project is that it contain contaminated dredged materials and provide for RCRA closure and corrective action for contaminated soil and groundwater at the ECI site. Therefore, it is being designed in accordance with Section 404/401 of the Clean Water Act and RCRA. Contaminated sediment from the Indiana Harbor and Grand Cal system will be disposed in the CDF. For the purposes described above the design does effectively use the existing real estate at the site. The liner system and inward gradient system (to control leachate generation) are state-of-the-art.

2. The proposed design is economical in that the project has a high benefit to cost ratio for the intended purpose of confining contaminated dredged materials.

ENVIRONMENTAL AND GEOTECHNICAL SERVICES
Chicago, Illinois *Elkhart, Indiana*

3. The proposed site development plan does not allow the opportunity for the disposal of non-hazardous solid industrial waste, which can provide for more economical development of brownfield sites and remediation of existing industrial facilities throughout Northwest Indiana by providing a nearby and affordable waste disposal location.

3. The CDF will be a general navigation facility to provide for disposal of dredged materials from the Indiana Harbor and Canal and possibly from the Grand Calumet River. It has taken over 20 years to locate and agree upon a disposal site for Indiana Harbor dredged materials. The available capacity at this site will be used solely for dredged materials. Locally interests, including the City of East Chicago, will not support expanding the CDF project to incorporate industrial waste. Local interests wish to limit the height of the CDF to the lowest elevation possible.

4. The incorporation of non-liquid, non-hazardous industrial waste can be beneficial for the subject site by improving the dewatering, solidification, stabilization, and strength of the sludge material located in the subject site's dewatering ponds. This strength enhancement should provide sufficient strength to allow for the vertical expansion discussed below. The incorporation of industrial wastes such as fly ash will also reduce the permeability of the waste and reduce its leaching potential.

4. See response to comment No. 3 above.

5. Incorporating this additional industrial waste (other than the sludge material) to the subject site will provide an additional source of funding for the development, operation and maintenance of the ECI site, thereby reducing the need for funding from the State of Indiana and/or the US Environmental Protection Agency.

5. See response to comment No. 3 above.

Proposed Alternative Conceptual Design *(Weaver Boos-CWI)*

To address the concerns raised above, we propose an alternative site development plan which will allow for additional non-hazardous non-liquid wastes to be placed at this site. Conceptual drawings showing this waste placement and a possible configuration are attached to this letter.

This conceptual design requires that the sludges be physically solidified and chemically stabilized by the addition of an industrial waste with cementatious qualities, such as fly ash or slag. This solidification will increase the strength of the dewatered sludge, necessary to support our proposed vertical expansion. Fly ash, in particular, will likely reduce the permeability of the dewatered sludge and thereby reducing the amount of leachate generated. Fly ash type materials can also chemically stabilize the waste, thereby reducing the amount of contaminants which will leach out of the waste with time.

The physical shape of the alternative design will provide for more sloping sides and less flat top surfaces reducing the amount of stormwater infiltration and resulting leachate generation. The shape of the alternate design is a much more cost-effective use of the slurry-wall and the cover and monitoring systems. The tipping fees from the industrial sites could fund a significant portion of the site development and operations and maintenance costs.

The site could be developed such that exterior berms are maintained as the site is filled up so that the working areas are not visible from the surrounding properties even with the increased height (a drawing illustrating this concept is attached).

Having such a facility in Northwest Indiana would provide significant benefit to the cleanup and subsequent development of brownfield sites and benefit existing on-going industrial operations in the region. This facility would reduce the need for individual in-place closures. A centralized

larger facility can generally be better staffed and operated by professionals in the waste disposal business. Such facilities are also easier for regulatory agencies to monitor and inspect.

We appreciate the opportunity to submit these comments regarding the development of the subject site. If you have any questions, please call us.

Sincerely,
Weaver Boos Consultants, Inc.

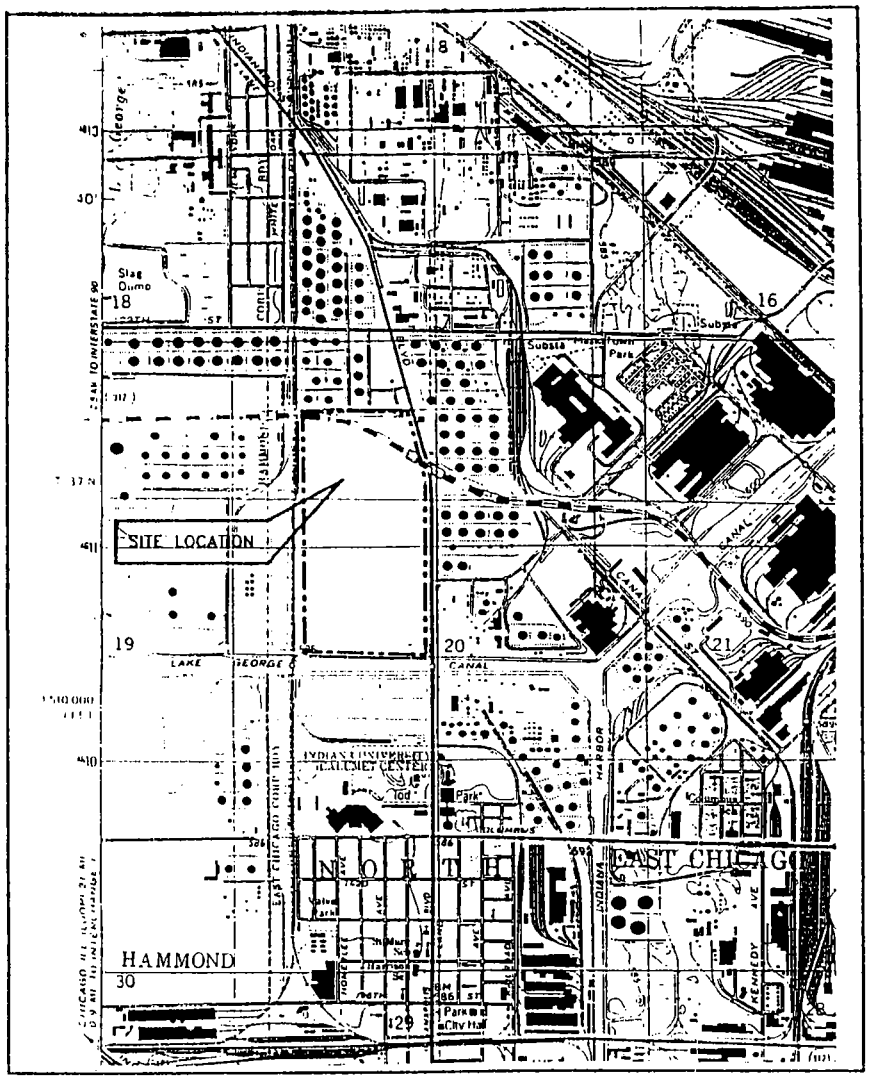
John W. Weaver AB

John W. Weaver, II, P.E.
President

Enclosures (4)

cc: US Army Corps of Engineering, Chicago District
City of East Chicago
Continental Waste Industries, Inc.

19D



NORTH

ADAPTED FROM THE WHITING, IN
U.S.G.S 7.5 MINUTE SERIES QUADRANGLE
DATED 1991.
CONTOUR INTERVAL 5 FT
SCALE: 1" = 2000'

COPYRIGHT © 1996 WEAVER BOOS CONSULTANTS, INC. ALL RIGHTS RESERVED.

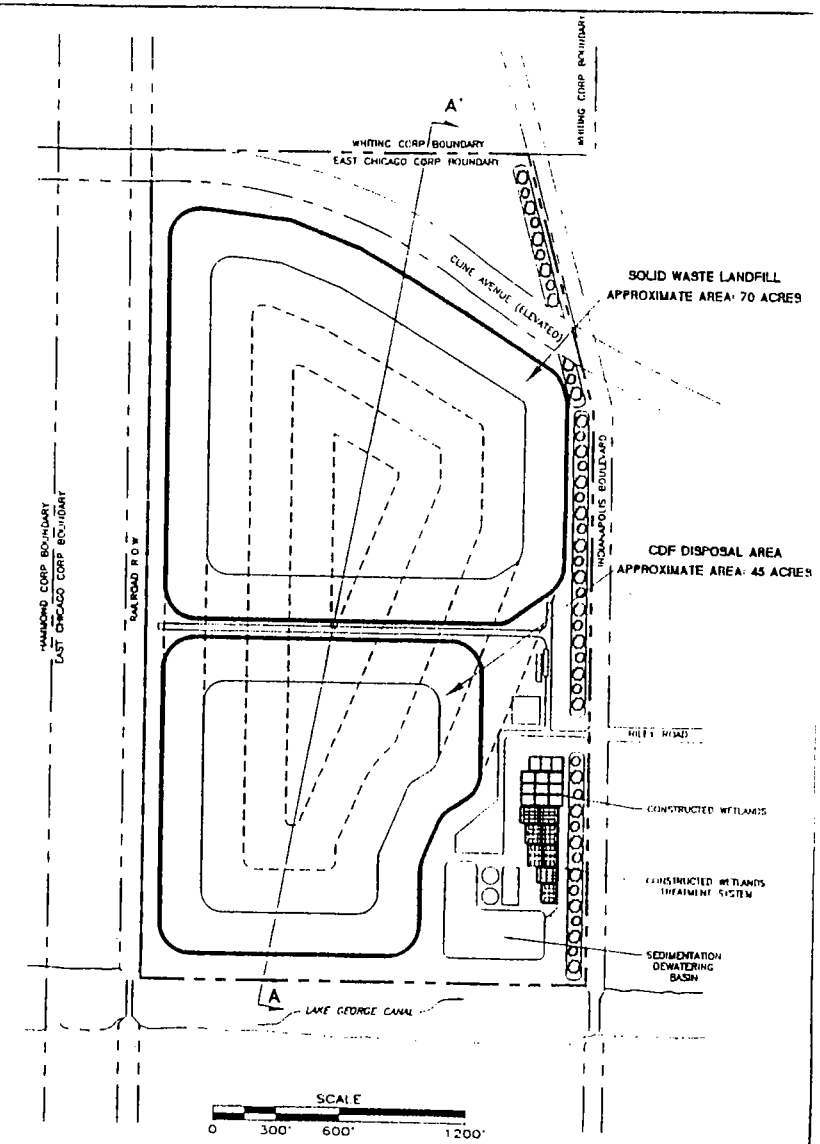
U.S.G.S. QUADRANGLE MAP

FORMER ECI FACILITY
EAST CHICAGO, INDIANA

WEAVER BOOS CONSULTANTS INC
520 N. MICHIGAN AVENUE, CHICAGO, IL 60611, (312) 670-0041
801 W. BEARDSLEY AVENUE, ELKHART, IN 46514, (219) 294-1630

	DATE: 2/23/96	FILE: PN 8012
REVIEWED BY: JWW	CAD: SITEBORD.DWG	FIGURE 1

19E



LEGEND

FORMER ECI SITE BOUNDARY

SITE PLAN ADAPTED FROM A 1979 AERIAL PHOTOGRAPH FROM THE SIDWELL COMPANY AND THE WHITING, IND. U.S.G.S. 7.5 MINUTE QUADRANGLE, DATED 1991.

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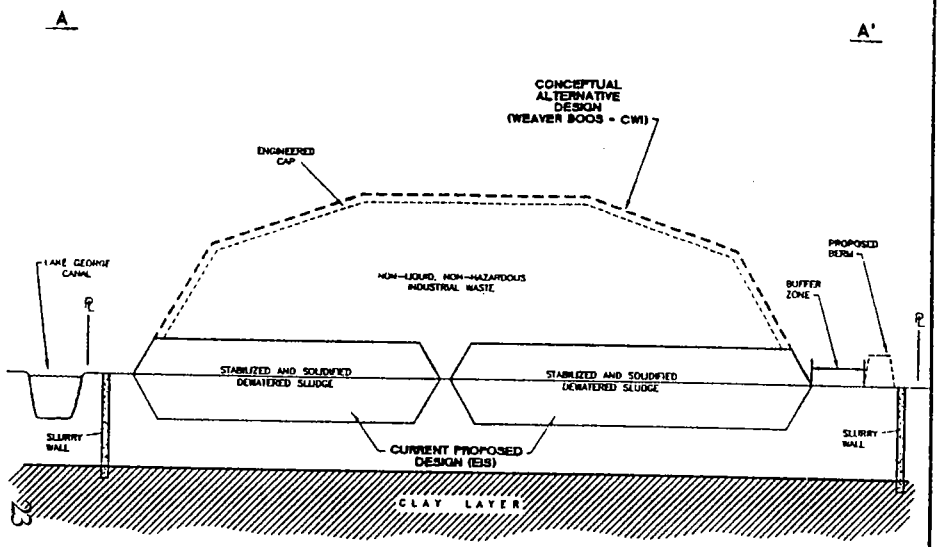
CONCEPTUAL ALTERNATIVE DESIGN

FORMER ECI SITE
EAST CHICAGO, INDIANA

WEAVER BOOS CONSULTANTS, INC.
520 N. MICHIGAN AVENUE, CHICAGO, IL 60611, (312) 670-0041
801 W. BEARDSLEY AVENUE, ELKHART, IN 46514, (219) 294-1630

DRAWN BY: TAC	DATE: 2/23/96	FILE: PN 8012
REVIEWED BY: JWW	CAD: ALTPLAN.DWG	FIGURE 2



NOTE: DRAWING IS NOT TO SCALE

CONCEPTUAL ALTERNATIVE DESIGN
CROSS-SECTION A-A'
FORMER ECI SITE
EAST CHICAGO, INDIANA

WEAVER BOOS CONSULTANTS, INC.
520 N. MICHIGAN AVENUE, CHICAGO, IL 60611, (312) 670-0041
601 W. BEARDSLEY AVENUE, ELKHART, IN 46514, (219) 294-1830

DRAWN BY: TAC	DATE: 2/23/98	FILE: PN 8012
REVIEWED BY: JWW	CAD: ALTCSEC.DWG	FIGURE 3

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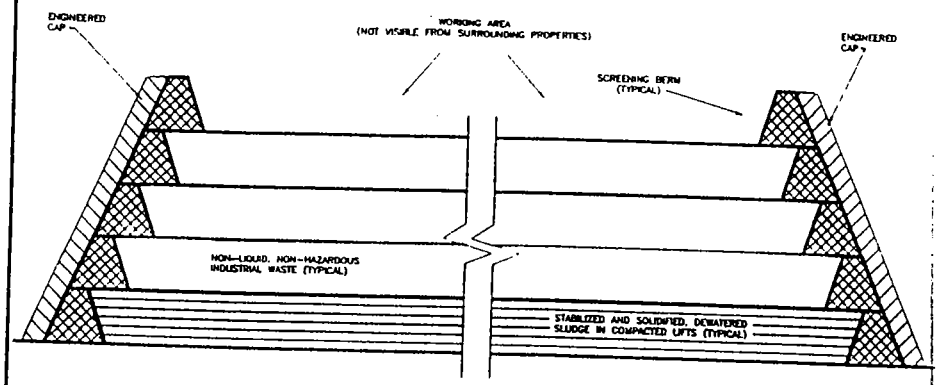
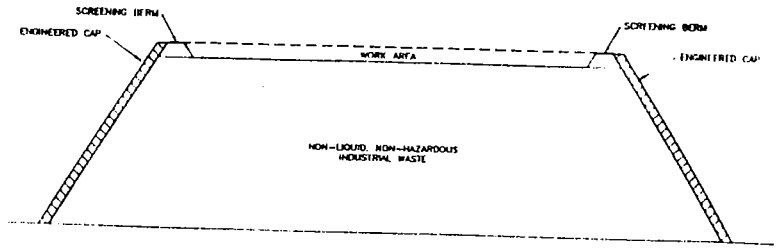


CROSS-SECTION OF ACTIVE CONCEPTUAL SITE DEVELOPMENT



CONCEPTUAL SITE

NOTE: DRAWING IS NOT TO SCALE

CONCEPTUAL SITE DEVELOPMENT
FORMER ECI SITE
EAST CHICAGO, INDIANA

WEAVER BOOS CONSULTANTS, INC.
520 N. MICHIGAN AVENUE, CHICAGO, IL 60611, (312) 670-0041
601 W. BEARDSLEY AVENUE, ELKHART, IN 46514, (219) 294-1830

DRAWN BY: TAC	DATE: 2/23/98	FILE: PN 8012
REVIEWED BY: JWW	CAD: ALTSDEV.DWG	FIGURE 4

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THE EAST CHICAGO SANITARY DISTRICT

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Honorable Robert A. Pastrick, Mayor

March 19, 1996

Mr. Keith Ryder
Planning Division
Environmental and Social Analysis Branch
Depart of the Army
Chicago District, Corps of Engineers
111 North Canal Street Chicago, IL 60606-7206

Re: Comments on the Comprehensive Management Plan (CMP) and the Draft Environmental Impact Statement (EIS) and on the Confined Disposal Facility (CDF) at East Chicago, Indiana.

Dear Mr. Ryder,

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The District has reviewed the Comprehensive Management Plan, feasibility report and draft environmental impact statement for the proposed maintenance dredging and construction and operation of a confined disposal facility at Indiana Harbor and Canal, at East Chicago in Lake County, Indiana. The District recognizes that this proposed project will increase opportunities for additional commerce in the Indiana Harbor and Ship Canal area. Just as important, the proposed project will improve the environmental condition of the canal and harbor through significant reductions in sediment deposits and their impact on the water column quality, both in the canal and Lake Michigan.

The District staff have the following comments on the CMP/EIS:

1. **Feasibility Report, Harbor and Canal Sediments, Sediment Sources, page 11**: the report states that an estimated 152,000 cubic yards (CY) or (182 million pounds) or sediment are added to the Indiana Harbor Canal/Grand Calumet River (IHC/GCR) each year from permitted municipal and industrial outfalls, combined sewer overflows (CSO), and urban runoff. In Appendix C, "NO ACTION ALTERNATIVE", the source for that estimate is defined. For point sources, the 1984 HydroQual, Inc. wasteload allocation data was used to arrive at an annual estimate, 57 million pounds of suspended solids. For CSO discharges, the 1984 USEPA study was used to obtain the annual estimate of 22 million pounds of suspended solids. That number was based on an average concentration of 273 mg/L and an annual CSO discharge of 9.7 billion gallons in the portions of the tributary to Lake Michigan. The Appendix also states that the number for CSO loadings is probably low.

1. As stated in Section 5.3.6 of Appendix C, the sediment loading estimates are only a rough approximation. In an effort to obtain current information, the Corps contracted with the USGS to perform a study to provide data on the suspended sediment discharges in the Indiana Harbor and Canal. This work was completed in cooperation with the IDEM, and covered a two-year period. The final results are not yet available from the USGS. However, the results will be inconclusive since significant storm events did not occur during the period of monitoring from mid-1996 through mid-1998. It is generally accepted that the vast majority of sediment movement in the tributaries to the Great Lakes occurs during storm events. Thus, without a significant event during the monitoring period, the sampling results are likely to be substantially lower than long-term averages. Depending on funding, the Corps may continue working the USGS on a modified monitoring program in which suspended sediment data would be gathered only for significant events.

The District questions the use of 1984 data, since several changes have taken place since that year. First and foremost, the District has replaced an old inefficient treatment plant with a new state-of-the-art facility. Additionally, the District has submitted a Combined Sewer Overflow Operational Plan (CSOOP) to IDEM for approval. Even though the CSOOP has not been approved, the District began implementing the program since its submittal in June 1988. Consequently, the suspended solids data for the East Chicago Sanitary District has vastly improved since 1984 as shown in Table 1 below. It is conceivable that other dischargers and municipalities have also reduced suspended solids loadings to the IHC/GCR, thus making the Corps estimates invalid.

Table One
East Chicago POTW and CSO Loadings (CY) for 1984 vs. 1995

Source of Suspended Solids	1984	1995
Treatment Facility (POTW)		76
CSO Lagoon		12
POTW + CSO Lagoon	681	
Alder CSO	164	121
Michigan CSO	1,283	122
Total Suspended Solids Loading	2,128	331

2. **Feasibility Report, TENTATIVELY SELECTED PLAN, <u>Dredged Material Disposal Facility</u>, page 91**: the CDF is described as containing three separate cells, with the west cell, on parcel IIA being divided to create an isolated subcell for the disposal of PCB contaminated sediments. All of the cell walls will be constructed of a 3 foot layer of compacted clay placed along the dike face and a soil/bentonite slurry cutoff wall extending from the toe of the dike down approximately 33 feet to an existing clay formation (APPENDIX F, ENVIRONMENTAL ENGINEERING, page F-57). However, the internal wall, separating the TSCA material from the remainder of the west cell will be reworked dredge material. Shouldn't this wall also have a clay barrier to prevent transport from the TSCA cell to the other dredge material?

3. **Feasibility Report, Optimization of ECI Site CDF, page 72-73**: the list of features for the optimum plan include the following . . .

   - *Pretreatment of water collected from within the CDF, if needed.*

   - *Final treatment of water collected from within the CDF by City of East Chicago waste treatment plant, if needed.*

   and, on page 92, . . .

2. Indiana Harbor sediment is very impermeable (8.66×10^{-8} cm/sec) and will act as an excellent dike system for the TSCA cell.

"Construction and operation of the CDF may require an on-site treatment plant to provide initial treatment of the precipitation runoff within the CDF and groundwater collected from the gradient control system in order to meet City of East Chicago pretreatment standards prior to discharging to its waste treatment plant. Further study will be required to determine if pretreatment of the CDF runoff will actually be required."

The Feasibility Report makes a major assumption, i.e. the District is willing to consider taking the wastewater generated from CDF. No communication between the Corps or the District has taken place to date. The quality of the sediments, the Lysimeter Test Results (Appendix E, Table E-9), the probable maximum leachate concentrations (Table E-10), and the groundwater analytical data (Appendix F, Table F-8) all indicate that some degree of treatment may be required.

Moreover, while Appendix I does an admirable job of describing the District's treatment facility, the Corps has assumed that the pretreatment limits will remain the same as those in Table I-2. If the Corps had communicated with the District, it would have learned that the District is anticipating a new NPDES permit and that local pretreatment limits will change. Additionally, IDEM is currently writing rules to adopt the Great Lakes Water Quality Guidance (GLWQG) by March 1997. The District will have to adjust its pretreatment program to incorporate new requirements under those rules. Thus, the current local limits will be changing at least once and probably twice in the near future.

Furthermore, the GLWQG rules will required the District to take a strict stance on bioconcentrating chemicals of concern (BCC). "Strict stance" should be interpreted as no discharge over the limit of detection. The current list of BCCs includes PCBs, mercury and 24 other compounds. PCBs and mercury are definitely in the sediments.

Due to the regulatory requirements associated with BCCs under the GLWQG, the District would prefer the Army Corps of Engineers to apply for an NPDES permit for direct discharge to the Lake George Branch of the IHC. The effluent from the CDF, will probably require pretreatment to the point where direct discharge becomes an economically feasible alternative.

4. **Appendix I, page I-6, Article 5.2**: this states,

"This two stage filter system is not necessary to bring the CDF effluent into compliance, but would be employed to reduce the amounts of PCBs that reach the WWTP to a minimum."

PCBs in any concentration shall not be discharged to the collection system. All wastewater shall be tested for PCBs prior to acceptance by the District. Since laboratory analysis, with the proper clean up procedures, can take as long as ten days, the water will have to be stored on site and processes as a batch. This would mean a

3. The current confined disposal facility plan no longer includes on-site pretreatment and subsequent discharge to the East Chicago wastewater treatment plant. The current recommended plan provides for complete treatment the CDF site and discharge directly back to the Lake George Branch. Final design work will include bench testing to determine the treatment necessary to allow for discharges directly to the waterway to meet BCC requirements. Final determination of manner of discharge will be made after further coordination with State an U.S. EPA.

4. See response to comment No. 3 above

number of large storage tanks will have to be constructed on site which would hold about 1.5 million gallons (80 gpm * 12 days). Should PCBs be detected in the tank, rinse and decontamination procedures will have to be developed. Also, since the detection limit for PCBs is sample matrix dependent, a study must be performed before applying for a discharge permit to determine the PCB limit of detection for the discharge.

5. **Appendix I, page I-6, Article 4.6**: states,

   "This system would first require raising the pH of the effluent by adding lime."

   Using an ammonia stripper would mean adding lime, caustic soda, or soda ash which would raise the total dissolved solids (TDS). Also, acid may have to be added before discharge to readjust the pH. These possible chemical additions may become an issue due to anticipated low local pretreatment limits for TDS and sulfate.

6. **Appendix I, page I-5, Article 4.4**: will there be a backwash from the sand/anthracite filter? If so, where will that backwash be discharged to? Will this water be recirculated to the dredging pile? Concentrations of contaminants may be "cycled up" by recirculating this water over the dredge material.

   If there is no backwash, how will blinding by oil & greases be addressed?

7. **Appendix I, page I-5, Article 4.4**: how will the activated carbon filters be regulated in order to prevent "break through"? What indicator will be used? Lack of an immediate indicator may force batch treatment.

8. The use of activated carbon should remove organic compounds to a level adequate to meet NPDES effluent limits. A clean water discharge to the District's collection system will not help that system during rain events. Currently the District required groundwater dischargers to severely restrict or cease their discharge during wet weather events exceeding 0.1 inches of precipitation. Heavy rainfall may provide a serious issue for the CDF operation. Larger storage facilities may be required during spring and fall rainy seasons.

9. Appendix I has no plans for metal treatment. Anaerobic activity will produce sulfuric acid from sulfides and consequently, leachate concentrations of metals may be higher than what is anticipated.

5-9. Issues raised in these five comments are no long applicable because the effluent from the CDF site will no be discharged to the East Chicago wastewater treatment plant. See response to comment No. 3.

In summary, due the impending requirements of the GLWQG and the anticipated "clean" water quality from probable pretreatment requirements for the CDF effluent, the District strongly urges the Army Corps of Engineers to pursue direct discharge via NPDES permit.

Sincerely,

Daniel R. Olson, Manager
Wastewater Division

CC: Michael Suty, Director of Utilities
Matt Didier, Waterway Management District
Anthony DeBonis, Jr., Counsel, Waterway Management District
Michael Iczkowski, Pretreatment Coordinator

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March 21, 1996

Lt. Col. Robert E. Stockbower
District Engineer, Chicago District
U.S. Army Corps of Engineers
219 S. Dearborn St.
Chicago, IL 60606

Re: Draft EIS for dredging of Indiana Harbor and Ship Canal, and related construction of CDF at East Chicago.

Dear Col. Stockbower:

As the major regional advocacy sportfishing organization in the Great Lakes region, the Great Lakes Sport Fishing Council is always concerned with aquatic resources and related habitat and wetlands.

Comments are noted.

We also share an equal concern for the economy of the region as we endeavor to protect and enhance our natural and stocked resources.

We have reviewed the ***Feasibility Report and Draft Environmental Impact Statement*** and the ***Comprehensive Management Plan*** issued jointly by USEPA and USCOE. We understand the project involves construction of a confined disposal facility (CDF) at the ECI site in East Chicago, dredging of Indiana Harbor and Canal, and placement of dredged materials in the CDF.

We also understand no wetlands, historic properties, valuable wildlife habitat or endangered species will be impacted by the project. Our members also recognize there will be short term impacts to low-quality aquatic habitat, and these will be impacted primarily during the construction and dredging period.

The Council is encouraged when comprehensive and symbiotic plans are made to improve degraded economic and environmental sites. We especially applaud the somewhat unique approach taken by USEPA and USCOE to work together to effect the best approach to improving a specific site.

Thank you for the opportunity to comment on this proposed project and we wish you success in your endeavors.

Sincerely,

Dan Thomas

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

Evan Bayh
Governor
Kathy Prosser
Commissioner

100 North Senate Avenue
P.O. Box 6015
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Telephone 317-232-8603
Environmental Helpline 1-800-451-6027

March 28, 1996

Keith Ryder
Department of the Army
Chicago District, Corps of Engineers
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Mr Ryder

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On October 30, 1995, the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency held a press conference to notify the public of the release of the "Indiana Harbor and Canal Maintenance Dredging and Disposal Activities Feasibility Report and Draft Environmental Impact Statement." Since that time, IDEM has been reviewing the assessment of environmental impacts in this proposal from the perspective of our statutory and regulatory authorities Our review of this document is now complete.

Comments are noted.

Obviously, both the Corps and the EPA have dedicated tremendous resources to the creation of this document. Our review concludes that the potential environmental impacts of dredging and disposing the contaminated sediments that currently reside in the Indiana Harbor and Canal has been comprehensively assessed.

The International Joint Commission identified, as part of the Great Lakes Water Quality Agreement, fourteen beneficial uses associated with the Great Lakes. In 1991, IDEM released the Stage I Remedial Action Plan for the Northwest Indiana Area of Concern. That document acknowledged that all fourteen beneficial uses were impaired. Many of these impairments can be attributed to polluted sediments in the Grand Calumet River and the Indiana Harbor and Canal. Only the most pollution tolerant benthic organisms can survive in the Indiana Harbor and Canal sediment. Pollutants in the sediment exist at levels that preclude open lake disposal or beach nourishment. Fish that inhabit this area are unfit for human consumption. And local industries incur additional costs because of the inability to freely navigate the Harbor and Canal.

IDEM recognizes that no single project can restore all of the fourteen impaired beneficial uses. Removal of over four million cubic yards of contaminated sediment will, however, be a

significant step in the right direction. Consequently, the Indiana Harbor and Canal Maintenance Dredging and Disposal project is now a cornerstone of the draft Stage II Remedial Action Plan.

A multitude of environmental issues were analyzed as part of the Draft Environmental Impact Statement. The result of this analysis is a preferred option that minimizes adverse environmental impact, is cost effective, and yields a long term environmental gain. IDEM supports the Corps' conclusions.

IDEM's role as a regulator has been to assess the analysis of the environmental impacts discussed in the "Indiana Harbor and Canal Maintenance Dredging and Disposal Activities Feasibility Report and Draft Environmental Impact Statement." Although the comment period closes on April 1, 1996 IDEM will continue working with the Corp and the public to protect the environment as permit applications are submitted. We look forward to this continued relationship. Questions can be directed to Kay Nelson at (219)881-6712.

Sincerely

Kathy Prosser,
Commissioner

cc: Valdus Adamkus
Dave Wersan
Northwest Regional Office
p-file

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF OCEAN RESOURCE CONSERVATION AND ASSESSMENT
HAZARDOUS MATERIALS RESPONSE AND ASSESSMENT DIVISION
COASTAL RESOURCE COORDINATION BRANCH, Region 5 (SRT-4J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

March 28, 1996

Mr. Keith Ryder
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, IL 60606-7206

Dear Mr. Ryder:

The National Oceanic and Atmospheric Administration (NOAA) has reviewed the document entitled *Comprehensive Management Plan, Feasibility Report and Draft Environmental Impact Statement, Indiana Harbor and Canal Maintenance Dredging and Disposal Activities, 1995* prepared by the U.S. Army Corps of Engineers, Chicago District (USACE) and the U.S. Environmental Protection Agency, Region V (EPA). NOAA's review of the subject document focused on the aquatic environment from the perspective of a federal natural resource trustee.

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NOAA agrees with the overall conclusion that the benefits of the proposed dredging far outweigh the potential risks. By implementing the proposed dredging project, a substantial contaminant load will be removed from the Indiana Harbor and Canal, the annual discharge of contaminated sediments into Lake Michigan will be substantially reduced, and the federal navigation channels will no longer restrict commerce. Closure, capping, and hydrodynamic containment of the ECI RCRA facility will also benefit the environment by eliminating discharges of petroleum contaminated groundwater from the site, thereby decreasing the overall contaminant loading of the Indiana Harbor and Canal (IHC). The document does, however, raise several concerns, many of which may only require clarification.

One of NOAA's major concerns is that the EIS and any associated permits should not inadvertently waive the rights of the United States government to pursue natural resource damages, if and when this becomes necessary. Therefore, it is important that and any dredging permits associated with the proposed cooperative dredging project and the EIS document state that nothing in either a the permit or the EIS shall be construed, either explicitly or implicitly, to irreversibly or irretrievably commit natural resources beyond the confines of the area dredged.

In general, the analysis of alternatives presented in the Feasibility Report and the Draft Environmental Impact Statement (EIS) appears to focus on the *advantages* of the recommended alternatives without thoroughly exploring either the disadvantages of those alternatives or without thoroughly documenting the evaluation of other alternatives. For example, little discussion is presented on the benefits of using hydraulic dredging technology, while the problems associated with this alternative are discussed at length. Conversely, the benefits of using closed-bucket dredging technology are highlighted, while problems associated with it are essentially ignored. The same is true of the potential for impacts to aquatic organisms once presently buried contaminated sediments are exposed by dredging. The document addresses this potentially significant problem by stating that

it will be eliminated naturally over time by deposition of uncontaminated sediment. However, no supporting information is provided to show how long this process will take.

NOAA's specific comments and concerns are listed in Attachment I and are provided to improve the document and ensure that the short-term impacts to the aquatic environment are minimized. In the interest of moving this project forward, many of these comments may best be addressed in the design phase.

NOAA appreciates the opportunity to review and provide comments on this document and looks forward to coordinating with the USACE and the EPA toward our mutual goals of protecting our nation's natural resources and public welfare. Please feel free to contact me at 312/886-7527 if you would like to discuss these comments or if I can provide any clarification or additional information.

Sincerely,

J. Todd Gocks
Coastal Resource Coordinator

Attachment I
Review Comments for
Draft EIS Indiana Harbor and Canal
Maintenance Dredging and Disposal Activities

1. In order to reserve the rights of the United States government to pursue natural resource damages if and when this becomes necessary, NOAA requests that a statement be added to the Final EIS which explicitly states that nothing in the EIS shall be construed, either explicitly or implicitly, to irreversibly or irretrievably commit natural resources either directly or indirectly associated with the proposed dredging of the IHC beyond those areas outside the area of dredging.

In addition, NOAA requests the opportunity to review and comment on all dredging permit applications and draft dredging permits associated with the IHC cooperative dredging project. This review is to ensure that the federal natural resource trustee rights and authorities are not inadvertently waived and that impacts to natural resources are minimized such that any associated liabilities are not unduly increased.

2. Feasibility Report: Table 7, page 61; Alternatives 1 and 3, pages 62-65: The text and the table appear to provide conflicting information. Shouldn't the volume figures listed for Reaches 1-5 be the same for Alternatives 1 and 3 in Table 7?

3. Section 4.2.2.3.6, page EIS-52: In addition to the hydrodynamic containment discussed in this Section for the purpose of limiting seepage from the proposed CDF, groundwater monitoring outside of the slurry wall would allow periodic checks of the containment system effectiveness. This monitoring program may be best developed in the remedial design.

4. Dredging Impacts and Environmental Controls, page 97 Feasibility Report; Sections 4.2.3.2-Sediment Quality Impacts of Dredging, pages EIS 53-55; 4.2.4.2-Water Quality Impacts of Dredging, pages EIS 56-57; 4.3.1.2- Aquatic Community Impacts of Dredging, pages EIS 64-65; and Appendix H-Dredging Technologies and Impacts: The authors state that dredging within the IHC will expose deeper, contaminated sediments. The document minimizes the potential significance of this problem by assuming that any impacts will be short-term, and that clean sediments will be deposited rapidly over the contaminated sediments. This may or may not turn out to be the case. What the authors refer to as "short-term" exposure may in fact be sufficiently long-term to result in significant impacts to benthic organisms in the area. It is also possible that the dredging could result in trophic transfer of contaminants to higher trophic level species. A monitoring program should be implemented to ensure that sediment-associated contaminants are not bioaccumulating in the tissues of aquatic organisms. It would also be appropriate to conduct biological surveys in the area to ensure that benthic organisms recolonize areas following dredging.

5. Appendix H-Dredging Technologies and Impacts: In Appendix H , as well as in numerous other sections throughout the document, the authors discuss the use of closed-bucket clamshell dredges. They state on page H-4 that the closed-bucket clamshell reduces turbidity in the water column by 30-70%, compared to open- bucket clamshell dredges, and if used by an experienced operator, can reduce sediment resuspension to levels observed using hydraulic dredges. However, Hayes et al. (1984) have demonstrated that while the use of closed-bucket clamshell dredges can reduce upper water column turbidity by 39-56%, it can also increase lower water column turbidity by 220-330%, compared to open-bucket dredges. The reason

1 Requested statement has been added as paragraph 4.6.2 of the final environmental impact statement.
NOAA will be included on the mailing list of those parties to receive notification of permits which may be required

2. The volumes listed for Alternatives 1 and 3 Table 7 are different because the channel reaches to be dredged under the two alternatives are substantially different. Alternative 1 is a partial dredging plan limited to Reaches 1 through 5, plus the PCB hotspots along the north bank of Reach 6.
Alternative 3 includes dredging in 13 reaches.

3 Groundwater monitoring to determine the performance of the containment system (perimeter cutoff wall and extraction wells) has commenced. Four monitoring wells (three shallow, one deep) were installed in 1995 along the northern and western property boundary for purposes of monitoring background water quality prior to construction of the CDF. These wells were also installed to remain intact after CDF construction and monitor the performance of the facility

During the detailed design phase of the project, additional permanent monitoring well locations will be designated and wells will be installed before construction activities commence in order to obtain additional baseline data and will be used to monitor the performance of the containment system. Monitoring requirements will be coordinated with IDEM

4 The comment states that dredging will expose deeper, contaminated sediments. As stated in section 4.4.5.2 in Appendix E and sections 4.4.5 and 5.6 of Appendix H, except for the contaminant PCB, the contaminant concentration within the IHC does not indicate any significant change with depth. Remedial activities for the PCB hot spots will be addressed in the design phase.

With regard to the need for a monitoring program and biological survey, existing literature indicates that dredged areas are recolonized first by opportunistic species. These populations are later replaced by the original fauna (Schmal 1978, Morton 1977, Oliver et al 1977). Removal of the contaminated sediment and associated improvements in water and habitat quality of the IHC should result in the establishment of higher quality, more diverse benthic populations than presently inhabit the harbor and canal. A coordinated monitoring effort could determine whether changes or improvements occurred in the IHC benthic community. Development of a post dredging monitoring plan will be coordinated with area natural resource agencies and research institutions as part of the development of the RAP

5. A recent report by the Chicago District (1995, Report on Maintenance Dredging of Calumet River) contains water quality monitoring results for an enclosed or closed clamshell dredge. The Calumet River, which has sediment with physical parameters similar to Indiana Harbor, was mechanically dredged in December 1994. The dredging specification required the use of a clamshell bucket designed and manufactured as an enclosed bucket. The total suspended solids (TSS) samples were monitored at approximately 1 foot below surface and mid-depth. The samples were collected 100 feet upstream of the dredge (background) and 100 and 500 feet downstream. The average surface samples within 100 feet of the dredge was 50 mg/L with a background of 45 mg/L. The average of the mid-depth samples within 100 feet of the dredge was 56 mg/L with a background of 67 mg/L. The average TSS concentration of the monitoring station located 500 feet downstream of the dredge was slightly lower than the monitoring station located 100 feet downstream of the dredge. In summary, the TSS samples did not differ significantly between upstream and downstream monitoring stations within 100 feet of the closed clamshell as compared to the worst case situation of the 500-800-foot long plume created by a standard clamshell as discussed in section 4.6.2 of Appendix H.

for this increased turbidity is that closed-bucket dredges tend to push water ahead of them as they descend, thereby stirring up sediments at the bottom. This problem can be avoided if the closed-bucket is modified so that top plates remain disengaged until the bucket is closed on the bottom. USACE should confirm that closed-bucket clamshell dredges with this modification will be used. If this type of modified closed-bucket is not available, further consideration should be given to the use of hydraulic dredging.

6. Appendix H-Dredging Technologies and Impacts, Section 3.5, Environmental Controls, page H-7: Silt curtains are mentioned in the text of the document as one possible means of controlling turbidity during dredging, and it is stated that silt curtains could "possibly" be used. However, in Appendix H the authors state that because of variable currents and narrow channel widths, silt currents will be of minimal benefit, and are not recommended for this project. The silt curtains discussed in the document would extend only part way into the water column from the water surface. However, silt curtains may be effectively deployed across the entire water column. When deployed in such a manner, this affords protection from sediment migration from the base of the channel to the surface. This type of silt curtain is being successfully employed by EPA at the Manistique Harbor dredging project in Michigan.

EPA's work at Manistique has shown that silt curtains can be effectively designed and deployed to perform in areas subject to highly variable currents. The apparent discrepancy on the potential use of silt curtains in HHC should be clarified in the document.

Adequate ambient water quality monitoring, including turbidity, should be conducted during dredging to ensure that contaminant migration does not occur outside of the dredging area. Monitoring should be consistent with that conducted at the USACE dredging project in New Bedford Harbor, CT. Prior to the initiation of dredging, a baseline of ambient contaminant concentrations in the water column should be established. If monitoring during dredging indicates that the ambient water quality levels are exceeded within the 95% confidence level, then dredging should be shut down until adequate controls can be deployed.

7. Appendix H-Dredging Technologies and Impacts, Section 3.6.3, Selection of Dredging Equipment, Character of Material, page H-8: Sediments to be dredged are described in this Section as being "predominantly fine-grained soil particles (silt and clay), [which] are not dense or firmly compacted." The results of sieve analyses would be very beneficial in documenting the analysis of alternatives. Bulk chemistry analyses performed on each sieve fraction may reveal significant associations between sediment fractions and contaminants. Coarser fractions may not be contaminated. Physical separation may be cost effective. This may allow for placing less material in the proposed CDF. This could be further evaluated during the design phase and remain consistent with the statement in Section 4.1, page H-12 that the USACE may employ alternative dredging methods. This type of evaluation may prove especially beneficial in dealing with the PCB contaminated sediments as found at EPA's Manistique Harbor project.

8. Appendix H-Dredging Technologies and Impacts, Section 3.6.5 Distance to Disposal Site, page H-9: This Section indicates that the cost of constructing an overland pipeline to transport sediment from a hydraulic dredge would be prohibitive. This Section should note that the proposed CDF site is adjacent to the canal and discuss the potential use of a floating or submerged pipeline.

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6 Section 4.2.4 refers to the monitoring plan which will be conducted during dredging. The plan will be fully developed in the design phase.

7 Physical separation was one of the treatment technologies reviewed for the Assessment and Remediation of Contaminated Sediments (ARCS) program. To be used, the sediment must consist of two distinct physical sizes and one of the phases must be more contaminated than the other. According to 6.3.2 of Appendix E, the sediment is found to be mostly silt and clay, with some sand. Since all three phases are contaminated, physical separation is not appropriate for this Indiana Harbor and Canal dredged material.

8 As stated in the CMP and draft EIS, mechanical (by closed clamshell bucket) dredging is the recommended method over hydraulic dredging. The advantages of mechanical dredging as applicable to this project are outlined in page 97 of the CMP and sections 3.6.9 and 5 of Appendix H. The following paragraphs will expand on the advantages by comparing the CDF effluent quality/quantity and CDF drying/disposal operational procedures for the two dredging methods.

Comparison of effluent quality and quantity. Hydraulic dredges typically add four or more volumes of water for each volume of in place sediment removed while mechanical dredging remove sediment with little or no change in water content. The additional volume will increase treatment costs. The Corps' Waterways Experiment Station (WES) estimated the constituent concentration for the hydraulic and mechanical disposal into an in lake CDF. The water quality for hydraulic disposal had concentrations 10 to 1000 times higher than for mechanical disposal. With hydraulic dredging, the water quality standards for ammonia, arsenic, cadmium, lead, and nickel were exceeded. In the same report, WES performed a modified elutriate test on the sediment to predict water quality and found elevated levels of Aroclor 1248 for the unfiltered water (see Table E-6). The modified elutriate test simulates the effluent from a CDF containing sediment which has been hydraulically dredged.

Comparison of drying and disposal operational procedures. Dredging of the channel is designed to maintain authorized navigation depths for commercial traffic. Maintaining authorized depths will also reduce the sediment loadings to the lake because the channel will function as a sediment trap. The dredging project is designed to dredge the sediment accumulated since 1972 within the first seven to eight years (backlog dredging), and then perform maintenance dredging for the remaining years of the project. Because each lift of the dredged material in the CDF needs to be consolidated for placement of the next lift, it is critical that the dredged material be dried out before the next dredging event.

The disposal operation proposed for dewatering, consolidation and stabilization of the dredged material is most effective when the water content of the material is minimized to the extent possible. The minimum practical water content allows thinner lifts of material to be placed in the CDF and maximizes the drying period for rapid consolidation and stabilization of the dredged material.

Experience at other Corps' CDFs indicated that stabilizing dredged material placed by hydraulic methods can take up to three years, while those of mechanical methods can be achieved in one year. During backlog dredging, dredging cycles are every other year per cell and drying must be accomplished within the off year in order to meet the disposal schedule. Given this time frame, hydraulic dredging would not allow sufficient drying time between the dredging events.

9. Appendix II-Dredging Technologies and Impacts, Section 4, Impacts of Maintenance Dredging, pages II12-II22: Many of the potential impacts of the proposed mechanical dredging may be ameliorated by employing hydraulic dredging. Secondarily, employing the type of modified closed-bucket discussed in Comment 4 would lessen many of the impacts discussed in this Section.

9 See response to comment No. 8 above.

Literature Cited

Hayes, D.F., Raymond, G.L., and McLellan, T.N. (1984). Sediment resuspension from dredging activities. In: Montgomery, R.L. and J.W. Leach, [eds.], Dredging and Dredged Material Disposal, American Society of Civil Engineers, New York, NY.

East Chicago Waterway Management District

March 28, 1996

Lt. Col. Robert E. Slockbower, P.E.
District Engineer
United States Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Re: East Chicago Waterway Management District Comments Concerning Comprehensive Management Plan, Feasibility Report and Draft Environmental Impact Statement - Indiana Harbor and Ship Canal Dredging Project

Dear Colonel Slockbower:

Please find enclosed a Resolution adopted by the Board of Directors of the East Chicago Waterway Management District on March 27, 1996 making formal comments on the Comprehensive Management Plan including Feasibility Report and Draft Environmental Impact Statement on the above-referenced project. Thank you for providing us with this opportunity to comment on this important proposal.

Yours very truly,

James W. Knight

JAMES W. KNIGHT, President
East Chicago Waterway Management District

cc: All interested agencies and parties

EAST CHICAGO WATERWAY MANAGEMENT DISTRICT
RESOLUTION NO. 96-002

A RESOLUTION AUTHORIZING COMMENTS ON THE COMPREHENSIVE MANAGEMENT PLAN FOR INDIANA HARBOR AND CANAL MAINTENANCE DREDGING AND DISPOSAL ACTIVITIES

WHEREAS, the United States Army Corps of Engineers ("Corps") and the United States Environmental Protection Agency ("USEPA") have proposed a Comprehensive Management Plan ("Plan") for the dredging and disposal of dredged materials from the Indiana Harbor Ship Canal which plan is currently undergoing public hearing and comment; and

WHEREAS, the Plan, including a Feasibility Report and Draft Environmental Impact Statement, is a document of vital interest to the District and concerns activities at the heart of the District's purposes to "manage and supervise, in conjunction with other state and federal authorities, the industrial, commercial, and recreational development of the waterways in the city in which the District is formed" and "to assist other agencies of local, state, and federal government to manage, maintain and promote the use of the waterways in the city in which the District is formed;" and

WHEREAS, certain issues are raised by the documents now under hearing and comment of importance to the District, and the District, being mindful of its responsibilities, desires to comment formally to the Corps and USEPA and to spread said comment upon the public record.

BE IT THEREFORE RESOLVED by the Board of Directors of the East Chicago Waterway Management District that:

A. The District hereby adopts the following as its official comment upon the Plan including the Feasibility Report and draft Environmental Impact Statement

submitted for the Indiana Harbor and Canal Maintenance Dredging and Disposal Activities to the Corps and USEPA:

> The East Chicago Waterway Management District ("District") acting by and through its Board of Directors, makes the following official comment to the Comprehensive Maintenance Plan for Indiana Harbor and Canal Maintenance Dredging and Disposal Activities submitted by the United States Army Corps of Engineers ("Corps") and United States Environmental Protection Agency ("USEPA").
>
> The District commends the Corps and USEPA for addressing navigational and environmental problems posed by shoaling in the Indiana Harbor and Ship Canal. Removing the accumulation of contaminated sediment and safely disposing of this material in an environmentally responsible fashion are activities vital to the economic and public health of Northwest Indiana. The District welcomes the opportunity to work with the Corps and USEPA to implement the comprehensive plan which is tentatively described on pages 89 through 115 of the subject document. The District believes at this time that the Plan constitutes the best available alternative to address remediation of contaminated sediments in the Indiana Harbor and Canal. The document raises a number of issues, however, upon which the District comments as follows:
>
> 1. **The Role of the Waterway Management District.** Although the legislation which created the District enacted by the Indiana General Assembly (P.L. 56-1994, Section 2; I.C. §8-10-9-1 et. seq.) empowers the District to act as a local sponsoring agency under contract or memorandum of understanding with any agency of the state or federal government and further authorizes the District to accept grants, transfers, payments, property and funds to establish or manage confined disposal facilities and similar structures (I.C. §§8-10-9-(7) and (8)(b)), there is no specification of the elements of the local sponsorship agreement which is contemplated between the District and the Corps. Although the District has been under notice that the Corps will draft such an agreement for its consideration, the District has only general information concerning its functions under the proposed dredging project, its long term responsibilities, and its role in various matters referred to below concerning permitting, future closure activities, and related matters. Members of the public, industrial users of the canal, the local governments with related jurisdictions all require this information in order to evaluate the project and propose their own plans consistent with their needs and the needs of the residents nearby. The District calls upon the Corps of Engineers to provide a detailed draft agreement for review and discussion as soon as possible addressing every issue and function for which activity by the District is anticipated. The District would also find helpful the production to its Board of Directors of

1. During the period 1997-1998, the Chicago District met with the East Chicago Waterway Management District (ECWMD) to discuss the roles and responsibilities of the ECWMD and the Corps of Engineers, provided a guidebook covering PCA and real estate issues, and attended ECWMD Board meetings to answer questions in an effort to help the ECWMD begin to define its role in the CDF project.

existing sponsorship agreements the Corps has entered into at other locations which have similar facilities. The District also requires some statement by the Corps as to the date by which such an agreement should be completed and executed so that the District can plan an effective and broadly based public information process prior to signing the agreement.

2. **Calculating Disposal Costs for CDF Users.** The District understands that the apportionment of dredging costs will be based upon volume estimates made from differences in pre-design and post-dredging soundings. In negotiating with local users, the District will need to know how long before and after the dredging the soundings will be made. How will the Corps ensure that soundings accurately reflect the volume of sediment removed and thus minimize the effect of additional deposition? The District also requires an explanation of how soundings and data reduction activities will be funded and how and when local users will transfer money to the Corps to pay for dredging and construction activities.

2. Following award of a dredging contract, the contractor is required to complete a pre-dredging sounding survey to provide a baseline for payment purposes. Post-dredging soundings are subsequently obtained by the contractor as soon as practical so that the quantity of materials dredged can be calculated. The cost of the pre- and post-dredging soundings are included in the contractor's bid price. The project cost sharing agreement will identify the process and timing of the local sponsors funds to the Corps of Engineers to pay for the dredging and construction activities.

3. **Assurance of Adequate Financial Resources.** The legislation which created the District allows limited funding of the District by the imposition of user fees for waterways and public facilities within the District's jurisdiction limited for fiscal year 1997, for example, to $300,000.00. However, because the Indiana Harbor and Ship Canal is, for a substantial portion of its useful length, a federal channel, the imposition of such fees may be blocked by federal law. Accordingly, the District's ability to raise funds from independent sources is severely limited. Contrary to the statement contained in the plan as submitted, the District does not regard the dredging of the harbor and canal and the establishment and operation of the confined disposal facility as "primarily" a local expense. Requiring local entities to shoulder the majority of the costs of the CDF is a potential stumbling block. The District urgently requests the following action:

A. The Corps and USEPA aggressively pursue securing additional federal funds for the construction of the CDF, and its long term operation and maintenance. This can be done either by direct grants, or by permitting the District, by amendment of federal law, to impose reasonable user fees to assure a reliable source of revenue to finance the project.

3.A. The proposed apportionment of costs between Federal and non-Federal interests is discussed in the Comprehensive Management Plan under the section titled Apportionment of Costs. The Federal share of the construction and maintenance of the CDF will be in accordance with the provisions of Section 201 of the Water Resources Development Act of 1996.

B. The Indiana Department of Environmental Management ("IDEM"), the Indiana Department of Natural Resources ("IDNR") as well as USEPA and the Corps should likewise press the Indiana General Assembly and the executive branch of the state government to allocate sufficient state funds to assure financing of the project. The District believes that the contribution made to governmental revenue by the citizens of the area and the industries whose

3.B. The U.S. EPA and the Corps will not lobby the Indiana General Assembly to provide state funds for this project. Such action is the responsibility of the East Chicago Waterway Management District and other local interests. However, the Federal agencies can provide technical and funding requirements to the local interests to assist in their discussion with the General Assembly.

business depends on the canal more than justifies substantially increased state commitments.

C. With respect to those federal funds already committed through the Corps of Engineers and other sources, the document as now drafted does not provide a firm estimate of federal contributions now authorized and likely to be authorized and, more importantly, the timing of their availability. The District realizes that this necessarily involves estimates which may not prove to be entirely reliable, but the District requires this information for sound planning of its activities.

3.C. See response to comment 3.A. above. Schedules for Federal and non-Federal funding requirements will be developed during the negotiations for Project Cost Sharing Agreement (PCA).

4. **Permitting Issues.** As owner of the real estate upon which the confined disposal facility will be established, it is clear that under current environmental legislation the District must be at least a co-permitee of several permits necessary to implement the project. The District intends to apply for and hold permits necessary for the remediation of the ECI site and the construction, operation, and long term maintenance of the CDF. In order to begin the process, the District requests the Corps' assistance in compiling a reliable comprehensive list of federal, state and local permits which will be required for this project. Either as part of its local sponsorship agreement with the Corps or through some other instrument, the District will require technical assistance in preparing aspects of permit applications. Assurance that this will be available to the District is of primary concern. Again, an allocation of what functions the District versus the Corps will perform in securing permits must be specified at the earliest possible date.

4. The U.S. EPA and USACE will be identifying the permits that will be required to develop and implement the project during the detail design phase. The Federal agencies will assist in the technical aspects of the permit application process as requested by the Waterway Management District (WMD).

5. **Liability and Closure Issues.** As in the case of other funding mechanisms, the plan does not include a clear statement of how the District, as owner of the real estate, will fund environmental closure and potential liabilities. The District has an opportunity to prepare plans for funding these contingencies, but can do so only after having reliable estimates in current dollars of likely closure costs and the cost of addressing risks of liability by reason of failure of facilities or structures or other release of contaminants into the environment.

5. It is expected that funding for the RCRA closure and corrective actions at the ECI site will come from the Federal District Court Consent Decree settlement in connection with environmental claims filed by the U.S. EPA and the IDEM against the ECI estate. In 1993, the Court allocated $13.2 million in connection with these claims. The estimated RCRA closure and corrective actions costs are estimated at $11.58 million as summarized in Table 18 of the CMP.

6. **Public Participation Plans.** The District is committed to maintaining and enlarging a public process for the dissemination of information and receipt of comment and other contributions by citizens and affected organizations in the planning, construction, maintenance, and operation of the entire project. To this end, the District has already under consideration its first public participation plan. The District believes that the comprehensive management plan should include, perhaps through the local sponsorship agreement with the District, the establishment of a process to assure that there will be regular public information, meetings,

6. The Corps of Engineers and the U.S. EPA will participate with the Waterway Management District in the public participation process to be established for this project. The role of the Corps in public participation plans can be addressed during the discussions on the PCA.

and/or hearings for the duration of the project. Provision should also be made for the ongoing ability of the public to submit written comments on any issue and to provide for a timely response to such comments. The District is willing to enter into an arrangement with any of the governmental agencies involved to manage the public participation process. Moreover, the District, by and through its bylaws has contemplated the establishment of an advisory committee to include not only federal, state and local agencies having an interest in the project, but also residents and citizen groups. The District requests a formal commitment by USEPA and Corps to participate and support the work of this committee.

7. **Independent Review of Design and Construction.** To provide reasonable assurance to local residents and neighbors of the Indiana Harbor Ship Canal, the District calls upon the Corps to commission an independent review of the confined disposal facility's detailed design and a post construction review to insure that the project, as built, meets design specifications. Likewise, the District calls upon the Corps to review its plans for operation and maintenance of the facility in detail and open this issue to the public for review and comment well before the opening of the facility. Identifying a specific source of funding for quality assurance activities is also important as is a statement of the entity or entities which will be responsible for same.

7. An independent technical review (ITR) is completed in connection with every Corps of Engineers' construction project. The ITR is sometimes done with in-house personnel and sometimes by a combination of in-house personnel, individuals from other agencies, outside technical experts and consultants. The participation by specific outside individuals participating in an ITR is funded by the Corps of Engineers. If the Waterway Management District desires to establish a panel for technical peer review, it is Corps of Engineers' policy that all such advisory committee members serve without compensation in accordance with the Federal Advisory Committee Act.

B. The President of the Board of Directors of the District is authorized to forward this Resolution containing the District's comments to the responsible federal and state agencies and to such other organizations and individuals, including the public, which he determines have an interest in said Comprehensive Management Plan and Draft Environmental Impact Statement.

ALL OF WHICH IS ADOPTED as the resolution of the Board of Directors, East Chicago Waterway Management District on this 27th day of March, 1996.

James W. Knight, President

Frank Kollintzas, Vice President

John E. Carroll

Kim Lenti

Rose Parker

Robert Ruiz

March 29, 1996

Department of the Army
Chicago District, Corps of Engineers
Planning Division
Environmental and Social Analysis Branch
111 North Canal Street
Chicago, IL 60606-7206

The LTV Steel Company, Inc. ("the Company") respectfully submits its comments on the U.S. Army Corps of Engineers' (USACE) "Comprehensive Management Plan for the Indiana Harbor Canal, Maintenance Dredging and Disposal Activities", as issued by the USACE on October 19, 1995.

LTV Steel owns and operates an integrated steel plant, its Indiana Harbor Works, in East Chicago, IL and is dependent on the Indiana Harbor navigation channel for the receipt of its raw materials. The Indiana Harbor Works employs approximately 3600 people and annually produces about 3.6 million tons of raw steel.

The company supports the USACE's proposal to build a Confined Disposal Facility (CDF) at the ECI site in East Chicago and to dredge the Indiana Harbor to prescribe navigation depths.

While the company supports the dredging of the Indiana Harbor, it cannot agree with the cost allocation procedure recommended by Lieutenant Colonel Slockbower. The recommended procedure allocates costs based upon alleged benefits to non-Federal sector from savings for the closure of the ECI site. LTV Steel believes that the USACE based these allocations on two erroneous assumptions:

1) that only $12.4 million, the proceeds from the ECI bankruptcy, are available from the responsible parties for the cleanup of the site. Other Potentially Responsible Parties (PRPs) and the Superfund itself are available for sites such as the ECI property, and

2) that the alleged benefits from closing the ECI site as part of the CDF construction represents a savings to the industrial facilities that use the Indiana Harbor for shipping. While the Corps can rightly assign these benefits as non-Federal, it is improper to conclude that these savings will benefit the users of the Harbor and to require increased costs to be assigned to such entities.

1 The cost allocation proposed in the Comprehensive Management Plan is a template for assuring that the project can be funded. The assumptions made regarding funds that might be obtained from the ECI Site are conservative and based on what is known at this time. It is unclear whether or when funds from other PRPs to the ECI Site may become available. The Superfund is not available as a funding source at this RCRA Site. The exact funding of the project will be established prior to execution of the Project Cost Sharing Agreement with the East Chicago Waterway Management District, based on the funding sources that are available at that time.

2 The economic and environmental benefits to completing the project are to the entire community, but most directly and financially to the commercial shipping interests on the IHSC. The cost allocation of the project is set by national policy. The Federal government is spending over $80 million of the national tax dollars to enhance the waterway for this community. After subtracting the ECI settlement amount, the remaining share, which amounts to less than a quarter of the project, is borne locally. The Comprehensive Management Plan (CMP) proposes that local industries that wish to have sediments removed from their dock faces and other parts of the IHSC are allocated this local share. This is a reasonable proposal when analyzed on a cost per cubic yard basis and when compared to the benefit to the realized by the commercial shipping interests. The CMP outlines an example of a possible financing arrangement in the report section titled, Financing Arrangements Example. This is just an example. It will be up to the East Chicago Waterway Management District to determine exactly how the local cost sharing requirement will be funded.

Subject to the comments contained herein, LTV Steel supports the USACE's proposal for the construction of a CDF at the ECI site and the dredging of the Indiana Harbor and Canal.

Sincerely yours,

William L. West

William L. West
Director,
Environmental Control

WLW/dh
0002370.dlh

East Chicago, Indiana 46312

219 399 4191

John D. Fekete
Director, Environmental, Health & Safety

Inland Steel Flat Products

March 29, 1996

Mr. Robert E. Slockbower, P.E.
Lieutenant Colonel, U.S. Army District Engineer
USACE - Chicago District
111 N. Canal Street, Suite 600
Chicago, IL 60606-7206

Subject: Comments on Draft Environmental Impact Statement

Dear Mr. Slockbower:

We have reviewed the Draft Environmental Impact Statement (DEIS) and Comprehensive Management Plan (CMP) for the proposed dredging of the Indiana Harbor Ship Canal (IHSC). Inland supports the project as planned. The vast majority of contaminated sediments in the ship canal and turning basin are from a number of upstream sources, given the many industries and municipalities which have historically discharged wastewater and groundwater into the river system. We believe the project will provide a reasonable, environmentally sound method for all parties responsible for the removal of the contaminated sediments. As you are aware, Inland has committed $19 million to assess and clean up the IHSC portion of these sediments.

To date we have coordinated with USACE personnel (Mr. Rich Carlson, and Mr. Tom Fogarty) on technical and logistical concerns for the project. We understand that the cost of dredging borne by Inland will be based upon volume estimates made from differences in pre-dredging and post-dredging soundings. We have the following specific comment:

- USACE shows the volume for 2, 3, and 6 Docks (per Table 18 of the DEIS) as 142,000 cubic yards. Inland estimates the current in-place volumes for these same Docks as 23,716 cubic yards. We want to resolve this estimate discrepancy with the ACE.

If you have any questions, please call me at extension (219) 399-4191, or Tom Barnett at (219) 399-6296.

Sincerely,

John D Fekete

John Fekete

Utilizing revised soundings taken in December 1994, the volumes in the Inland Steel Dock areas have been revised. The current USACE volumes show 2 dock at 15,200 cubic yards, and 3 dock at 6,640 cubic yards. The volumes for 2 dock and 3 dock have been coordinated with Inland Flat Products engineers, Woodward-Clyde Consultants. The USACE has not developed a detailed volume for sediments at 6 dock. However, the USACE has determined that the average depth to the east of the Federal channel, in the vicinity of the dock, is close to the Federal channel project depth.

cc: Tom Barnett
Bill McCormick
Jim D'Orazio
Dan Banaszek - Woodward Clyde

file: condec/sediment/deis

U.S. Department
of Transportation
**Maritime
Administration**

Great Lakes Region

2860 South River Road
Suite 185
Des Plaines, IL 60018 241
(708) 298-4535

Robert E. Slockbower, P.E.
Lieutenant Colonel, U.S. Army District Engineer
Chicago District, Corps of Engineers
Planning Division, Environmental and Social Analysis Branch
111 North Canal Street
Chicago, IL 60606 7206

March 29, 1996

Dear Lieutenant Colonel Slockbower

The Great Lakes Region office of the Maritime Administration-Department of Transportation offers support for your *Comprehensive Management Plan, Indiana Harbor and Canal Maintenance Dredging and Disposal Activities*

46 In accordance with the Maritime Administration's mission to promote the development of efficient U.S. ports and enhanced mobility of freight, we embrace your plan to eliminate the present restraining conditions to waterborne commerce. Maritime transit remains a highly efficient mode of transport as highlighted by the following points:

A. Water transit is by far the most fuel efficient form of transportation when compared to haulage of cargo by either rail or highway modes.

B. Water carriers move bulk commodities more safely than on rail or highway by having the fewest numbers of incidents of any surface mode

C. Cost efficiencies of marine transport provide important economic advantages to the industries utilizing this form of transportation.

D. Air and noise pollution from maritime transit is far less than truck emissions.

E. Transit via water has few congestion problems and seldom adds them to busy urban areas.

Comments are noted.

Our Washington, D.C., Office of Environmental Activities, provides the following comments: "The U.S. Environmental Protection Agency (EPA) and the Chicago District of the U.S. Army Corps of Engineers (Corps) have performed an outstanding study in order to resolve the dredging problem in the Indiana Harbor. The deepening of the Indiana Harbor will reduce commercial navigation transportation costs while improving the environment by removing contaminated sediments which threaten to spread to and pollute Lake Michigan. Based upon our review of the DEIS, we concur with the EPA and Corps' position on the Energy Cooperative Site, Inc. location as the most cost-effective and environmentally sound disposal option."

"We also agree with the Corps that dredged materials should under no circumstances be considered solid wastes. As you know, however, that runs contrary to EPA's position that part of Indiana Harbor's dredged sediments should be considered solid wastes and therefore, be subject to the provisions of Resource Conservation and Recovery Act."

"Finally, the findings of both the Comprehensive Plan and DEIS appear all encompassing and we hope that the Indiana Harbor proceeds with the necessary dredging operations, suspended since 1972 due to lack of suitable disposal options."

Collectively, the Maritime Administration's Office of Environmental Activities and the Great Lakes Region office support the Indiana Harbor and Canal *Comprehensive Management Plan.*

Sincerely,

Floyd Miras
Transportation Specialist

Amoco Petroleum Products
Refining Business Group
Whiting Business Unit
2815 Indianapolis Boulevard
Post Office Box 710
Whiting, Indiana 46394 0710
219-473-7700

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 29, 1996

Lieutenant Colonel Robert E. Slockbower
Department of the Army
Chicago District, Corps of Engineers
111 North Canal Street
Chicago, IL 60606-7206

Comments on the Comprehensive Management Plan and Draft Environmental Impact Statement - Indiana Harbor and Canal

Dear Sir:

Amoco appreciates the opportunity to comment on the Comprehensive Management Plan and draft Environmental Impact Statement (draft EIS) on the proposed maintenance dredging and construction and operation of a confined disposal facility at Indiana Harbor and Canal, at East Chicago in Lake County, Indiana.

Amoco strongly supports the dredging of the Indiana Harbor Ship Canal. Dredging the Canal will remove contaminated sediment that has accumulated since the Canal was last dredged in 1972 and also improve shipping. Removal of the contaminated sediments is an integral part of the Remedial Action Plan that has been developed for the Grand Calumet and nearshore Lake Michigan Area of Concern. The dredging should result in a improvement in water quality because much of the present water quality concerns arise from resuspension of contaminated sediment. In addition, the deeper, dredged area will serve as a sediment trap and prevent migration of sediment into Lake Michigan. Locating the confined disposal facility at the ECI site also provides a mechanism for controlling contamination from the ECI site.

We urge USACE to continue to keep Amoco involved throughout the project. Since Amoco property is adjacent to the ECI site, any alterations to ground water table and gradients resulting from the slurry wall and associated activities will directly impact the ground water under Amoco property and potentially some of

The containment activities proposed for the ECI site should have no negative impact on remediation systems presently being operated by the Amoco facility. The containment system may in fact benefit Amoco by reducing the amount of contaminated groundwater presently being pumped and treated in their wastewater treatment facility.

Amoco's remediation systems. USACE should keep Amoco appraised of any activity that could potentially impact Amoco. We could work with the USACE project team to understand and minimize any adverse impacts the confined disposal facility may have on Amoco's remediation systems.

The USACE will keep Amoco informed of all activities related to the containment system at the ECI site and any potential offsite impacts.

We support your decision to dredge the federal channel in the west branch of the Lake George Canal adjacent to the Amoco docks. In addition, we are also interested in coordinating the dredging of the dock face area with you to make sure that the area adjacent to Amoco's docks is dredged at the same time as the federal channel. We have not however, decided on the best way to handle the dredged material from the area adjacent to our dock face. A possible cost sharing scenario which lists Amoco as an entity sending dredged material to the confined disposal facility is presented in Table 18 of the draft EIS. Amoco has not made any decision about sending any material to the confined disposal facility since issues such as liability, have not been addressed as yet.

Comments are noted.

Again, Amoco supports the dredging of the Indiana Harbor and Canal. Please keep us appraised of the project status so that we can coordinate dredging of the dock face adjacent to the Amoco dock with your actions. Communication between USACE and Amoco is also essential to make sure that activity on the ECI site will not impact Amoco operations, particularly our remediation systems. Please contact me at (317) 473-3740 if you have any questions.

49

Sincerely,

Shiv Baloo/LRF

Shiv Baloo
Team Leader - Water

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Custom House, Room 244
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2904

REPLY REFER TO

ER 95/798

April 1, 1996

Comment Noted.

Lt. Colonel Robert E. Slockbower
District Engineer
U.S. Army Corps of Engineers
Chicago District, Suite 600
111 North Canal Street
Chicago, Illinois 60606-7206

Dear Colonel Slockbower:

The Department of the Interior (Department) has reviewed the revised draft Comprehensive Management Plan (CMP) Report for the Indiana Harbor and Canal (IHC) Maintenance Dredging and Disposal Activities, City of East Chicago, Lake County, Indiana. The CMP Report consists of a Feasibility Report (FS) and Draft Environmental Impact Statement (DEIS), and supporting Appendices. We have the following comments and recommendations.

GENERAL COMMENTS

The presently proposed CMP is the result of many years of effort on the part of the U.S. Army Corps of Engineers (Corps), the U.S. Environmental Protection Agency (USEPA), and other interested parties, including the U.S. Fish and Wildlife Service (Service), to find a suitable disposal site to allow for the removal of the contaminated sediments from the IHC. In response to various earlier plans, the Service has provided a number of reviews and reports, including a draft Fish and Wildlife Coordination Act (FWCA) Report, dated January 30, 1989. The Service will be providing its final (updated) FWCA Report by the end of May 1996, as well as a Biological Opinion regarding potential project effects on the peregrine falcon by May 22, 1996. Unfortunately, our present review of the CMP Report is not as thorough as it might have been, due to the fact that the Service will not complete the FWCA report for another two months. Accordingly, we request that the Corps carefully consider the comments and recommendations of the FWCA report (and Biological Opinion) in preparing the final CMP Report.

Both the Department and the Service believe that a dredging project in the IHC could provide significant environmental benefits to the IHC and to the adjacent area of Lake Michigan. Based on the high degree of sediment contamination found

throughout the IHC, we support the selection of Dredging Alternative 3, which will result in the maximum removal of the in-place, contaminated sediments, and the use of the former Energy Cooperative, Inc. (ECI) site for disposal. The use of the ECI site, with the integration of the Resource Conservation and Recovery Act (RCRA) closure and corrective action requirements, should ultimately result in controlling the hazardous substances currently migrating from this site to the IHC and Lake Michigan.

While we support the concept and scope of the proposed dredging, and the selection of the ECI site for the Confined Disposal facility (CDF), we have questions about the proposed selection of mechanical (closed bucket) dredging in lieu of hydraulic dredging. We believe that the latter method would result in less sediment resuspension and release of petroleum hydrocarbons. The development of selection criteria and comparisons of the two dredging methods to them were not as fully discussed in the CMP Report as we believe are needed to ensure that the public has the information necessary to evaluate the appropriateness of the preferred alternative.

We are pleased with the decision not to place these contaminated sediments in the Inland Steel lakefill, as we believe this would lead to adverse impacts to fish and wildlife in the nearshore Lake Michigan waters for decades to come. For the sake of brevity, we have not included all of the reasons why the Inland Steel CDF site should no longer be considered as a possible disposal area for the highly contaminated sediments of the IHC, even if the ECI site were later rejected as the site for the CDF.

As discussed during the February 14, 1996 meeting with District representatives, the Secretary of the Department of the Interior is a designated trustee for certain natural resources under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Oil Pollution Act (OPA). This authority provides natural resource trustees the ability to seek restoration for injuries associated with the release of hazardous substances or discharges of oil into the environment. A defense position against a claim for natural resource damages under CERCLA is the "irreversible and irretrievable commitment of natural resources" identified in an environmental impact statement.

The Department's preliminary review of the Indiana Harbor Canal indicates injury to trust resources associated with the ongoing release of hazardous substances into the environment. The immediate concern for the Department as a natural resource trustee is the containment of the hazardous substances in order to eliminate potential sources of ongoing contamination. The EIS should state in the Summary, Section 1, and in Section 4.6, page EIS 74, "A major objective of the dredging is to eliminate or

Pg2,¶1

("While we support the concept....")

As stated in the CMP and draft EIS, mechanical (by closed clamshell bucket) dredging is the recommended method over hydraulic. The advantages of mechanical as applicable to this project are outlined in page 97 of the CMP and sections 3.6.9 and 5 of Appendix H. The following paragraphs will expand on the advantages by comparing the CDF effluent quality/quantity and CDF drying/disposal operational procedures for the two dredging methods. In addition, resuspension sampling results collected during the 1994 maintenance dredging of Calumet River, when the river was dredged mechanically using a closed clamshell bucket, will be summarized.

Comparison of effluent quality and quantity. Hydraulic dredges typically add four or more volumes of water for each volume of in-place sediment removed while mechanical dredging remove sediment with little or no change in water content. The additional volume will increase treatment costs. The Corps' Waterways Experiment Station (WES) estimated the constituent concentration for the hydraulic and mechanical disposal into an in-lake CDF. The water quality for hydraulic disposal had concentrations 10 to 1000 times higher than for mechanical disposal. With hydraulic dredging, the water quality standards for ammonia, arsenic, cadmium, lead, and nickel were exceeded. In the same report, WES performed a modified elutriate test on the sediment to predict water quality and found elevated levels of Aroclor 1248 for the unfiltered water (see Table E-6). The modified elutriate test simulates the effluent from a CDF containing sediment which has been hydraulically dredged.

Comparison of drying and disposal operational procedures. Dredging of the channel is designed to maintain authorized navigation depths for commercial traffic. Maintaining authorized depths will also reduce the sediment loadings to the lake because the channel will function as a sediment trap. The dredging project is designed to dredge the sediment accumulated since 1972 within the first seven to eight years (backlog dredging), and then perform maintenance dredging for the remaining years of the project. Because each lift of the dredged material in the CDF needs to be consolidated for placement of the next lift, it is critical that the dredged material be dried out before the next dredging event.

The disposal operation proposed for dewatering, consolidation and stabilization of the dredged material is most effective when the water content of the material is minimized to the extent possible. The minimum practical water content allows thinner lifts of material to be placed in the CDF and maximizes the drying period for rapid consolidation and stabilization of the dredged material.

Experience at other Corps' CDFs indicated that stabilizing dredged material placed by hydraulic methods can take up to three years, while those of mechanical methods can be achieved in one year. During backlog dredging, dredging cycles are every other year per cell and drying must be accomplished within the off year in order to meet the disposal schedule. Given this time frame, hydraulic dredging would not allow sufficient drying time between the dredging events.

Resuspension during mechanical dredging. A recent report by the Chicago District (1995, Report on Maintenance Dredging of Calumet River) contains water quality monitoring results for an enclosed or closed clamshell dredge. The Calumet River, which has sediment with physical parameters similar to Indiana Harbor, was mechanically dredged in December 1994. The dredging specification required the use of a clamshell bucket designed and manufactured as an enclosed bucket. The total suspended solids (TSS) samples were monitored at approximately 1 foot below surface and mid-depth. The samples were collected 100 feet upstream of the dredge (background) and 100 and 500 feet downstream. The average TSS of the surface samples within 100 feet of the dredge was 50 mg/l with a background of 45 mg/l. The average of the mid-depth samples within 100 feet of the dredge was 56 mg/l with a background of 67 mg/l. The average TSS concentration of the monitoring station located 500 feet downstream of the dredge was slightly lower than the monitoring station located 100 feet downstream of the dredge. In summary, the TSS samples did not differ significantly between upstream and downstream monitoring stations within 100 feet of the closed clamshell as compared to the worst case situation of the 500-800-foot long plume created by a standard clamshell as discussed in section 4.6.2 of Appendix H.

Pg2, ¶3 - Comment noted. Document was revised to accommodate the concern.

Pg2, ¶4 - The following should be added to the Summary and the Section 4.6 of the EIS (Rich Carlson has the document on computer): "A major objective of the dredging is to eliminate or contain contamination from the harbor and canal through removal of the source contamination. While there may be incremental impact to or loss of natural resources due to dredging, dredging is not an irreversible or irretrievable commitment of natural resources, dredging is needed to minimize the long-term impacts of continuing releases of contaminants into the system."

contain contamination in the harbor and canal through the removal of the source contamination. While there may be some incremental impact on or loss of natural resources due to the dredging activities, the dredging is not an irreversible or irretrievable commitment of any natural resources but is meant to minimize the long term effects of continuing releases of contamination into the system".

SPECIFIC COMMENTS ON MAJOR ISSUES

Remediation of Upstream Contaminant Sources

Various parts of the revised draft CMP Report (pages 11-14, EIS-xiii, EIS-6, and C-43 and 44) provide information concerning investigations and remedial/enforcement activities occurring primarily upstream of the IHC project area. Municipalities involved include the sanitary districts of Hammond, East Chicago, and Gary; and industries include USX (US Steel). The outcomes of these efforts to reduce both discharges and in-place sediments as sources of contaminants are obviously important to the long-term success of the CMP in contributing to the improvement of the quality of the bottom sediments and water quality in the IHC area. Some of the information provided appears to be seriously out-of-date, particularly concerning enforcement actions against the East Chicago Waste Water treatment plant (page C-43, section 6.6.7), the Hammond Sanitary District Clean Water Act case (page EIS-6, section 1.4.4), and the Gary Sanitary District (page 14). We recommend that information on the current status of all of the subject enforcement actions/Consent Decrees be updated in the appropriate parts of the final CMP Report. We also recommend that in at least one location in the final CMP Report, all of the updated information be consolidated to present a complete and accurate picture of what is happening or planned.

Page 12 of the FS states that future "environmental dredging" pursuant to Consent Decrees negotiated between the USEPA and various facilities will reduce the amount of sediment entering the IHC navigation channel in the future. It would be beneficial to clarify the type of environmental dredging -- closed bucket or hydraulic -- likely to be used, and whether the reduced sediment inputs were considered in projecting quantities for future IHC maintenance dredging.

On page EIS-1 (section 1.1.5), the DEIS states that this project may serve as an example for other dredging projects. However, it is our understanding that the other major dredging project currently being planned in the Grand Calumet River/IHC will differ significantly from the subject project in that it is being planned as a hydraulic dredging project. Please identify

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Pg3, ¶1.
There are a significant number of other ongoing and recently completed enforcement matters. A good summary of the enforcement action is contained in the December 1997 Stage II RAP. Chapter 5 contains a section on Administrative Orders, Consent Orders and other actions in support of RAP goals (pp. 111-116). In addition, the U.S.EPA and the U.S. Fish & Wildlife Service recently settled a case with industrial users of the Hammond Sanitary District which discharges to the Grand Calumet River.

Pg3, ¶2.
The USX environmental dredging will be accomplished by isolating the dredging area with a cofferdam and then using a mechanical bucket dredge to complete the dredging. The type of dredging equipment to be used for other Consent Decree dredging has not been identified. In projecting quantities for future IHC maintenance dredging a sedimentation analysis was developed based on past sediment deposits in 1972, 1984/1985, 1990, and 1991/1992. A dredging model was constructed based on the sedimentation rates from the analysis, dredging volumes, and bank sloughing and used to estimate future dredging quantities in the Federal channel and environmental dredging areas. A closed bucket dredging operation will be used for the environmental dredging.

Pg3,¶3.
Other dredging projects for which this project may serve as an example are Buffalo Harbor and River, NY, and Ashtabula River, OH.

specific dredging projects for which the proposed project may serve as an example.

Page 13 of the FS states that in the eastern 5 miles of the East Branch Grand Calumet River "the (US Steel) characterization study showed that fully one-third of the 66 samples taken contained PCBs at concentrations greater than or equal to 500 parts per million. Sediments were contaminated with PCBs or elevated levels of hazardous wastes at 27 of the 36 transects." We assume that this quote must refer to the 1991 draft version of this document, because in the January 1993 final characterization document, PCB sediment concentrations were either revised downward or not reported due to insufficient samples to reanalyze. If this assumption is correct, further clarification of the study results should be provided in the final CMP Report.

Page 13 of the FS indicates that the USEPA and Indiana Department of Environmental Management (IDEM) are in the process of gathering data to use in the development of a "TMDL" (Total Maximum Daily Load) approach to address pollution sources on the Grand Calumet River. Provision of an update on the status of this effort in the final CMP Report would be helpful.

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It is our understanding that the "whole effluent toxicity testing" (WETT) on the combined sewer overflows (see page 13 of the FS) was conducted in 1993. If the results of this testing are available, they should be included and discussed in the final CMP Report.

Water Column Impacts

While we concur that a dredging project would have significant overall benefits to the IHC area, we are concerned about the temporary water column impacts resulting from the dredging operations, and whether these impacts will be appreciably greater with the proposed mechanical dredging than they would be with alternative hydraulic dredging. We recommend that the information on dredging impacts, which is presented on pages 54-55 of the FS, EIS-56, EIS-57, EIS-64, and H-11 to H-22, be enhanced to provide a clearer indication of the relative differences between these two types of dredging. For example, it would be helpful to contrast important factors in a table, such as the expected size of the dredging plume, concentrations of suspended solids, and rates of dispersion or settling.
We agree that there will likely be some water quality impairments associated with increases in ammonia and decreases in dissolved oxygen associated with the dredging operation. It is possible that some fish mortality will be observed.

Pg4. ¶1. - PCB sediment concentrations were reanalyzed after the 1991 draft version of the document. Comment noted - text revised.

Pg. 4.¶2.
The U.S. Army Corps of Engineers has issued a contract for development of a sediment transport model to estimate loadings to the water column during dredging. The estimates of sediment transport will be used as inputs to the TMDL modeling. IDEM is currently addressing this issue in relation to the Great Lakes Initiative and the effect these rules may have on the loading allocation process. IDEM controls CSO's through NPDES permits, and it is anticipated that CSO's will contribute less contamination over time as stricter controls are required.

Pg4. ¶4.
The water column impact from closed clamshell mechanical dredging is discussed in the response to Pg2.¶1 comment. The water column samples (TSS) did not differ significantly between upstream and downstream monitoring stations. Based on these results, the water column impact from mechanical dredging appears to be less of a concern as the increased water volume requiring treatment, water quality, and drying constraints which will occur with hydraulic dredging. In addition, as mentioned in Sections 3.2.4, 3.4.7, and 3.6.9.3, a skilled operator is a major component of reducing the resuspension versus type of dredge. Section 4.3.1.2.4 describes localized dredging impacts and the potential for toxicity to fish and other aquatic organisms.

A dispersion model developed by the Corps of Engineers' Waterways Experiment Station (WES) was used to simulate the potential for creation of an ammonia plume around the dredging operation. Using site information and insitu ammonia concentrations, the model predicted a maximum ammonia concentration of 1.9 mg/L. Historic water quality data shows that background ammonia concentration in the canal ranges from <1 to 5 mg/L.

Page H-18 (section 4.6.2) mentions an in-situ assessment of suspended sediment downstream of a standard clamshell dredging operation in Calumet Harbor. While it is likely that sediment particle size does not differ significantly between this area and the IHC, we are not aware of the Calumet Harbor having as serious a petroleum hydrocarbon contamination problem as does the IHC. The Department is very concerned about resuspension of contaminated sediments (up to 800 feet away from the operating dredge), specifically the creation of oil sheens, from dredging on the IHC. Such sheens already occur on the IHC without dredging and may worsen with dredging.

Section 4.6.3 indicates that 30 to 70 percent reductions in turbidity over that experienced with a standard clamshell dredge can be expected with the use of a closed bucket clamshell (a 1978 Corps report is referenced). Section 3.2.4 (page H-4) indicates that the amount of sediment resuspended by a closed bucket clamshell, when used by an experienced operator, can be reduced to levels similar to those caused by a hydraulic dredge. Unfortunately, no detailed data or report reference is provided in the CMP Report to support this claim. The CMP Report could be substantially improved by including a synopsis and analysis of the findings of pertinent investigations concerning the sediment resuspension characteristics of hydraulic dredges and any additional data available for closed bucket clamshells. Unless the requested analysis convincingly demonstrates the fact that closed bucket clamshell dredging is unlikely to result in appreciably greater sediment resuspension and release of petroleum hydrocarbons than would hydraulic dredging, a more detailed analysis of the feasibility of the use of hydraulic dredging should be provided in the final CMP Report. Please see our comments below regarding dredging technologies for further discussion of this issue.

The overall benefits of the closed bucket method of dredging may still outweigh the impacts of temporary oil slicks, but the true effectiveness of booms to control this problem should be discussed in greater detail. Costs associated with constant use of booms and absorbents can be prohibitive, and infrequent maintenance (as with some booms currently deployed in the IHC) can result in a serious wildlife hazard. These issues should be explained in greater detail. While we agree that the use of silt curtains would not be an effective technique to control these problems, many of the same factors adversely affecting the use of silt curtains will likely result in reduced effectiveness of booms.

We recommend that the discussion of water column impacts on pages ETS-54 and 55 be revised, as much of this information is redundant (e.g. sections 4.2.3.2.4 and 4.2.3.2.11).

Pg5, ¶1. (Page H-18 ...)
Refer to section 4.6.6 in Appendix H regarding the use of oil booms. Section 4.6.6 recognizes the issue discussed in the comment. The extent of oil release will be monitored during dredging and appropriate mitigation measures (booms, absorbents) will be implemented. See last paragraph in response to Pg2, ¶ 1 comment for resuspension discussion.

Pg5, ¶2. (Section 4.6.3 indicates...)
See last paragraph in response to Pg2, ¶ 1 comment for resuspension discussion. Refer to USACE (Hayes, 1988) referenced in Appendix H for detailed analysis of various dredging methods. Slight resuspension impacts near the dredge are not significant enough to warrant the use of hydraulic dredging techniques unless very low water content methods are developed in the future than can reduce the sediment drying and consolidation time and mitigate the cost of added return water treatment and attendant pollutant losses.

Pg5, ¶3. (The overall benefits...)
Comment noted. Spill prevention plans will be developed in the design phase.

Pg5, ¶4. (We recommend...) Comment noted.

On pages EIS-xi and EIS-56 (section 4.2.3.3.4), potential spills associated with rehandling of dredged sediments are discussed. The final CMP Report should provide additional information on precautions and spill-related water quality countermeasures that will be developed prior to implementation of dredging.

Pg6, ¶1 On pages EIS-xi ...)
As stated in sections 4.3.2 and 4.3.3 of Appendix N, the contractor will be required to submit plans for rehandling. A section of the construction or quality control plan will address safeguards to prevent spillage.

Dredging Technology Issues

If convincing data are not available that the use of closed bucket clamshell mechanical dredging is unlikely to result in appreciably greater sediment resuspension and release of petroleum hydrocarbons than would hydraulic dredging, we believe that a more detailed analysis of the feasibility of the use of hydraulic dredging in connection with the ECI CDF should be provided in the final CMP Report. Neither the FS nor the DEIS provides a detailed alternatives analysis to support the proposed selection of mechanical dredging. Instead, both refer the reader to Appendix H. However, on pages H-3 to H-11, Appendix H provides only general information on available dredging technologies and selection criteria, provides a cursory analysis of the technologies relative to the criteria (with no specific reference to the ECI site or any of the other disposal sites under consideration), and then ends by concluding that mechanical clamshell is the recommended dredging method.

Pg6, ¶2. (If convincing data...)
See last paragraph in response to Pg2, ¶ 1 comment for resuspension discussion. Refer to USACE (Hayes, 1988) referenced in Appendix H for detailed analysis of various dredging methods. Slight resuspension impacts near the dredge are not significant enough to warrant the use of hydraulic dredging techniques unless very low water content methods are developed in the future that can reduce the sediment drying and consolidation time and mitigate the cost of added return water treatment and attendant pollutant losses.

The dredging technology selection criteria presented on pages H-8 and H-9, and 97-98 do not indicate that disposal site limitations are of primary importance in the selection of the dredging method. However, it is stated on page H-11 that the use of dredging methods other than mechanical will be considered "if these methods can be made to transport sediments at near insitu water contents, as is the case for mechanical dredging." If the quantity of water delivered to the ECI CDF with the dredged sediments is the legitimate overriding factor to be considered in the selection of a dredging method, which it may well be, it should be so stated and sufficient analysis should be provided in the final EIS (not just in the appendix) to support the conclusion.

Pg6, ¶3. (The dredging technology...)
See response to Pg2, ¶ 1 comment (first 4 paragraphs only). The quantity of water delivered with the dredged sediments is an overriding factor in this dredging project with this material.

Additional information addressing the technical difficulties associated with the need to collect, remove, and treat the substantially larger volumes of water generated from hydraulic dredging could assist the reader of the document in understanding the decision to eliminate this method from further consideration, especially since closed bucket dredging is indicated to be nearly twice as expensive as pipeline dredging for amounts exceeding 100,000 cubic yards (page H-11). The treatment of decant water, regardless of which dredging method is ultimately selected,

Pg6, ¶4. (Additional information...)
Comment noted. The costs in Table H-3 are generic in nature and do not reflect the total project costs because they do not include construction, operation, and maintenance of the facility. Treatment of decant water is included in response to Pg2, ¶ 1 comment.

remains a concern and is addressed in more detail in the next section of this letter.

The dredging technology selection criteria presented on pages 97-98 and pages H-8 and H-9 did not include environmental impacts. Some of the criteria that are discussed in Appendix H, such as equipment availability, and abandoned cars in the areas to be dredged (we are not aware of any) appear to be rather weak rationalizations for not using hydraulic dredging. Distance to the disposal site is another weak argument against hydraulic dredging, as the ECI site adjoins the project area. If any landowners were to be inconvenienced, it should be remembered that they are also primary beneficiaries of this project. With a benefit-cost ratio of almost 4 to 1, this project could afford the additional upland piping costs, if necessary. Navigation hazards associated with in-stream piping would likely be a legitimate issue, as it will be with adequate boom deployment.

If additional analysis of the feasibility of using hydraulic dredging continues to appear to be impractical for the majority of the IHC dredging, perhaps using a combination of closed bucket and hydraulic dredging (the latter for the PCB hot spots) should be considered to reduce environmental impacts and maximize environmental benefits.

Water Treatment Issues

The provision of adequate treatment of the decant water collected from sediments deposited in the ECI CDF, regardless of which dredging method is ultimately selected, remains a major concern. On page EIS-60 (section 4.2.4.3.11), the City of East Chicago's commitment to treat water from the CDF is presented. The final CMP Report should elaborate on the nature of the commitment made by the City of East Chicago regarding the acceptance of water generated at this CDF via mechanical dredging, and what other alternatives exist to ensure adequate treatment if East Chicago does not honor this commitment.

The discussion in Appendix F (page F-85) on CDF effluent water treatment is very helpful to our understanding possible treatment options. If possible, the final CMP Report should indicate how this information might be factored into final CDF design plans. On page EIS-10 (section 2.3.3.3.4), the document mentions filtration/carbon sorption as a water treatment practice that was considered for one of the other potential CDF sites. However, it is unclear if its use will be recommended at the ECI site.

Appendix I was helpful to our understanding East Chicago's Waste Water treatment plant capabilities. However, this Appendix

Pg7, ¶1. (The dredging technology ...)
The main reason hydraulic dredging is not being consider is this dredging method currently requires substantially higher volumes of water relative to mechanical dredging in order to transport the slurry. This water requires expensive treatment prior to being discharged back to the adjacent watercourse. The sediment drying and consolidation time is also greatly increased. Therefore, there would be both significant additional capital cost and operating cost associated with the treatment system. Also, it has been shown that when using a closed bucket clamshell the turbidity and suspended solids are localized near the dredge. Data taken during dredging a the Calumet River shows that suspended solids at a distance less than 100 feet were the same upstream and down stream of the dredge. In the future, if hydraulic dredging methods were shown to be similar in water content to existing mechanical methods they would be considered.

Pg7, ¶2. (If additional analysis...)
Comment noted. See response to Pg7, ¶ 1 comment above.

Pg7, ¶3 (The provision...)
The current confined disposal facility plan no longer includes pretreatment on site and subsequent discharge to the East Chicago wastewater treatment plant. The current recommended plan provides for complete treatment on the CDF site and discharge directly back to the Lake George Branch. Final design work will include bench testing to determine treatment necessary to allow for discharge directly to the waterway. Final determination of manner of discharge will be made after further coordination with State and U.S. EPA.

Pg7, ¶4. (The discussion...)
See response above comment Pg 7,¶2 on City of East Chicago's wastewater treatment plant. With respect to treatment options the following are being evaluated in treatability tests: equalization, oil/water separation, sand filtration, chemical precipitation, biological treatment and carbon absorption.

Pg7, ¶5. (Appendix I ...)
The current confined disposal facility plan no longer includes pretreatment on-site and subsequent discharge to the East Chicago wastewater treatment plant. The current recommended plan provides for complete treatment on the CDF site and discharge directly back to the Lake George Branch. Final design work will include bench testing to determine treatment necessary to allow for discharge directly to the waterway. Final determination of manner of discharge will be made after further coordination with State and U.S. EPA.

should be updated to reflect recently proposed (January 1996) revisions to East Chicago's National Pollutant Discharge Elimination System (NPDES) permit. On page I-5, Table I-2 presents East Chicago's pretreatment standards, except for PCBs. This omission, if it is one, should be corrected in the final CMP Report.

Table E-6 presents elutriate test results for the IHC sediments. Contaminant levels present, including PCBs, are cause for some concern. Given this data, if the CDF elutriate is not treated by at least filtering it, any possible waste water pretreatment standards for PCBs are unlikely to be met.

Sediment PCB Hot Spots

The FS and its supporting documents discuss two areas of the IHC (Reach 6 and Reach 13, Figures 13 and 14) where sediments contain elevated levels of PCBs. The deeper sediments are more highly contaminated than the surficial sediments, and will be exposed to the water column as a result of the proposed project dredging of the surficial sediments to navigable depths (pages 14, 62-64, EIS-64, E-11, H-16 and H-17). We are concerned about the exposure of aquatic fauna to these higher concentrations and recommend that the Corps address ways in which the exposure can be minimized. For example, the Corps should consider dredging these areas to depths at which the PCB concentrations are at environmentally safe levels, or possibly capping the areas with relatively clean material.

On pages 62-64, the three dredging alternatives are discussed. On page 64, Alternative 3 is said to include all of Alternative 2, plus some additional areas associated with Inland Steel. On page 61, Table 7 presents the estimated sediment volume to be dredged on a transect-by-transect basis. This table indicates that under Alternative 3, relative to Alternative 2, 14,000 yd^3 and 10,000 yd^3 less sediment will be dredged out of Reaches 6 and 13, respectively. This apparent contradiction should be explained. We encourage the maximum sediment removal from these highly contaminated areas to reduce or eliminate ecological risk and maximize net environmental benefits. As previously mentioned, perhaps additional measures can be taken in these areas to address ecological concerns associated with leaving these sediments in place.

ECI Site Issues

Pages 65-75 of the FS presents information on the ECI site alternatives. As previously mentioned, this site in its current

Pg8, ¶1. (Table E-6...)
The high PCBs in Table E-6 is one reason why mechanical dredging is preferred to hydraulic dredging. The unfiltered modified elutriate analysis for Aroclar 1248 was 31.5 mg/L (see Table E-6) and the predicted concentration of PCBs in the CDF untreated effluent using mechanical dredging is 0.00004 mg/L (see Table E-26). The modified elutriate test simulate the effluent from a CDF containing sediment which has been hydraulically dredged.

Pg8, ¶2. (See response to Pg8, ¶1 above.
Based on the evaluation of historic canal levels (Appendix O), the sediment deposition rates in the canal will probably be on the order of three inches per year in reaches that have been dredged. Thus, cleaner sediments from upstream will tend to cover hot spots that may have been exposed by dredging. If potential monitoring shows that the deposition rates are lower, sand or gravel could be used to cover exposed materials in the hot spot reaches.

Pg8, ¶3.
Utilizing new soundings taken in December 1994, the volumes to be dredged out of reaches 6 and 13 have been revised. For Alternative 2, the current amount to be dredged out of reaches 6 and 13 is 46,300 cubic yards and 431,800 cubic yards respectively. For Alternative 3, the current amount to be dredged out of reaches 6 and 13 is 45,100 cubic yards and 442,100 cubic yards, respectively. The differences in amounts are in part due to the sediment trap efficiency of each area. The quicker or more often an area is dredged, the more sediment will settle. Therefore, with a better trap, in the long term, more sediments will have to be dredged.

Pg8, ¶4-Pg9,¶3 - Under the current recommended CDF plan the railroad spur will be relocated to the north end of ECI site. Rain water which might infiltrate through the bedding can be accommodated by the hydraulic gradient control system.

unremediated condition poses serious environmental threats. The placement of a CDF on it as part of a RCRA closure is a viable alternative. However, it seems very unfortunate that the railroad spur that bisects the northern parcel of property can not be relocated to the northern boundary of the site. The primary purpose of a RCRA clay cap is to prevent rain-water percolation through the facility. The final CMP Report should address whether there is sufficient cap runoff and percolation potential within the railroad spur right-of-way to stress the groundwater control system that is to contain groundwater within the site's slurry wall. Any additional measures that might need to be considered to address this potential influx of water to the site, if it is considered to be a problem, should also be discussed.

The U.S. Geological Survey has noted that the CMP Report says little about ground-water flow at the ECI site (page EIS-25). Site specific studies have been conducted at the CDF site by private consultants and by the IDEM. This information should be available and could be used in the site assessment.

Soil and ground water at the proposed CDF site are contaminated by free-phase hydrocarbons (p. EIS-24). Any effect that the presence of these materials may have on the installation of the slurry wall should be discussed in the final CMP Report. Any effects on the east side of the CDF as a result of pumping ground water should also be discussed.

On page EIS-x and xi, the use of alternative construction materials for the ECI CDF is discussed. We question the wisdom of experimenting with alternative materials, given the high level of contamination of the sediments to be contained.

On pages EIS-xii and EIS-62 (section 4.2.5.3.7), the placement of the Toxic Substances Control Act (TSCA)-regulated PCB sediment into the CDF cell is discussed. This discussion should be expanded to identify the timeframes and conditions under which this portion of the CDF would be active. This information would assist in the assessment of any potential wildlife risks associated with this facility. Despite statements made in Appendix D (section 7.2, which is misnumbered as 6.2) and on page EIS-68 (section 4.3.2.3.9), operating CDFs can be a significant contaminant pathway to wildlife. More information in this regard will be provided to the Corps in the final FWCA Report.

The earthworm contaminant uptake studies conducted by the Corps and discussed on pages EIS-66 (section 4.3.2.3.3) and E-34 (section 6.6.5.2) confirm the need for a comprehensive "wildlife exclusion plan" (WEP). The CDF WEP needs to be developed in

Pg9, ¶1. (The U.S. Geological Survey..)
A general discussion of the soils, geology, and hydrology of Indiana Harbor appears in Appendix L of the CMP/DEIS. The site specific groundwater studies to date (1994-1995) indicate that the groundwater surface in the Calumet (surficial) aquifer under the site mirrors the ground surface elevations. The water table is peaked in the middle of the site with the gradient causing flow radially out towards the perimeter. The gradients vary around the site, being very flat on the north and west sides and steep on the south and east sides. The East Chicago sewer line and the Amoco groundwater recovery system at the along Indianapolis Blvd. are probably responsible for the steepness of the gradient along the east side of the site. A groundwater skimming system is operating on the south and southwest sides of the ECI site and is apparently the cause of the steep gradients at these locations.

The regional flow in the bedrock aquifer is from the recharge zone in the Valparaiso Moraine towards Lake Michigan. Locally, around the CDF, there is a depressurization of the bedrock aquifer. The hydraulic head difference between the surficial (Calumet) aquifer and the bedrock aquifer is 40 feet. The result is a vertically downward component of the groundwater gradient. The Calumet Aquifer is separated from the bedrock aquifer by 66 feet of predominantly glacial till with a hydraulic conductivity value of $1x10^{-8}$ cm/sec. The time required for groundwater to travel from the Calumet aquifer to the bedrock aquifer is several thousand years (this assumes no degradation or interaction with the till material). The information is based on preliminary site data collected in 1995. Ongoing work will further refine the understanding of the site hydrology.

Pg9, ¶2. - Compatibility of free-phase hydrocarbons with the cutoff wall will be influenced by actual materials as well as operational procedures at the CDF. These issues are under study as part of the Design Memorandum (DM) and will be discussed in that document.

Pg9, ¶3. The alternate construction materials discussed in the EIS refers to the CDF dike and not the liner. The geographical adequacy of alternative construction materials will be evaluated before they are used.

Pg9, ¶4. - Utilizing soundings taken in December 1994, the volumes to be dredged out of the PCB hot spots have been revised. The year the dredging occurs for each of the PCB hot spots, for each of the plans, is as follows:

Plan	Reach 6	Reach 13
Partial	2009	
Complete	2006/7	2006/7
Cooperative	2006/7	2006/7

It should be noted that the dredging plans are based on existing soundings. New soundings will taken the prior to the actual dredging and will influence the timing of any specific dredging operation.

Pg9, ¶4
See section 2.3.3.7.3 of the draft EIS regarding the TSCA-regulated PCB sediment placement. The FWCA report contained little specific information on operation of CDFs as contaminant pathways. The contaminated sediment will be more exposed in the CDF than it was at the bottom of the channel. Therefore, as described on page 102 of the CMP, a Wildlife Exclusion Plan (WEP) will be developed during the design phase. The WEP may include scare devices, repellent minimizing standing water or hazing among other actions to reduce bird and mammal use of habitat at the CDF before it is full and capped. Baseline wildlife field work will be completed in 1989 to develop the WEP.

Pg9, ¶5
In May 1994 Chicago District formulated a draft wildlife exclusion plan. In June 1994 Chicago District staff discussed further development and implementation of a wildlife exclusion plan with staff of the U.S. Dept. of Agriculture (Judy Loven and Richard Dolbeer of Animal Damage Control Program.). Following the advice of USDA, a plan will be developed in conjunction with state and Federal wildlife management agencies. USDA provided advice during a site visit

conjunction with State and Federal fish and wildlife management agencies. This plan is crucial to minimizing adverse environmental impacts associated with this project. The final FWCA Report should provide much of the baseline wildlife survey information needed to develop this plan, so that development is finalized and in-place concurrent with the building of the CDF. Any additional modifications to the WEP could be made on an as-needed basis as the CDF becomes operational.

On page EIS-67 (section 4.3.2.3.5), the use of chemical repellents is listed as one of the possible WEP strategies. We recommend against such use.

Fish and Wildlife Impacts

The wildlife impacts discussion on pages 102, and EIS-34 to 45 (section 3.4) is quite inadequate. At the Corps' request, the Service will be providing additional information to address these issues in a final FWCA Report to be completed in May 1996.

Section 3.4.1.1.1 on page EIS-34 should be updated with current information on alewife/fish community interactions. Page EIS-36 should be updated with reviews of more recent fish community work for this area (e.g. Sobiech et al. 1994).

The description of aquatic communities in section 3.4.1 (pages EIS-34 to EIS-37) fails to provide any information regarding the wildlife component of the these communities.

Section 3.4.1.3.2 (page EIS-38) provides a brief synopsis of PCB information from Appendix D to the DEIS for the Waukegan Harbor dredging project. This information might be useful in further analysis of the CMP and should either be elaborated on in the Final EIS, or included in Appendix C or as a separate appendix.

On page EIS-39, the DEIS states that the FDA recently lowered its PCB action levels from 5.0 to 2.0 ppm. The FDA took this action in 1987. Please update the text and clarify the abbreviations used in Table EIS-9.

Section 3.4.2.1 (pages EIS-40 and EIS-41) does not adequately document the wildlife resources that are present in the project area. The statement concerning "very limited diversity and abundance" of wildlife in the project area (section 3.4.2.1.1) is simply not accurate. Much of the information needed to correct this deficiency will be provided to the Corps in the final FWCA Report.

Pg10, ¶1. (On page EIS-67..)
Comment is noted.

Pg10, ¶2. - The Comprehensive Management Plan (page 102) is not meant to serve as a NEPA document, and therefore contains only general information on environmental impacts; no revision is necessary. For more detailed information on wildlife impacts, see the revised sections 4.3.1 (aquatic communities) and 4.3.2 (terrestrial communities) of the FEIS.

Pages EIS-34 through EIS-45 of the draft EIS contained section 3.4, which presents information on existing biological resources, including aquatic and terrestrial wildlife and habitat. Section 3.4 (like the remainder of section 3) is not meant to document impacts; impacts to wildlife are discussed in section 4.3 (pages EIA 63 through EIS 69 of the draft EIS).

Pages EIS-34 through EIS-45 of the draft EIS contained an adequate but perhaps somewhat dated description of the aquatic wildlife resources of the various project sites considered. Section 3.4.1 of the FEIS has been updated with post 1990 data (including pertinent portions of pages 50-59 of the Fish and Wildlife Coordination Act report)

The description of terrestrial resources in section 3.4.2 of the FEIS has been expanded (by incorporating pertinent portions of pages 60-72 of the Fish and Wildlife Coordination Act report).

The description of wildlife impacts in section 4.3 of the FEIS has been revised (by incorporating pertinent portions of pages 94-95 of the final Fish and Wildlife Coordination Act report as sections 4.3.1.2.8 and 4.3.3.4).

Pg10, ¶3. - Section 3.4.1.1.1 of the FEIS has been updated with available data (including pertinent portions of page 55 of the Fish and Wildlife Coordination Act report as section 3.4.1.1.8) on alewife/fish community interactions.

Sections 3.4.1.1.3 and 3.4.1.2 of the FEIS have been updated with post-1990 data (including portions of pages 53, 54, 56-59 and 75 of the Fish and Wildlife Coordination Act report as sections 3.4.1.1.9 through 3.4.1.1.12) pertinent to fish and benthic invertebrate communities of the Grand Calumet River and Indiana Harbor and Canal.

Pg10, ¶4. - The description of terrestrial resources in section 3.4.1 of the FEIS has been expanded (with pertinent data from page 67 of the Fish and Wildlife Coordination Act report as section 3.4.2.1.4). Additional information on amphibians, reptile, and mammals using the canal and harbor will be added to the revised section 3.4.2.1.4 (terrestrial) of the FEIS.

Pg10, ¶5. - Appendix C is supportive of net negative impacts of "no action" as the appendix is written. Additional data will not alter its determinations to any significant degree.

Pg10, ¶6. - Text and table have been revised.

Pg10, ¶7. - The description of terrestrial resources in section 3.4.2 of the FEIS will be expanded (by incorporating pertinent portions of pages 60, 62-64, 66, 67, 72, 75, 76, 86, 87, 92, and 94 of the Fish and Wildlife Coordination Act report, as sections 3.4.2.7 through 3.4.2.22). It is the opinion of the Chicago District staff that

a) wildlife resources immediately adjacent to the ECI site and dredging zone are limited in diversity and abundance due to the urban/industrial nature of the area, and a lack of valuable habitat;
b) adverse impacts to wildlife will be minimal and short-term; and
c) adverse impacts to endangered species (specifically the peregrine falcon) will be minimal or non-existent

Much of the information in sections 3.4.2.4.1, 3.4.2.4.3, 3.4.2.5.1, 3.4.3.1, 3.4.3.2, and 3.4.3.3 (pages EIS-42 through EIS-45) has not been updated for several years. The final FWCA Report will provide information that can be used to update them.

Sections 4.3.1.1.3, 4.3.1.1.4 and 4.3.1.1.5 (page EIS-63) also need to be updated and revised to reflect the current literature. Statements such as "the significance of PCB contamination to ecology and humans (in the Great Lakes) is unknown" are certainly not supportable based on the scientific literature.

Appendix C, the "no action" alternative, contains no information on wildlife resources, or any description of ambient biological conditions. There is much in the way of new fisheries, wildlife, and sediment toxicity data relevant to this project that should be discussed in detail in this appendix in the final CMP Report.

Section 4.4.2.14 (page C-18) should be updated by including the IDEM's 1994 fish data. On page C-19, section 4.4.3.3 would be much improved by including reviews of new literature (e.g., Hoke et al., 1994; Ingersoll et al., 1993; and Sobiech et al., 1994).

Appendix C deals largely with the topic of sediment transport and to a lesser degree with modelling contaminant uptake by fish, but the larger issues remain unaddressed. Much more discussion is needed in the final CMP Report regarding what has been and will be the impact to aquatic life in the IHC and Lake Michigan, and what has been observed and predicted for adverse effects to wildlife in Lake Michigan. If the transport of contaminated sediment is harmful to the environment, which we certainly believe it is, this fact needs to be clearly presented.

SPECIFIC COMMENTS ON SECONDARY ISSUES

IHC Sedimentation Rates

The U.S. Geological Survey (USGS) notes that the sedimentation rate analysis (pages 17 and 58) relies heavily on computer models and, except for data from historical soundings in the IHC, there seems to be little data specifically collected for model input. Discharge from the IHC ranged from 431 to 800 cubic feet per second during 1992-94. Limited data on suspended sediment collected in the Grand Calumet River/IHC indicate an average concentration of about 5 mg/L. USGS calculations indicate that the annual sediment discharge may be much lower (5-12 million pounds per year), compared to the estimate (182 million pounds) in the report. A lower sedimentation rate would result in less storage space needed at the CDF, or more space for other remedial dredging disposal, or a longer CDF life. A much better estimate

Pg11, ¶1 and 2. (Much of the information...) - These paragraphs have been updated using information from the U.S. Fis and Wildlife Coordination Report.

Pg11, ¶3.
Appendix C is supportive of net negative impacts of no action as it stands. Additional discussion and data will not alter the determinations made to any substantial degree.

Pg11, ¶4.
Section as written depicts poor but improving fisheries and additional data or review of subject would not alter determinations already made therein.

Pg11, ¶5.
In a general sense the predicted adverse effect of no action has been presented in Appendix C as longer recovery time fo the canal system and longer time and quantity of discharge to the lake of highly contaminated sediments. To speculate beyond the general sense would not alter the conclusion that the project has a net positive environmental impact. Analy of this project's environmental impact can be based on qualitative assessment of past harm and current conditions and th project's net benefit to the ecosystem. It has not deemed an appropriate use of resources to conduct intensive detailed modeling.

Pg11, ¶6.
The Chicago District, in cooperation with the Indiana Department of Environmental management, is currently funding th USGS, Indiana Office to perform suspended sediment sampling in the Indiana Harbor/Grand Calumet River basin. This part of the District's support of the Remedial Action Plan (RAP). Preliminary estimates from the USGS show a low volume of sediments. However, these samples have all been taken at low to average flow conditions. It is generally accepted that the vast majority of sediment movement in the tributaries to the Great Lakes occur during storms events. This phenomena is detailed in variety of technical publications (for example, Lick, et al. "The Resuspension and Transpo of Fine-Grained Sediments in Lake Erie," International Association for Great Lakes Research, 1994 and Richards, et al., "Pesticide Concentration Patterns in Agricultural Drainage Networks in the Lake Erie Basin," Environmental Technology and Chemistry, 1993). Thus, without a significant event during the monitoring period, the sampling results are likely to b substantially lower than long-term averages. Depending on future funding, the Corps may continue work the USGS on a modified monitoring program in which suspended sediment data would be gathered only for significant events.

could be obtained by combining discharge data from the streamflow gage with minimal sampling of suspended sediments in the IHC.

"Presumptively Hazardous Waste" Issue

On page EIS-29 and page E-17 (section 4.4.5.5), there is a discussion of what should be done with the 60,000 cubic yards of "presumptive RCRA Subtitle C Hazardous Waste." It is unclear how much of this material will slough off into the navigation channel to be captured by a later maintenance dredging operation, if it is not dredged concurrently with the rest of the material during the initial backlog dredging. This issue should be addressed in the final CMP Report.

Pg12, ¶1. (On page EIS-29...) - Inland will undertake further testing in the turning basin pursuant to the Consent Decree to characterize the benzene area. In the current dredging plans the RCRA material is planned to be dredged after the initial backlog dredging of the Federal channel. Under this dredging condition, it is possible that some sloughing can occur. However, dredging operations can be planned so that sufficient quantities of sediment adjacent to the RCRA materials are dredged currently with the RCRA materials to preclude problems with potential sloughing.

Pg12,¶2. - Comment noted.

Inland Steel's Lakefill CDF Site

On pages EIS-59 and 60, the proposed Inland Steel Lakefill CDF site is discussed. Since this is not the preferred alternative, we have chosen not to elaborate on our concerns with the possible use of the site, or on the many serious problems associated with this section of the document. We do not believe that it should necessarily be assumed that the Inland Steel Site will be filled by private interests if not utilized for the CMP (page EIS-65, section 4.3.1.3.4).

It should also be pointed out in this discussion on in-lake CDFs (page E-20, section 5.3.2.2), that even the most hydrophobic compounds will have some partitioning into water, and if there is any "turnover" (i.e., movement) of that water, the result is a net (perhaps substantial) transport of contaminants offsite. For those compounds which also bioaccumulate in the food chain, this can be a significant ecological problem.

Pg12, ¶3. (It should also...)
The transport of hydrophobic compounds by partitioning into the water is insignificant compared to those bound to the suspended solids. The dredging project will reduce solids loading to Lake Michigan by 50-70%.

Lake George Branch of IHC

On pages 42 and EIS-7 (section 2.1.2.5), mention is made of the FWS's proposal in its 1989 Draft FWCA Report that a portion of the Lake George Branch be closed off, filled in with dredged material, and capped. What may have been unclear in the FWCA Report and therefore not addressed in the DEIS is the fact that this action was proposed, in large part, as a remedial measure to sequester the contaminated sediments already in the subject area. It is unclear from the draft CMP Report whether there is any navigation on that portion of the Branch, and whether the CMP includes the removal of the contaminated sediments from that area. Upstream wetland impacts from this recommendation are unknown and likely would be no more significant than leaving this area in its existing contaminated state.

Pg12,¶ 4.
Currently there is no navigation upstream of the Indianapolis St. bridge on the Lake George Branch. However, during dredging operations this reach, which is adjacent to the ECI site, will be dredged to allow barges/scows to transport dredged materials to the CDF unloading area at the ECI site.

IHC Sediment Characterization

On page 18, reference is made to the project removing "tons of low-level contaminants that denigrate the river system." This characterization of the sediment contaminate levels appears to be inconsistent with the bulk sediment chemistry findings that are described on page 14 as consistently showing " high levels of metals, nutrients, oil and grease, and volatile solids." This apparent inconsistency in sediment characterization should be resolved in the final CMP Report.

Pg13, ¶1. (On page 18, reference...)
Low level as used here was intended to be understood as a relative term - it is low level relative to hazardous or toxic waste, but high for sediments.

Air Emissions

On page EIS-61 (sections 4.2.5.2.1 and 4.2.5.3.2), there is a discussion of air emissions related to sediment disturbance. It is stated that emissions emanating from such activities would be of "low significance." It would be helpful to the readers' understanding of what is meant by this characterization if the expected volatile releases from the proposed dredging activity were compared to releases under existing conditions.

Pg13, ¶2.
See Table 16 in the CMP and refer to Appendix T and Appendix V for an in depth discussion of volatile releases.

State Water Quality Standards

In several places in the DEIS and its supporting documentation, references are made to the Indiana Water Quality Standards (page EIS-30, section 3.3.4.1; page EIS-31, Table EIS-5; and page EIS-36, section 3.4.1.2.1). It appears that not all of these references are consistent with the most current Indiana Water Quality Standards. For instance, in section 3.4.1.2.1 on page EIS-36, the classification of the IHC as suitable for "limited aquatic life" appears to conflict with the use designations for the IHC as presented on page EIS-30. Information from the latest Indiana 305(b) Report (IDEM 1955) could be used to update this section for the Final EIS.

Pg13, ¶3.
Table EIS-5 and section 3.4.1.2.1 (page EIS-36) have been updated. Pursuant to the Great Lakes Water Quality Agreement and the Great Lakes Critical Programs Act of 1990, EPA developed Great Lakes Water Quality Guidance that was published in final form in March 1995. Each Great Lakes state is required to develop water quality standards and permitting regulations for waters in the Great Lakes basin that are consistent with the guidance. The Indiana rules became effective February 13, 1997. See 327IAC 2-1.5 et seq. These water quality standards have three components: use designations; anti-degradation policy; and water quality criteria. The use designation of the Grand Calumet River was not affected by this rule; however, NPDES permits that regulate discharges of pollutants to the Grand River may be affected by the anti-degradation provisions and the water quality criteria.

Appendix F (pages F-2 through F-7) also does not appear to have been revised to be consistent with Indiana's most current water quality standards and use designations. In addition to updating Appendix F, if needed, please clarify whether the appropriate citation for Table F-2 is IDEM (1989) or IDEM (1986).

Pg13, ¶4.
Tables F-1 through F-4 and section 2.1.3.2 have been updated.

Federal Dredging Standards

On page EIS-5 (section 1.2.3.4), the DEIS describes the "Federal Standard" for the disposal portion of "Operations & Maintenance" dredging and disposal activities, but fails to do so for the dredging portion. A description of the dredging portion of the Standard, if there is one, should be included in the Final EIS.

Pg13, ¶5.
Dredging methods are selected on a case-by-case basis and the selection is usually based on a number of factors including the amount of return water and the cost of water treatment, as outlined in section 3.6.1 of Appendix H

Project Environmental Benefits

On pages 80-82, a summary of the economic analysis of the environmental benefits of the CMP is presented. Appendix B-1 describes the contingent value analysis supporting these claims. Although we have not analyzed the methodologies utilized in this environmental benefits analysis, we concur with the results of this analysis which show substantial environmental benefits will result if this project is implemented.

SPECIFIC COMMENTS - MISCELLANEOUS

In at least two places in the Report (pages EIS-46, section 3.6.1.1, and E-6), Atlantic Richfield is named as a major petroleum company in the inner portion of the canal's mainstem. It may be helpful to clarify in the Final EIS and Appendices that Atlantic Richfield has not been an owner of the subject properties since at least the early 1980s.

63 On page EIS-48 (sections 3.6.5.3 and 3.6.5.4), information is presented on recreational uses in the general project area, including a discussion of planned marina developments (1988 IDEM citations). As some or all of these developments have now been completed, the recreational use information should be updated in the Final EIS.

On page EIS-26 (section 3.3.3.2), mention is made of a Corps/USEPA testing protocol document. We presume that the DEIS is referring to "Evaluation of Dredged Material Proposed for Discharge in the Waters of the U.S. -- Testing Manual (Draft)," dated August 1994, also referred to as the "Inland Testing Manual." Please explain in the Final EIS how this more recent document does or (perhaps) does not supersede the reference(s) cited in section 3.3.3.3 (USACE/U.S. EPA 1992, and Francinques et al., 1985).

On page E-12 (section 4.4.4.14), reference is made to a study initiated by Unger in 1988. If the study report has been completed, the citation and Appendix E references should be updated. A more detailed description of the pertinent findings and their relevance to this project would also be helpful. Reference is made to the IDEM's submittal of a Stage I Remedial Action Plan (RAP) to the International Joint Commission in 1991 (page C-2, section 2.7). As much has changed since 1991, an updated summary of actions regarding the RAP would be helpful.

On pages C-23 and C-24, references are made to Indiana's waste load allocation studies conducted in 1974 and 1984. It was our understanding that this waste load allocation was updated in 1991

Pg14, ¶1. (On pages 80-82...) - Comment noted.

Pg14,¶2.
Reference to Atlantic Richfield in the FEIS has been deleted.

Pg14, ¶3.
Sections 3.6.5.3 and 3.6.5.4 have been revised to reflect recent marina developments.

Pg14, ¶4.
The Inland Testing Manual is a separate document from the other two references mentioned. It is a national document which provides guidance for open water disposal, one of the dredged material disposal methods. Both the Francinques and USACE/USEPA, 1992 documents provide general guidance for evaluating the environmental acceptability of dredged material management alternatives. As stated in section 3.3.3.3 of the EIS, they are broader documents and address various disposal alternatives (i.e. CDFs, open water disposal, and beneficial use) rather than solely open water disposal. The Francinques document was written by the Corps in 1985 and served as a model for developing the USACE/USEPA, 1992 document.

Pg14, ¶5.
IDEM recently finished the Stage 2 RAP and SCRAP Reports which evaluate various remedial measures to restore beneficial uses, identify the selected measures, and identify persons or agencies responsible for implementation.

Pg14, ¶6
Comment noted. Even though more recent data may now exist, that data is not likely to alter the conclusions of the CMP or EIS.

to reflect changes made to Indiana's water quality standards in 1990. If our understanding is correct, the information in this portion of Appendix C should be updated.

Section 5.5.8 (page C-39) refers to a Master Plan (USEPA, 1985) and the RAP (IDEM, 1988) as "recent initiatives." Information on subsequent updates to these plans, which we understand have occurred, should be provided.

On page EIS-6 (section 1.4.3.2) the ARCS study of the GCR/IHC sediments was mentioned. The study report was finalized in 1993. The inclusion of a discussion of its major findings in this part of the Final EIS would be beneficial.

ENDANGERED SPECIES ACT COMMENTS

As pointed out in the Service's letters to the Corps of September 19, 1995, and January 22, 1996, the Corps has not provided all the information considered necessary by the Service to assess potential project impacts to the peregrine falcon. However, the Service is committed to provide its Biological Opinion to the Corps by May 22, 1996, and will proceed to do so with the information at hand. In addition to addressing the potential project impacts to the peregrine falcon, the Biological Opinion will include an updated threatened and endangered species list (e.g., change in status of Karner Blue butterfly), a discussion of habitats in the project area that are suitable for listed species, and more accurate information on peregrine falcon nest locations (nest location shown in Figure D-1 is not accurate).

LAND AND WATER CONSERVATION FUND ACT COMMENTS

The National Park Service notes that the disposal of dredged materials from the IHC could have an impact on two Land and Water Conservation Fund (L&WCF) sites: Marquette Park (project 18-00488) and a site acquired under project 18-00405 (Indiana Fish and Wildlife Project). Section 6(f)(3) of the L&WCF Act, as amended, states:

> "No project acquired or developed with assistance under this section shall, without the approval of the Secretary [of the Interior], be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other

Pg15, ¶1.
For the update of the RAP, refer to response to comment on Pg14, ¶ 5. The Master Plan was written in response to a public meeting and was not intended to be updated.

Pg15, ¶2.
Comment noted. Eventhough more recent information may be available, that information is not likely to alter the conclusions of the CMP or EIS.

Pg15, ¶3.
Comment noted; biological opinion and Fish and Wildlife Coordination Act report has been received.

Pg15, ¶4.
The IDNR was sent a copy of the DEIS in October 1995 for renew and comment.

Pg16, ¶1-3. (As previously mentioned...)
Comments noted.

recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location . . . "

The L&WCF program is administered in Indiana by the Department of Natural Resources. We suggest that you bring the maintenance dredging project to the attention of Ms. Susan M. Murphy Chief, Grants Section, Division of Outdoor Recreation, Department of Natural Resources, 402 West Washington, Indianapolis, Indiana 46204 (telephone 317-232-8036).

FISH AND WILDLIFE COORDINATION ACT COMMENTS

As previously mentioned, the Service will be completing a Final FWCA Report addressing the CMP by the end of May 1996.

The Service also provides FWCA review of Department of the Army permit applications. The DEIS lacks a discussion of the possible need for such permits for actions associated with the CMP. However, it is our understanding that any party that would be doing non-Federal dredging as a part of the CMP would require a permit under Section 10 of the Rivers and Harbors Act of 1899. These departmental comments do not preclude separate evaluation and comments by the Service on any forthcoming permit applications. At that time, the Department will review the U.S. Army Corps of Engineers' public notice to ensure that the proposed work would be in compliance with all provisions of the CMP and that adequate mitigative measures for fish and wildlife habitat losses, if needed, have been incorporated into the project's final plans and specifications.

SUMMARY COMMENTS

We believe that the proposed dredging of the IHC and the planned use of the ECI site will have substantial environmental benefits. We appreciate the considerable efforts put forth by the Corps and the USEPA in addressing a very complicated set of issues. It is our intent in providing the above comments not to unnecessarily criticize the revised draft CMP Report, but to try to ensure that all reasonable alternatives being considered for each of the major components of the final CMP are objectively evaluated, that the decision making process is well documented, and that all aspects of this process, and thus the final project plans, are adequately supported by current scientific information. Major components of the CMP Report that we believe need additional analysis or documentation include the selection of the dredging methodology, actions to ameliorate exposure of the PCB hot spots, existing fish and wildlife impacts, and short-term impacts and long-term benefits to fish and wildlife resources as a result of the CMP.

The Department offers its continued technical assistance to support implementation of a CMP. Please contact the Supervisor, U.S. Fish and Wildlife Service, 620 South Walker Street, Bloomington, IN 47403-2121 (telephone: 812-334-4273) regarding fish and wildlife resource issues identified herein, especially completion of the FWCA Report and the Biological Opinion.

Thank you for providing the opportunity to review the proposal and provide these comments.

Sincerely,

Don Henne

Don Henne
Regional Environmental Officer

REFERENCES

Hoke, R.A., J.P. Giesy, M. Zabik, and M. Unger. 1993. Toxicity of sediment pore waters from the Grand Calumet River - Indiana Harbor, Indiana Area of Concern. Ecotox. Environ. Safety 26:86-112.

IDEM. 1995. Indiana 305(b) Report, 1992-1993. Indiana Department of Environmental Management, Office of Water Management, Indianapolis, Indiana. 488pp.

Ingersoll, C.G, D.R. Buckler, E.A. Crecelius, and T.W. LaPoint. 1993. Biological and Chemical Assessment of contaminated Great Lakes sediment: Assessment and Remediation of Contaminated Sediments (ARCS) Program. (EPA 905-R93-006). Great Lake National Program Office, U.S. Environmental Protection Agency, Chicago, Illinois.

Sobiech, S.A., T.P. Simon, and D.W. Sparks. 1994. Pre-remedial biological and water quality assessment of the East Branch Grand Calumet River, Gary, Indiana, June 1994. U.S. Fish and Wildlife Service, Bloomington, Indiana Field Office. Biological Report. 44pp.

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April 1, 1996

Robert E. Slockbower, P.E.
Lieutenant Colonel, U.S. Army
District Engineer
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, Suite 600
Chicago, Illinois 60606

Re: Comments to EIS No. 950489, Draft EIS, Indiana Harbor and Canal Dredging and Confined Disposal Facility, Construction and Operation, Comprehensive Management Plan, East Chicago, Lake County, IN

Dear Colonel Slockbower:

Atlantic Richfield Company ("ARCO") herein respectfully submits its comments to the EIS No. 950489, Draft EIS, Indiana harbor and Canal Dredging and Confined Disposal Facility, Construction and Operation, Comprehensive Management Plan, East Chicago, Lake County, IN.

Please do not hesitate to contact me at (610) 640-4783 if you have any questions or comments concerning this matter. ARCO looks forward to receiving your responses.

Very Truly yours,

Tim T. Potter

Enclosure
cc: Scott A. Lehecka, Esq.
Michael H. Elam, Esq.

Comments to:
EIS No. 950489, DRAFT EIS, COE, IN,
Indiana Harbor and Canal Dredging and Confined Disposal Facility,
Construction and Operation, Comprehensive Management Plan,
East Chicago, Lake County, Indiana

Atlantic Richfield Company ("ARCO") respectfully submits the following comments relating to EIS No. 950489, DRAFT EIS, COE, IN, Indiana Harbor and Canal Dredging and Confined Disposal Facility, Construction and Operation, Comprehensive Management Plan, East Chicago, Lake County, IN.

ARCO believes that to the extent set out in the Comprehensive Management Plan, Feasibility Report and Draft Environment Impact Statement, the proposed dredging and disposal activities may provide significant navigational and economic benefits to the adjoining property owners, industry, the City of East Chicago, as well as the economy in general. The proposed dredging of portions of this significantly altered natural and created waterway, with its long and extensive industrial past, however, presents a particularly complex situation and array of issues and alternatives that must be considered. Review of the draft EIS and the project, however, is significantly constrained by the relatively limited information on the specific issues associated with the dredging and CDF construction project, including cumulative impacts and review of available alternatives. In addition to adequately responding to the questions and comments presented, a supplemental EIS may be required as the project scope is more fully defined and characterized.

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I. <u>Sediments/Dredging Spoils</u>

A. What are the exact areas (vertical and horizontal locations) to be dredged that are used for the basis of the EIS?

B. How, and on what basis, have the specific areas identified for dredging been selected? What are the specific studies and evaluations on which the need for dredging has been based?

C. Have all of the specific sources of contamination in the sediments to be dredged been specifically identified? If so, what are/were these sources, and what data suggest these conclusions?

D. What is/are the rate(s) of sediment movement, toward Lake Michigan, in the areas currently proposed to be dredged? What is the rate of sediment movement upgradient from the areas currently proposed to be dredged?

E. What is the rate of sediment "build up" (vertically) in the areas proposed to be dredged? How has it changed over the last 10 years? How is it projected to change over the next 10 years if no dredging occurs?

I.A. The specific areas (vertical and horizontal locations) to be dredged are described on pages 62-65 of the Comprehensive Management Plan (CMP) under the report sections titled "Alternative 2 - Complete Federal Channel Dredging" and "Alternative 3 - Cooperative Dredging Program." The recommended dredging plan is Alternative 3 which includes all of the dredging included in Alternative 2, plus a one-time complete dredging of all of the Inland Consent Decree dockface areas, as shown on Figure 14 of the CMP.

I.B. The specific areas identified for dredging were selected based on a detailed formulation process described on pages 58-88 of the CMP. The need for dredging is discussed on pages 11-18 of the CMP under the section titled "Problems and Issues." The specific studies and evaluations on which the need for dredging has been based are discussed in the CMP on pages 19-88. Formulation of Alternative Plans, and throughout the various technical appendices of the CMP.

I.C. See discussion on pages 11-16 of the CMP under the report section titled, Harbor and Canal Sediments. Identify the sources of all the contamination to the Indiana Harbor and Ship Canal (IHSC) is information that will be useful in preventing the resource from becoming recontaminated. The regulatory agencies are constantly identifying current sources of contamination to the IHSC and are working diligently to reduce the amount of pollutants that enter the waterway which could recontaminate the sediments. Much of this information such as National Pollutant Discharge and Elimination System (NPDES) permits, RCRA Corrective Action Orders, or Superfund Site Characterizations, is publicity available.

I.D. A sediment transport model of the (IHC/GCR) Basin does not currently exist. As explained in the CMP current sediment transport models (IHC/GCR) are not able to effectively predict the movements of cohesive sediments such as those in the Indiana Harbor channels. Without such a model it is not possible to predict the actual movements of sediments in any specific area. In lieu of such a model, an average annual volume of sediment discharged into Lake Michigan was computed. Based on the refilling of the Indiana Harbor channels after storm events, and an approximate "trapping" percentage, it was estimated that 150,000 cubic yards of sediment annually flows into the lake (see Appendix Q, sections 5.2 and 5.6).

I.E. A sediment transport model of the IHC/GLR Basin does not currently exist. As explained in the CMP current sediment transport models are not able to effectively predict the movements of cohesive sediments such as those in the Indiana Harbor channels. Without such a model it is not possible to predict the actual build-up of sediments in any specific area. However, as noted in the response to comment I.D. above, average deposition rates, based on refilling after a storm event, were computed for the harbor and canal. The rates (noted in Appendix Q, section 5.2) are 0.20 feet/year if just the canal is refilling, and 0.16 feet/year if both the harbor and canal are being refilled.

F. If the sources of contamination in, and upgradient from, the are projected to be dredged have not been identified and controlled, will contaminati continue to accumulate in the sediments, necessitating continued dredging and futu CDFs? Are additional CDF's, or CDF capacity to address future dredging anticipat or considered?

G. What percentage of the water flow in the Indiana Harbor Canal, tl Calumet River and the Lake George Branch, (and areas upgradient of the areas propos to be dredged), is due to controlled or artificial discharges, as contrasted with natur flow? Have all such discharges been identified, and, if so, what are the sources for the: discharges?

H. What are the cumulative impacts of these sources of contamination ar controlled or artificial discharges on the proposed dredging and CDF project goal objectives and considerations?

I. What is the specific impact that barge, boat or vessel traffic has on tl movement or discharge of sediments, and how has this been calculated?

J. What data currently exists relative to the environmental need/benefit of tl dredging project?

K. What type of potential modifications to the CDF, or the dredging proces or changes in the identified sediment constituents, or types of new data or informatio would require a supplemental EIS, or reconsideration of the existing EIS?

II. Dredging

A. What mitigation measures and alternative plans to monitor and control th spread of re-suspended contaminated sediment have been considered? It is stated that th owner/operator will monitor the impact of the dredging operation on surface wate quality. Performance goals are stipulated for re-suspension of sediments but specifi information on the monitoring activities, performance criteria or corrective action (i needed) to abate surface water quality impacts are not provided. How will the owner operator be expected to monitor the impact of dredging on surface water quality?

B. What specific dredging techniques are anticipated for the project? Hov efficient will the dredging be in terms of capture (residual contamination left behind) an re-suspension? What references document the probable accuracy of these estimates? I there specific experience with similar contaminated sediment dredging which can b referenced for review by interested parties? What alternatives were considered?

I.F. Sources of sediments in the IHC/GCR Basin are discussed on pages 11 and 12 of the CMP. Pages 12 through 14 outline the actions taken by the USEPA and IDEM to reduce the amount of new contaminants and enforce the removal of existing contaminants from the IHC/GCR. As noted in section 4.4.11 of Appendix E, with the completion of remedial activities, the depositing sediment should be substantially cleaner than the existing sediment. As discussed in the CMP and noted in section 2.3.3.6.1 of the draft EIS (p. EIS-13), the CDF has a design life of about 32 years. The recommended CDF would have a capacity of about 4.67 million cubic yards. Neither additional CDFs nor additional CDF capacity are addressed in the CMP or EIS to accommodate future dredging needs.

I.G. The Chicago District has completed a reconnaissance level hydrologic simulation of the IHC/GCR Basin for the period January 1983 through September 1992. A breakdown of the average flows from the simulation analysis are as follows

Source	Flows (cfs)	% Flow
Major Industries	969	85
Sanitary Flows	99	9
Runoff	68	6

Since the hydrologic modelling was at a reconnaissance level, these are the only flows that have been identified. Note: The major industries are - USX, Inland and LTV; the sewage treatment plants are -Gary, East Chicago and Hammond.

I.H. A sediment transport model of the IHC/GCR Basin does not currently exist. As explained in the CMP, current sediment transport models are not able to effectively predict the movements of cohesive sediments. Without such a model it is not possible to predict the impacts of specific discharges on sediments movement. The Chicago District, in cooperation with the IDEM is currently funding the USGS, Indiana Office to perform sediment sampling in the IHC/GCR Basin. Preliminary estimates from the USGS show a low concentration of suspended sediments. However, these samples have all been taken during periods of low to average flow conditions. In its publication "Suspended-Sediment Characteristics of Indiana Harbor Streams, 1952-84", Open-File Report 87-527, dated 1988, the USGS indicates that on average a majority of sediments (75%) were transported during 10% of the time. Therefore, the normally occurring industrial flows are unlikely to have a major impact on sediment transport in the IHC/GCR Basin. It is expected that there would be a dramatic increase in the amount of suspended sediments taken during flood events.

I.I. A Sediment transport model of the IHC/GCR Basin does not currently exist. As explained in the CMP current sediment transport models are not able to effectively predict the movements of cohesive sediments. Without such a model it is not possible to predict the specific impact of ship traffic on sediment transport. However, as discussed on page 17 of the CMP, sediment displacement occurs as ships plow through the sediments at various locations in the Federal channel and when ships are winched into the docks as they are unloaded and their draft decreases. The sediment pushed to the channel center will be carried away mostly during high flow events such as storms. As stated in section of 5.4.5.4 of Appendix C, most of the sediment transport within the waterway occurs during rainfall events.

I.J. From a Corps of Engineers' mission and responsibility viewpoint, implementation of the recommended dredging and CDF project must be economically justified solely on the basis of commercial navigation benefits. Environmental benefits are considered to be incidental with respect to project justification. The economic and environmental need for the dredging project are summarized in the CMP on pages 11-18 under the section titled "Problems and Issues." The benefits are summarized on pages 80-84 under the section titled "Economic Analysis."

I.K. The criteria for preparing a supplemental EIS are contained in Parts 1502.9 and 1508.27 of 40 CFR Ch.V (7-1-89 Edition). Port 1502.9 indicates that a supplemental EIS is prepared when there are "substantial changes in the proposed action that are relevant to environmental concerns; or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." Part 1508.27 defines significance. The need for preparation of a future supplemental EIS would be made in the context of the criteria outlined in Parts 1502.9 and 1508.27. However, the District Engineer does not anticipate that there will be a need for preparation of a supplemental EIS and will not speculate on what project modifications or new information might require a supplemental EIS or reconsideration of the existing EIS.

II.A. As stated in section 4 of Appendix N, the dredging contractor will be required to submit a plan for review by the Corps of Engineers which will include monitoring parameters, location, and frequency. Additional guidance regarding the monitoring plan will be developed in the detailed design phase of this project.

III. CDF Capacity

A. What is the specific design capacity of the CDF, to hold dredging spoils or other materials, and what specific locations, and related volumes, would these dredging spoils and other materials to be placed into the CDF come from?

B. How much water will be placed into the CDF from the dredging process?

C. Is the current CDF capacity understated due to the compaction of dewatered dredging spoils?

D. Will this CDF receive sediments or materials from areas or sources not identified as part of the currently proposed dredging project?

E. Have any other potential dredging areas which have not been specifically identified and evaluated been considered for dredging and the placement of such dredging spoils in this CDF? If so, what are the specific locations, volumes and the conditions under which such "additional" dredging and placement in the CDF would occur?

F. If the CDF capacity is increased, or excess capacity realized, how would this available capacity be used? What level of increased dredging or disposal would require a supplemental EIS, or reconsideration, of the existing planned project? Under what circumstances would a supplemental, or new, EIS be required?

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IV. CDF Design

A. When did the United States first consider locating a CDF on the ECI site?

B. How is this CDF designed to comply with RCRA and TSCA, or to meet RCRA and TSCA requirements? Must the CDF be, regardless of its location, designed to comply with RCRA and TSCA, or to meet RCRA and TSCA requirements in order for it to receive dredging spoils? If the CDF does not, or need not, comply with or be RCRA and/or TSCA compliant to hold contaminated dredging spoils, what are the applicable requirements?

C. How has the dredging project and CDF design considered the extremes of lake and groundwater level fluctuations?

D. Would the current owner of the ECI Site be required to obtain a RCRA permit?

E. What permits will be required to construct the CDF? What permits will be required to operate the CDF? Who will be obtaining them?

II.B. Dredging would be performed using a closed bucket mechanical dredge (CMP, page 92). Section 3.2.4 of Appendix H discusses the reduction of sediment resuspension demonstrated with a closed bucket and Sectio 4.6.2 of Appendix H discusses the sediment plume using a standard clamshell. Both items identify references. A closed bucket dredging operation was used to complete maintenance dredging at Calumet Harbor and River in December 1994. A report by the Chicago District titled, "Report on Maintenance Dredging of Calume River," dated 1995, provides the results of water quality monitoring completed in connection with the closec bucket dredging, operation. See response to comment 5 of Attachment 1 to U.S. Department of Commerce, NOAA, letter dated March 28, 1996 for brief summary of the results of this water quality monitoring. The alternative dredging methods are discussed in the CMP, pages 47-50 and in Appendix H.

III.A. The CDF is designed to contain 4.67 million cubic yards of sediment . Locations and volumes of sediments which will be placed in the CDF are estimated in Table 7 of the CMP under the dredging Alternativ 3 based on data contained in Appendix Q of the technical appendices.

III.B. The sediments placed into the CDF will contain approximately 50% water.

III.C. The actual capacity or volume of the CDF is estimated at 4.67 million cubic yards. It is estimated that the bulk density of the dredged material in the CDF will increase compared to the bulk density of the dredged material in its in-situ state due to dewatering and compaction of the dredged material in the CDF. The increase in bulk density might be on-the-order of 10 to 15 percent. The actual increase will be determined by dewatering and compaction tests to be completed on representative sediment samples during the detailed design phase. An increase in sediment bulk density within the CDF could extend the life of the CDF. However, the actual capacity or volumetric measurement of the CDF would not change.

III.D. Page 89 of the CMP states the following: "Use of the proposed CDF would be limited to disposal of dredged materials from the IHC/GCR. It is not intended to be used for disposal of dredged materials from other harbors or waterways in Indiana or other Great Lakes states."

III.E. No. Also see response to comment III.D. above.

III.F. See response to commend III.C. above regarding the capacity of the CDF. As indicated in that response, an increase in bulk density of the dewatered dredged materials in the CDF could extend the life o the CDF. This could permit additional in-situ dredged materials to be placed in the CDF or could allow the height of the CDF to be reduced if the quantity of dredge materials was limited to 4.67 million cubic yards of in-situ sediments. In either cases, a supplemental or new EIS would not be required.

IV.A. The Chicago District Engineer conducted public coordination meetings in 1987 and 1988 to obtain comments and suggestions from agencies and the public on additional dredging and disposal alternatives to b considered at Indiana Harbor. At one of these coordination meetings, a private citizen suggested that consideration be given to locating the CDF at the ECI site. Therefore, it was in the late 1980's the Corps of Engineers first considered locating a CDF on the ECI site.

IV.B. See pages 65-75 and 90-92 of the CMP for a discussion of how the combined CDF and proposed ECI site RCRA closure and corrective actions have been designed to meet RCRA and TSCA requirements. It is Corps of Engineers' policy that RCRA regulatory requirements do not apply to dredged materials. Therefore, RCRA requirements would not be applicable at a CDF site which was not also an existing RCRA site such as the ECI site. Construction of a CDF at any location would have to be designed to meet the TSCA regulatory requirements for disposal of Indiana Harbor and Canal sediments containing PCBs in concentrations of 50 ppm or greater. See page 96 of the CMP and Appendix J, Toxic Substances Control Act Permit Application, for applicable TSCA requirements. Also, see response to comment IV.E. below.

IV.C. See CMP pages 68-75, and 90-94 for discussion of the design of RCRA closure and corrective actions and the CDF, and the operation of the proposed gradient control system to accommodate groundwater level fluctuations. Lake level fluctuations would have an indirect affect on the CDF through their impact on groundwater levels. Higher lake levels could be expected to cause greater sediment deposition in the Indiana Harbor and Canal channels than lower lake levels. However, average long-term sedimentation rates were used to estimate dredging requirements, thereby negating the effect of extreme lake fluctuations.

F. How does the CDF, when complete, address the threats posed by the contamination present at the ECI Site?

G. How was the basis for RCRA closure of the ECI Site determined; and what other response options were considered or are available?

H. Will the CDF comply with both operational and closure requirements of RCRA and TSCA? Will a waiver be issued by the Regional Administrator for TSCA?

I. The CDF would appear to be constructed more cost-effectively by moving the entire CDF south of the railroad tracks, or the railroad tracks could be moved, freeing up a significant amount of additional space, and reducing the length of the slurry wall RCRA feature. Have these options been considered?

J. How has the CDF design considered, and integrated into its design and operation, the ongoing and anticipated environmental response actions and clean-up activities on the ECI Site and on adjoining properties/sites? In particular, has the draft EIS considered coordinating onsite and offsite groundwater pumping, to maximize cost effectiveness and viability? Has the draft EIS evaluated and considered ARCO's ongoing response actions?

K. The draft EIS does not appear to have considered alternatives or alternative remedies, to both respond to existing contamination on the ECI Site, and for the CDF design, which may provide greater long term effectiveness or be more cost effective. For example, a single slurry wall along the canal with interior pumping, an on-site treatment system and discharge to the Canal, or other more cost-effective slurry wall configurations, pumping options and treatment alternatives, may warrant investigation before one option or combination of options is selected. Will such options be further considered during the design process? Will an opportunity for public comment be provided?

V. Cost Allocation

A. The proposed cost allocation understates the benefits to the ACOE, and allocates a disproportionately large share to certain non-federal end users.

B. What is the specific basis for calculating the local sponsor cost share and what specific legislation, regulations, guidance or the like, set out or establish this process?

C. Have any local sponsors at any ACOE dredging projects contributed less of a cost share? If so, where and why?

IV.D. It is expected that the East Chicago Waterway Management District will be responsible for obtainin the RCRA permit.

IV.E. The Corps of Engineers is working with IDEM and U.S. EPA to identify which permits are required. Currently RCRA, TSCA, and NPDPES permits are required. The East Chicago Waterway Management District is expected to be the permittee.

IV.F. The contamination present in parcels I, IIA and IIB of the ECI site (see CMP, figure 15) would be isolated or contained by construction of the proposed RCRA closure/corrective action features and the CDF described on pages 68-75 and 90-93 of the CMP. The CDF will be tied into the RCRA closure/corrective acti features and the CDF will serve as the final RCRA cap for parcels IIA and IIB.

IV.G. The basis for RCRA closure is determined in consultation with the Indiana DEM and the U.S. EPA. an EPA. A wide range of options was considered during the RCRA Facility Inventory Coordination Measure Study.

IV.H. The ECI site closure/corrective action features in combination with the CDF will meet RCRA requirements. A permit applications will be submitted to the U.S. EPA seeking a TSCA waiver (see CMP, page 96).

IV.I. The option of relocating the railroad track is being considered during the detailed design phase.

IV.J. The EIS evaluates a stand alone CDF and RCRA closure/corrective action project on ECI site parcels I, IIA and IIB. Consideration to coordinating with other on-going response actions or clean-up activities on the ECI site and on adjoining properties/sites.

IV.K. Refinements in the design of the RCRA closure/corrective action features and the CDF will be considered during the detailed design phased. For example, consideration will be given to such options as relocating the railroad track that currently exists between ECI parcels IIA and IIB; using a flexible, chemical resistant, impermeable high density polyethylene (HDPE) as an alternative to the slurry wall; and using alternative construction materials for the CDF dikes and dike liner. Consideration could be given t selective public comment; extensive formal public and agency comment periods, such as in a draft or final EIS review, are not envisioned. Yes, different options will be looked at during the Design Analysis phase.

V.A. Comment Noted. The cost allocation methodology shown in the draft CMP distributed for public revi in October 1996 was established by the Assistant Secretary of the Army for Civil Works as discussed on page 105-106 of the CMP in the section titled "Appointment of Costs."

V.B. See discussion on pages 105-110 of the CMP under the section titled " Apportionment of Costs" for specific basis for calculating the local sponsor cost share.

V.C. Yes. See first paragraph of page 20 of the CMP for a discussion of the cost sharing required for CDFs constructed under the authority of Section 123 of the Rivers and Harbor Act of 1970 (PL 91-611). An estimated 28 of 43 CDFs constructed around the Great Lakes were constructed under the Section 123 authority which no longer exists. The remaining 15 CDFs were constructed prior to the authorization of Section 123 under the Corps of Engineers harbor operations and maintenance authority. Non-Federal participation in almost all of the 43 CDFs generally consisted of providing lands, easements & rights-of-way, and operating maintaining the CDF after filled to capacity.

V.D. Section 601 of the 1996 Water Resources Developmental Act, Public Law 104-303, dated 12 October 1996, amended the 1986 Internal Revenue to allow the use of the Harbor Maintenance Trust Fund in the construction of confined disposal facilities for operations and maintenance purposes. However, the Trust Fund would be used to affect the Federal shore of CDF construction and would not be used to reduce the loc or end users costs/share. It is not known at this time if the Trust Fund could be used to advance CDF construction funds until reimbursement by end user payments. The District Engineer is awaiting Section 601 implementing guidance from the Corps of Engineers Headquarters, Washington, D.C. to determine the applicability of Section 601 to the proposed Indiana Harbor CDF projects.

D. Why isn't the Harbor Maintenance Fund being used to contribute to the CDF, particularly in light of the increased sediment releases created by boat and barge traffic? Has the Harbor Maintenance Fund ever been used at any dredging project so as to benefit or reduce the local or end users cost? Can the Harbor Maintenance Fund be used to reduce the local or end users costs/shares or to advance funds until reimbursed by end user payments? If it can be, why was it not factored in here?

E. The value of the properties adjacent to the dredged portions may increase significantly with the increased ability to ship and receive larger quantities of materials (the navigation benefit), as well as other potential benefits. This presents significant benefits for these current adjoining property owners. Will the adjoining property owners proportionately contribute to the dredging or simply receive a windfall? If they do not all contribute, how will this windfall be captured?

F. How would the "charges", or CDF disposal fees, associated with the placement of additional dredging spoils in the CDF, above the specific levels and areas currently projected, be calculated, and who would receive the benefit of these additional funds?

G. The utilization of the ECI Site as the location for the CDF will apparently generate a savings of $87.5 million even when potential increased response costs associated with pre-existing contamination on the ECI Site are considered, as compared to the utilization of the next alternate CDF Site. In addition, the ECI Site significantly minimizes environmental and socioeconomic impact issues associated with the further transportation of sediments and dredging spoils through additional areas to an alternate CDF site. Furthermore, this use of the ECI Site to construct the CDF is consistent with and supports current Brownfield initiatives. It is also likely that attempting to site the CDF elsewhere would delay the dredging project for years, with significant economic (navigational) as well as other costs and losses. Has the value of the ECI Site acquisition costs, and the savings associated with utilizing the ECI Site been considered in the cost calculations or allocation formula? If so, how? What compensation is the owner of the ECI Site receiving?

H. The ECI CDF Site acquisition costs do not appear to have been considered or factored into the cost calculations or allocation formula. A more appropriate allocation formula (given the use of this specific method) should take into account the difference between the ECI Site and the General Upland Site, as well as the difference in dredging costs (primarily the cost of transportation). Why aren't these costs savings factored into the analysis, and the appropriate parties justly compensated? In light of the significant cost savings ($87.5 million) and associated benefits to the overall dredging project of using the ECI Site for the CDF, as compared to alternate CDF sites, the significant value of the ECI Site should not be lost to those who have claims or potential obligations relating to the ECI Site.

V.E. Property values adjacent to the ship canal XXX the function of a number of variables, including the shipping capacity of the subject property. Assuming some kind of property value increase is highly speculative and cannot be part of a reasonable cost scenario. It is beyond the authority of the Federal government to tax the local property owners near a public works project to penalize them for increased property value. The cost Chicago Watering Management District currently does not have the authority to tax users of the resource to provide for the local share at this project on future maintenance projects.

V.F. See discussion on pages 107-110 in sections titled "Financing Arrangement Example" and "Annual Operations and Maintenance Costs" for one illustration of how CDF disposal fees might be calculated based on a CDF capacity of 4.67 million cubic yards. As indicated in the response to comment III.C. above, sediment samples will be tested during the detailed design phase to estimate the potential degree of consolidation of the dredged materials in this CDF due to dewatering and compaction of the sediments. The results of these tests will be used to adjust the CDF user or disposal fees prior to initiation of CDF construction. Once experience is gained through actual disposal operations, the fees can be further adjusted. Adjustments will also have to be made for future inflation. Also see response to comment V.J. below.

V.G. The purpose of the lengthy plan formulation process that was completed (CMP, pages 18-94) was to identify the most economically feasible plan that minimizes environmental and social impacts and has widespread conceptual support among Federal, state and local agencies; environmental and other interest groups; and individuals. The proposed CDF plan at the ECI site meets those criteria better than any other option. The potential savings associated with using the ECI site vs a more costly site are not specifically considered in the calculation or allocation of costs. However, the owner of the ECI site, the East Chicago Waterway Management District and other non-federal interests will contribute less financially under the recommended plan to realize a dredged harbor than under a more costly alternative. In addition, by combining the RCRA closure/corrective actions with the CDF construction, non-Federal interests will also pay less for RCRA clean-up costs for ECI parcels I, IIA and IIB than under without CDF conditions. See response to comment V.G. below concerning the value of the ECI site.

IDEAS: The ECWMD is getting a dredged harbor and avoiding total RCRA cleanup costs.

V.H. The ECI Bankruptcy Trustee sold the entire ECI site to the City of East Chicago Development Corporation for $10 IA 1986, (to which ARCO did not object). The East Chicago Development Corporation gave the property to the East Chicago Waterway Management District for no cost. A proper evaluation of the value of the property is based on the recent actual transactions, which is the basis for the figure use in the current analysis on page...

V.I. The ECI Trust Fund was established to resolve the Energy Cooperative, Inc. environmental liability at the ECI site. The Trust Agreement governing those funds instructs the Trustee, the East Chicago Waterway Management Districts to use the funds for the preparation of the site for use as a CDF and to undertake other site remediation. The Indiana Department of Environmental Management (IDEM) is the beneficiary at the Trust and retains oversight of Trust expenditures. The primary intent of the Trust, as established by the Trust Agreement, is to prepare the ECI site for CDF construction by completing certain environmental remediation activities that would otherwise fall to the site owner.

The $14 million has been factored into the cost analysis as a component of the Local Shore. As explained on CMP pages 106-108 the Local Sponsor is required to provide 66% of the CDF construction costs for this project. The Trust expenditures that are made to prepare the site are being credited to the local cost responsibility and are not a benefit to the Federal government or CDF end users.

V.J. The funds generated by CDF user fees will be used to help offset the non-Federal share of the cost of CDF construction and the operation & maintenance of the CDF and ECI site RCRA closure/corrective action features. The fees will be collected and managed by the local project sponsor, the East Chicago Waterway Management District.

V.K. Section 201 of the 1996 Water Resources Development Act, Public Law 104-303, dated 12 October 1996, authorized new cost sharing for dredged material disposal facilities. In general, Section 201 provides for the following:

a. The cost of constructing Federal navigation harbor CDFs shall be shared in accordance with the procedures set forth in section 101(CL) of the 1986 Water Resources Development Act (WRDA). Under Section 101(a) cost sharing, the non-Federal sponsor would pay during construction 25 percent of the cost of a disposal facility for a navigation project with depths greater than 20 feet but not greater than 45 feet.

The non-Federal sponsor would also provide the lands, easements, rights-of-way and relocations necessary for the disposal facility. The non-Federal sponsor would also have to pay an additional 10 percent of the cost of the disposal facility over a period of not to exceed 30 years but with the value of lands, easements, rights-of-way and relocations credited against this additional 10 percent payment.

I. There is an ECI Trust Fund which will apparently be available to contribute in excess of $14 million to address existing contamination on the ECI Site, or to prepare the ECI Site for the CDF. If the $14 million is not expended to further create a windfall to the end users of the CDF, it could, and will it, be used, as intended, to respond to contamination on the non-CDF portions of the ECI Site, which response costs and obligations may, in part, otherwise be borne by the City of East Chicago or related entities? This $14 million further reduces the CDF's costs that would otherwise be borne by the federal government or the end users, and further increases the benefit of utilizing the ECI Site as contrasted to other potential CDF sites. How has this $14 million benefit been factored into the cost analysis, or is it simply considered to be a windfall to the federal government and the CDF end users? Is, and, if so, why is, the ECI Trust Fund being given to the benefit of the federal government and CDF end users, rather than to remediate the ECI Site and benefit the City of East Chicago?

J. If the capacity of the CDF proves to be in excess of what is necessary for the current proposed dredging, or if the CDF capacity is expanded to include sediments or materials for other locations, will the City of East Chicago receive this income? If not, who will?

K. If new legislation allows for more federal funding of CDF's and dredging projects, will the currently proposed local share be reduced accordingly?

L. When did the preparation of the EIS begin?

b. The Federal share of the costs of operation and maintenance of the disposal facility shall be determined in accordance with section 101(b) of the 1986 WRDA. Under section 101(b)0 the Federal share of the operation and maintenance costs would be 100 percent except for disposal facilities for projects in excess of 45 feet where the non-Federal sponsor would share in 50 percent of the incremental operation and maintenance costs.

c. The Federal share of construction of dredged material disposal facilities associated with the operation and maintenance of Federal harbor projects, Federal dredged material disposal facility operation and maintenance costs, Federal costs of dredging and disposal of contaminated sediments that are in or that affect the maintenance of a Federal navigation channel and Federal costs of mitigation for storm damage and environmental impacts resulting from Federal maintenance activity are eligible operation and maintenance costs under section 210 of WRDA 86 and are paid from the Harbor Maintenance Trust Fund.

Constructing the CDF on an existing RCRA site, such as the ECI site, significantly impacts the non-Federal cost sharing requirements. The District Engineer will have to obtain guidance from the Corps of Engineers Headquarters, Washington, D.C. regarding the applicability of the new CDF cost sharing authorized by Section 201 to the ECI site CDF.

V.L. Preparation of the current EIS began in the late 1980's.

NITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION II
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APR 1 1996

Lt. Col. Robert E. Slockbower, P.E.
District Engineer
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street
Chicago, Illinois 60606-7206

Class: EC-2

Dear Colonel Slockbower:

The Environmental Protection Agency (EPA) Region II office has reviewed the draft environmental impact statement (EIS) for the proposed Indiana Harbor and Canal (IHC) project in East Chicago, Lake County, Indiana. Region II assumed the lead for reviewing the document because Region V served as a cooperating agency with the Army Corps of Engineers (ACE) and was very active in the development of the draft EIS. This review was conducted in accordance with Section 309 of the Clean Air Act, as amended (42 U.S.C. 7609, PL 91-604 12(a), 84 Stat. 1709), and the National Environmental Policy Act (NEPA).

The proposed project would provide maintenance dredging of the federal navigation channel in the IHC, and along adjacent berthing areas and dockfaces. It also would involve the construction and maintenance of a confined disposal facility (CDF) for the IHC dredged materials because they have been determined to be unsuitable for open-lake disposal or beneficial uses. The CDF would be located on a portion of the Energy Cooperative Inc. (ECI) property, which will undergo closure and corrective measures pursuant to the Resource Conservation Recovery Act (RCRA); the RCRA requirements for the ECI property have been integrated into the proposed CDF design. Based on our review, we offer the following comments.

Although the draft EIS evaluates numerous alternatives for disposal of dredged material, it does not evaluate dredging to depths below the authorized maintenance dredging depths (29 feet in the outer harbor approach channel, 22 feet in the main canal, and 22 feet in the upstream turning basins). According to the draft EIS, however, there are several feet of contaminated sediments below the authorized dredging depths. We are concerned that these remaining sediments, which will be exposed for approximately two years after each dredging event, will adversely impact water quality. We are also concerned that these sediments will be disturbed during successive ACE maintenance dredging operations, as well as through "prop dredging", which commonly occurs by ships with lower drafts navigating in the IHC.

PG1, ¶3
The current dredging plan includes the impacts of dredging the hot spot areas to 2 feet below project depth. It is anticipated that sand/gravel or some other capping material can be placed in the over excavated areas. With exception of PCBs in the TSCA areas, most IHC sediment is homogeneously polluted with respect to most other contaminants. It is anticipated that the dredged canal will act as a sediment trap and because of this, any material of higher contaminant level that would be exposed is expected to remain in place and be covered over relatively quickly by filling of average contaminant level material from upstream, which itself would be ultimately recovered in the next dredging season. The cycle of backfilling and dredging will eventually leave a bottom of less contaminanted material over time.

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Accordingly, we recommend that the final EIS evaluate dredging below authorized depths (i.e., down to clean materials). Evaluation of this alterative is consistent with 40 CFR 1506.2(d) and Section 2b of the Council on Environmental Quality's March 16, 1981 guidance, entitled "Forty Most Asked Questions Concerning CEQ's NEPA Regulations," which mandate the evaluation of reasonable alternatives outside the legal jurisdiction of the lead agency.

With regard to the draft EIS's cumulative impacts analysis, it appears to be limited to anticipated long-term beneficial impacts of the proposed project, but does not address impacts of other related past, present, or reasonably foreseeable future projects in the project area. For example, the proposed project would involve dredging of contaminated materials outside of the federal navigation channel by non-federal entities with disposal of the materials at the CDF. However, potential impacts of these activities are not addressed in the document. Accordingly, the final EIS should include an assessment of the cumulative impacts of all related projects in the area. At a minimum, this information should be reflected in water and air quality models, and the capacity design for the CDF.

In its discussion of PCB contaminated sediments, the draft EIS indicates that the proposed project would involve disposal of these sediments in a CDF. Because any disposal method other than incineration requires approval by the Regional Administrator for the Region in which the PCBs are located, the ACE will need to file an alternate disposal application to EPA Region V. The document also indicates that there is a five year limitation on alternate disposal approvals, and for this reason the ACE will not file an alternate disposal application until sometime in 2002, two years before PCB disposal is scheduled to begin. However, we note that the five year limitation is not a requirement in the regulations (located at 40 CFR Part 761.60(e)), and does not have to be applied to this situation. Further, we believe that it would be more appropriate to address general Toxic Substances and Control Act (TSCA) requirements (e.g. ground water monitoring, leachate collection) applying to the design of the CDF early in the process where public notice is involved. For instance, some of the operating specifics, such as traffic control, would have to be added to the plans before PCB waste is accepted at the CDF. With this in mind, we suggest that the final EIS include a plan to submit an alternate disposal application sooner in the design plan process.

With regard to RCRA activities at the ECI property, the preferred alternative includes a plan for ground water extraction, and possibly on-site pretreatment, prior to discharge to East Chicago's waste water treatment plant. However, the plan does not include provisions for the recovery of the significant free phase product layer. As such, the final EIS should indicate how this

PG2, ¶ 2

The proposed project includes all dredged material in the cooperative dredging proposal both within and outside the navigation channel. Non-Federal navigation channel sediments will be dredged as part of the proposed project and disposed of at the ECI CDF. Two small areas, totaling less than 1% of the proposed dredging may be dredged and disposed of by Inland Steel as part of its Consent Decree obligations. The taconite pellet area along dock face #6 was dredged in 1996, removing 17,000 cubic yards of sediment. The presumptive RCRA area in the turning basin will be analyzed for disposal options. It may be added to the project and dredged by the U.S. ACE, or depending on the benzene content of the sediments, dredged and disposed of separately. This area of the training basin is comparatively small and should have no significant impact

In addition to the EIS, there are two major documents, the Grand Calumet Remedial Action Plan State II (Stage II RAP) and the Grand Calumet River/Indiana Harbor Canal Sediment Cleanup and Restoration Alternatives Project (SCRAP), that address the impacts of related environmental cleanup projects in the Grand Calumet area

In December 1997, IDEM submitted a Stage II RAP to the International Joint Commission (IJC) that describes remedial and regulatory measures that will restore the beneficial uses of the Area of Concern. The Stage II RAP was required by the IJC's designation of the Grand Calumet River/Indiana Harbor as an Area of Concern pursuant to the Great Lakes Water Quality Agreement of 1978. IDEM, working with U.S. EPA Region 5, the Great Lakes National Program Office IDNR, U.S. Fish & Wildlife Service, U.S. Army Corps of Engineers, and representatives from industry, communities, and environmental groups produced the State II RAP. It identifies ongoing and planned, voluntary, regulatory, and enforcement based cleanup and restoration activities in the Area of Concern. The various activities identified, together with the "cornerstone" dredging and disposal project will restore the Area of Concern.

The SCRAP report, released September 1997, was produced by the Corps of Engineers under a cost sharing agreement with IDEM. The purpose of the SCRAP was to facilitate the environmental cleanup and restoration of the Area of Concern by consolidating and synthesizing available information about Grand Calumet River sediment contamination, sediment volume, hydrology, and habitats. The SCRAP analyzes sediment cleanup and habitat restoration options for 10 reaches of the waterway, based upon site characteristics or major property owners. Potential consequences of cleanup and restoration activities in each reach are considered with respect to potential actions in other reaches.

These two major documents, in conjunction with the EIS, provide an assessment of the potential impacts and environmental benefits of related private and public environmental cleanup and restoration projects in the area

PG2, ¶ 3

Although a five year limitation does not necessarily have to be applied to the Indiana Harbor dredging project, the PCB-containing sediments are not scheduled to be dredged until approximately 2004. Submission of the application two years before the anticipated dredging of the PCB-containing sediment will ensure that the most up-to-date TSCA requirements will be incorporated into the approval. In the interim, the US Army Corps of Engineers has been provided with the TSCA regulations governing chemical waste landfills and alternate disposal approval. This includes consideration of traffic patterns, groundwater monitoring and leachate collection

PG2, ¶ 4

The discontinuous free phase product layer has been evident during various sampling events for the wells installed in 1990 and 1991 at a screened interval from the surface to a depth of 11 to 15 feet below ground surface. In 1995, the Corps installed three groundwater monitoring wells with 10-foot screens to a depth of 27 feet. Free product was not encountered. The surficial aquifer extends from 30 to 35 feet below ground to a confining clay layer. The recovery wells for the groundwater extraction will have intake screens installed below the layer of floating oil. Therefore, no free phase oil will be extracted.

material will be handled. If this material does not meet the definition of a RCRA hazardous waste (40 CFR 262), it may be regulated under the used oil regulations (40 CFR 279). Should the product or other wastes generated from RCRA corrective action measures meet the definition of a hazardous waste, RCRA regulatory requirements would become applicable for generation, management, storage, and disposal (40 CFR Parts 262 and 264).

In summary, based on our review and in accordance with EPA policy, we have rated this draft EIS as EC-2, indicating that we have environmental concerns (EC) about the dredging depth, impacts to water quality, cumulative impacts, and TSCA and RCRA issues. Accordingly, additional information (2), as outlined in this letter, must be presented in the final EIS to address these issues.

If you have any questions regarding this letter, please have your staff contact Daisy Mather of my staff at (212) 637-3493.

Sincerely yours,

Robert W. Hargrove, Chief
Environmental Impacts Branch

cc: K. Ryder, ACE
A. Fenedick, EPA Region V

INDIANA DEPARTMENT OF NATURAL RESOURCES

PATRICK R. RALSTON, DIRECTOR

Mr. Richard E. Carlson
Deputy District Engineer
Department of the Army
Corps of Engineers
111 North Canal Street
Chicago, IL 60606-7206

April 1, 1996

Dear Mr. Carlson,

The Department of Natural Resources appreciates the opportunity to comment on the Draft Environmental Impact Statement for "Indiana Harbor and Canal Maintenance Dredging and Disposal Activities: Comprehensive Management Plan." 78

General:

This project may require the formal approval of our agency for construction in a floodway pursuant to the Flood Control Act (IC 14-28-1). If appropriate, a copy of this letter should be included with permit application materials.

Overall, the Department of Natural Resources (DNR) generally supports the dredging plan for the harbor and ship canal. The Energy Cooperative, Inc. site is a suitable location for containment of the contaminated sediments and is an appropriate Confined Disposal Facility. The DNR concurs with the decision not to use the Inland Steel Lakefill site since, in our opinion, there would be adverse effects on the fish, wildlife and botanical resources of Lake Michigan.

The DNR does support Alternative 3 as the most appropriate for dealing with contaminated sediment removal and its disposal. The DNR does request that the sediment with over 50 ppm PCB's and elevated levels of benzene be removed rather than left in place. This is problematic since the EPA considers dredged material a solid waste and requires its disposal as a hazardous waste. On the other hand, the ACOE does not consider dredged material a solid waste and, by policy, does not dredge contaminated sediment over 50 ppm or elevated levels of benzene. The ACOE leaves this task to a

EQUAL OPPORTUNITY EMPLOYER

PG1, ¶2
As regards to the construction of the CDF, it is typically the responsibility of the local sponsor to apply for a permit, if needed. As regards to dredging, it is the Corps' opinion that dredging does not require a state construction permit. However, as a matter of comity, the local sponsor for this project may apply for it.

A review of the 1980 Flood Insurance Study for the City of East Chicago, Indiana shows that the ECI site is not in the flood plain, and therefore not subject to any flood plain regulations. We will coordinate this with IDNR.

PG1, ¶3
Comment noted.

PG1, ¶4
The Corps of Engineers is authorized to dredge two feet below project depth. The Chicago District is reviewing the possibility of over dredging sediment with over 50ppmPCB to two feet below authorized project depth and backfilling with clean material. With the exception of PCBs in the TSCA areas, most IHC sediment is homogeneously polluted with respect to most other contaminants. The area of elevated benzene is outside of the Federal project limit and within the Inland Steel dredging project pursuant to a judicially enforced consent decree between the U.S. EPA and Inland Steel. It is also anticipated that the dredged canal will act as a sediment trap and because of this, any material of higher contaminant level that would be exposed is expected to remain in place and be covered over relatively quickly by filling of average contaminant level material from upstream. The cycle of backfilling and dredging will eventually leave a bottom of less contaminated material over time.

local entity. A local entity usually does not have the resources to address this issue.

This creates a contradiction with the EIS. In the text, reduction of the contaminate loading to Lake Michigan is discussed at length. This is used to a large degree to support the dredging project. Yet because of a policy difference between two federal agencies, some of the most toxic material will be left in place. The dredging project is a complicated procedure involving multiple agencies and concerned citizens; success depends on cooperation among all of the groups. It is unfortunate that the EPA and ACOE cannot resolve this disagreement.

Environmental Benefits:

The DNR concurs that there will be environmental benefits from the dredging because of the removal of contaminated sediments from the canal and harbor, and decreased loading to Lake Michigan. Throughout the document, reference is made that cargo vessels are only half loaded and must plow through contaminated sediment which causes a resuspension problem. Dredging will alleviate this problem to some degree.

There is no discussion in the text about resuspension of recently exposed contaminated sediments. The canal will be dredged to navigational levels, but all contaminated sediments will not be removed. The dredged channel will allow cargo vessels to be fully loaded. There is no discussion of the environmental impact of resuspension of sediments from the prop wash. This will be governed by the clearance between the vessels and the contaminated sediment. If there is increased commercial traffic, as implied by the EIS, the resuspension will be increased.

It is presumed that newly deposited sediments will be cleaner than previous deposits. This is only to a matter of degree. Maintenance dredging will remove the cleaner sediments and still expose contaminated ones. The EIS does not mention the ongoing contamination of groundwater and surface water contamination, especially from oil and its byproducts. These will contaminate the cleaner sediments.

These issues should be discussed more fully in the EIS. This will avoid the impression that all of the contaminate issues have been addressed, and the implication that there is no concern with continued contamination in the harbor and canal.

This continued contamination concerns the DNR. The dredging will cause adverse impacts to fish and wildlife primarily through the release of ammonia. Wildlife mortality is expected and the quantification is not known. Continual dredging of the clean material and exposure of contaminated material could prolong wildlife mortality. Dredging below navigational levels would be

PG2, ¶2
Comment noted.

PG2, ¶'s 3,4, and 5
The issue of exposure of more contaminated sediment has been addressed above. When the channel is maintained there will not be resuspension from prop wash. The newly deposited sediment will be, at first similar in quality to the existing sediment. Over time as the entire basin is being remediated the quality of deposited sediment should improve. The dredging project and the basin remediation efforts will both take a number of decades to implement. The recent approval of the Stage II RAP, the SCRAP Report prepared for IDEM, and the NRDA process will all contribute to addressing the significant concerns with continued contamination. Additional information on the volumnes of sediments, and the sediment chemistry in the upper reach of the Indiana Canal and the Grand Calumet River can be obtained in a report recently completed for IDEM by the Corps (Grand Calumet River - Indiana Harbor and Canal Sediment Cleanup and Restoration Alternatives Project, September 1997).

PG2, ¶6
The hot spot issue has been addressed in the response to comment page 1, paragraph 4 above. Ammonia concentrations around the dredging operation have been conservatively estimated to reach a high of 2 mg/l above the value for average canal ammonia as monitored by IDEM (0.8 - 1.4 mg/l). This increase is within the range for maximum background concentration of ammonia as measured by IDEM (2.5 mg/l). In addition, the extent of the ammonia impact from the dredging operation is estimated to be limited to within 1000 feet of the dredging operation. As addressed in other responses, the feasibility and effectiveness of clean capping will be evaluated design analysis phase.

beneficial and, if at all possible, clean sand deposited to navigational levels. This would reduce the problem of exposure of contaminated sediments with maintenance dredging.

Threatened and Endangered Species:

The DNR's main concern is the peregrine falcon. The long term effects of this project should be positive for the peregrines as long as exposure levels are reduced.

PG3, ¶2
Comment noted.

Short term effects may be neutral or negative depending on how the project is carried out. Disturbance during the dredging operation should not unduly disturb the falcons if dredging activities are confined to the channel of the Indiana Canal. A favored roost site is the first highway overpass support just to the northwest of the canal. This appears to be used most frequently during the winter. Dredging operations may cause the roosting birds to select an alternate site. Activity on land will potentially cause more of a disturbance and should be minimized or avoided, if possible.

Prey items used by the peregrine falcons at this site have not been well studied, but is likely dominated by terrestrial species belonging to the avian order Columbiformes and Passeriformes. Other birds such as grebes, ducks, coots, rails, gulls, terns, and shorebirds are occasionally taken. Consideration should be given to discouraging these species from feeding in the canal during the project.

Disposal sites should be distant from the nest site and/or managed such that they are not being used by aquatic bird species to minimize exposure to contaminants from dredged materials.

The DNR supports the efforts to dredge the harbor and canal especially in regards to any effort to protect fish, wildlife and botanical resources from adverse impacts.

Sincerely,

David L. Herbst

David L. Herbst
Deputy Director

wcf

April 1, 1996

LAKE MICHIGAN FEDERATION
59 E. Van Buren Street, Suite 2215
Chicago, IL 60605

Lt. Col. Robert E. Slockbower
District Engineer, Chicago District
U.S. Army Corps of Engineers
111 N. Canal St. Suite 600
Chicago, IL 60606-7206

Dear Lt. Col. Slockbower:

Enclosed please find the comments of the Lake Michigan Federation, Save the Dunes Council, Grand Cal Task Force, and Sierra Club, Great Lakes Office to the draft Environmental Impact Statement and the Comprehensive Management Plan for the Indiana Harbor and Ship Canal Dredging and Disposal Project. We appreciate the opportunity to comment on the Draft Environmental Impact Statement (EIS) for this much needed project, which involves the removal of the largest accumulation of contaminated sediments in the Great Lakes. This project will set precedents and serve as a model for other dredging projects throughout the Great Lakes.

The four organizations have worked together to scrutinize numerous aspects of the project and to encourage maximum public involvement in review of the project as it is described in the DEIS.

In general we find considerable merit in the dredging of the harbor and the disposal of contaminated sediment in a confined disposal facility. Northwest Indiana is a highly industrialized area which produces steel and petroleum products. The Indiana Harbor is the port through which vital raw materials are transported. As a result, the economy of Northwest Indiana would be severely impacted if the harbor were not dredged.

The project offers considerable environmental benefits. Removing the sediments from the Canal and the Harbor will improve water quality and benefit the health of humans and wildlife using Lake Michigan.

On the basis of our review, we first make the following general recommendations:

*Public health and the environment should be protected during the dredging and long term disposal and/or treatment of the contaminated sediments that are removed.

*The project should provide lasting benefit to water quality and the environment of the Grand Calumet River, the Indiana Harbor and Ship Canal and Lake Michigan.

*The design, construction and operation of the project should be integrated into long range remediation plans

General recommendations are noted.

for the entire watershed of the Grand Calumet River.

*Adequate funding should be committed for the entire life of the project.

*Flexibility should be provided so that new treatment technologies can be applied that may become available in the future.

*Opportunity should be given for periodic public review of the progress and status of sediment removal and environmental protection throughout the project.

Due to the magnitude and precedent setting nature of this proposed project activity, the four organizations jointly organized a fifteen member Technical Advisory Committee in December, 1995, with Dr. Gerrit Knapp, Chair, to review the Draft EIS and CMP.

In addition to Gerrit Knapp (UNIVERSITY OF ILLINOIS), the members of the TAC and their institutional affiliations are as follows: Tom Anderson, Charlotte Read (SAVE THE DUNES COUNCIL), Lee Botts, (ENVIRONMENTAL CONSULTANT), Tim Brown, Gene Peters (CLEAN SITES), Dorreen Carey, Mark Tenney (GRAND CAL TASK FORCE), Erik Christensen (UNIVERSITY OF WISCONSIN-MILWAUKEE), Gail Harkey (CHICAGO STATE UNIVERSITY), Brett Hulsey, Emily Green, Pat King (SIERRA CLUB, GREAT LAKES PROGRAM OFFICE), Jeff Jeep (BARNETT, BORNSTEIN & BLAZER), Phil Keillor (UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE), Tom Murphy (DEPAUL UNIVERSITY), Steve Skavroneck, Eleanor Roemer (LAKE MICHIGAN FEDERATION).

The TAC's detailed report is enclosed with this letter. Major concerns express in their review include:

The Methodology Used for Estimating Sediment Loads

Analyses undertaken for the Grand Cal Task Force, based on much more recent data than the Corps' analysis, estimate significantly lower sediment loadings than those assumed in the draft EIS. This has very important implications for the design and ultimate cost of this project. The estimates in the EIS need to be revisited and revised. In addition, monitoring of combined sewer overflows (along with improved quantification of runoff) and actual sampling of sediment loads in the ship canal are needed in order to ensure an effective project design.

Characterization of the sediments

We believe the sediment sampling described in the draft EIS is adequate to describe the problem, develop a tentative dredging and remediation plan and roughly estimate project costs. However, the sampling is not adequate to definitively characterize the sediments for remediation. For example, the EIS does not allow for determination of how many unduplicated locations are included in the five sampling episodes spanning 13 years. Such a sampling record cannot be composited to adequately characterize the sediment quantity and quality in a harbor where vessels routinely plough the

Pg2, ¶3

The TAC report is on file in the Corps of Engineers, Chicago District Office.

Pg2, ¶4

The Methodology Used for Estimating Sediment Loads - The sediment yield analysis in DEIS was not at a detailed level and utilized available information to characterize the sources of sediments within the GCR/IHC watershed tributary to Lake Michigan. The sediment loadings were characterized with information which was collected from the watershed during the 1980's, or from literature based on studies of other areas in this same time frame. The only "check" to verify the sediment loading estimates was the historic dredging records and bathymetric measurements from the Federal navigation channel. Clearly, the amount of sediments entering the river system had to be greater than the amount setting in the Federal channel or dredged from it. The analysis presented in the CMP/DEIS estimated sediment loadings 2-3 times greater than the volumes dredged from the Federal channel. This was considered a reasonable check on the sediment loading estimate. We concur with the report that the sources of sediments to the GCR/IHC are subject to change over time and some may be substantially reduced as a result of point and non-point pollution control measures within the basin. It should also be noted that a primary source of sediments to be transported would be existing sediments in the upper reach of the Indiana harbor and the Grand Calumet River. A report prepared by the Chicago District (Grand Calumet River - Indiana Harbor and Canal Sediment Cleanup and Restoration Alternatives Project, Septemberf 1997) shows that these volumes could be as much as 6,789,000 cubic yards. Because of the importance of accurate sediment loadings to this project, the Chicago District has worked with the USGS to collect the type of data necessary to provide more accurate estimates of sediment loadings. To finalize this activity, and depending on funding the Corps may continue working the USGS on a modified monitoring program in which suspended sediment data would be gathered only for significant events.

The sediment yield analysis in DEIS was not at a detailed level and utilized available information to characterize the sources of sediments within the GCR/IHC watershed tributary to Lake Michigan. The sediment loadings were characterized with information which was collected from the watershed during the 1980's, or from literature based on studies of other areas in this same tile frame. The only "check" to verify the sediment loading estimates was the historic dredging records and bathymetric measurements from the Federal navigation channel. Clearly, the amount of sediments entering the river system had to be greater than the amount settling in the Federal channel or dredged from it. The analysis presented in the CMP\DEIS estimated sediment loadings 2-3 times greater than the volumes dredged from the Federal channel. This was considered a reasonable check on the sediment loading estimate. We concur with the report that the sources of sediments to the GCR/IHC are subject to change over time, and some way be substantially reduced as a result of point and non-point pollution control measures within the basin. Because of the importance of accurate sediment loadings to this project, the Chicago District is developing a mathematical model and is currently working with the USGS to collect the type of data necessary to provide more accurate estimates of sediment loadings.

Pg2, ¶5

Sediment sampling investigations are outlined in section 4.4.4 of Appendix E. As shown in Tables H-4 and H-5 of Appendix H, the results consistently show that the sediment quality within the IHC, with the exception of the contaminant PCB, does not indicate any significant change with depth. Laterally, there is a trend of decreasing levels from upstream to downstream, but this trend is more distinct for some parameters than it is for others and is not applicable to PCBs. More delineation of the two PCB hot spots will occur before dredging. As noted above, sampling has occurred over a 13 year period and consistently has shown similar results laterally and vertically. The sampling data are clearly sufficient for the design of a navigational channel dredging project. The project is not a remediation effort and additional sediment sampling investigations other than at the PCB hot spots will result in substantial cost and time without providing useful information that could significantly effect the project design.

sediments and resuspension and retransport occur regularly. Based on a formula used elsewhere, almost 100 core samples would be needed during a single sampling episode, and sediment dating would be very useful, as well.

Assessment of Sediment Treatment Technologies

The assessment of various contaminated sediment treatment technologies was generally reasonable, however, treatment options should not be dismissed without first determining the savings that would result from avoiding the costs of long-term monitoring and maintenance of a confined deposit of untreated, contaminated sediment. In addition, the draft EIS should contain an analysis of how economy of scale or technology improvements might change the treatment cost picture. We also question why thermal desorption, bioremediation, and dechlorination were not included in the treatment technology assessment, each of which has been shown to be effective in treating PCBS, PAHs or petroleum hydrocarbons.

Dredging Operations

The technical advisory committee report suggests that additional factors, such as higher production rates and not having to barge and truck sediments to the CDF, should be considered before ruling out hydraulic dredging as the preferred method of sediment removal.

The project would benefit from an operations research type of analysis of the dredging method, schedule and dredged material transport system. This would allow for consideration of trade-offs among different bucket types, resuspension minimization techniques and transport techniques and may result in considerable cost savings.

Confined Disposal Facility Design

The technical advisory committee report raises concerns about, and in some cases suggests, alternative approaches to the the following design considerations:

- the integrity of the slurry walls and dike liners;

*the apparent failure of the design to account for the weight added to the system from the dredged materials;

*constructing portions of the dike from dried sediments;

*the ability of the CDF to maintain all the necessary hydraulic gradients;

*the potential for mixing of the sediments placed in the facility with the pollutants already residing below the site;

*the need for a mechanism to allow for periodic cleaning and maintenance of the sump and piping system; and

*the effectiveness of the proposed leachate treatment

PG3, ¶1

Long term monitoring and maintenance would be requried at the site with or without the CDF due to the RCRA closure/corrective action obligations so are not new or additional costs. Both thermal desorption and bioremediation were investigated through the USEPA's Assessment and Remediation of Contaminated Sediments (ARCS) Program. However neither was selected as having the greatest potential for application to sediments from the HIC. Thermal desorption is discussed in "Pilot-Scale Demonstration of Thermal Desorption for the Treatment of Buffalo River Sediments" (USEPA, 1993). To date, a report has not been published on the results of the bioremediation findings. The alkali-polyethylene glycol (APEG) process, discussed in Appendix G, is a dechlorination process and APEG dechlor was not ranked high enough for further discussion in the appendix. The procedure used to rank the treatment technologies is in Appendix G.

Hydraulic dredging has been carefully considered as a method of sediment removal but has not been selected for three main reasons. First, reason the CDF would have to be substantially larger to contain the large amount of water associated with hydraulic dredging. In addition, this water would require costly treatment before being returned to the canal. Finally, the sediment drying time would approximately double and would delay future dredging of the canal.

PG3, ¶2-3

As a point of clarification, there is at present no slurry wall installed at this site. The Federation comments are predicated on a groundwater model that assumes the containment is a bathtub and that the system is closed with only inputs into the groundwater system from seepage out of the sediments in the CDF. The model predicts that the seepage will cause the contaminated groundwater beneath the site to rise vertically through the dredge sediment. The organic free phase component of the groundwater under these conditions is believed capable of solubilizing the organic contamination within the dredge sediment. This proposed model is not accurate.

Topic 1 (the integrity of the slurry walls...

The USACE is aware of the concern over chemical compatibility of the materials used in the construction of the cutoff wall with the groundwater contaminates. This will be studied in detail in the Design Memorandum phase of the project.

Topic 2 (the apparent failure of the design...

The dredge sediment when it is initially placed within the CDF will contain a high water content. This liquid will be removed from the sediment by gravity drainage towards the decant structures or by seepage into the foundation. The seepage component will travel vertically until it arrives at the water table. Mounding of the water table beneath the disposal area system will be designed to accommodate the additional flow quantities contributed by the CDF operations. This water will be removed from the surficial aquifer and sent to the treatment facility. The design of the extraction well system will be included in the Design Analysis and estimates of quantities of water to be handled will be discussed in that document.

Topics 3 (Constructing portions...)

The engineering and hydraulic properties of the sediments will be further evaluated in the design phase.

Topic 4 (the ability of the CDF...

In addition to the perimeter cutoff wall, which will contain the groundwater beneath the site, a line of extraction wells is proposed to be installed inside the cutoff wall. The purpose of this system is to maintain the water level inside the cutoff wall two feet below the water level outside the cutoff wall. This drawdown will cause a groundwater gradient through the wall into the site. The extraction wells will also induce a slight gradient between the interior of the ECI site and the perimeter with groundwater flow towards the line of wells.

Topic 5 - (the potential for mixing of sediments ...)

As stated in section 6.3.3 of Appendix E, the results of permeability testing indicate that the sediment would have a permeability at or below that provided by clay liners (see Table E-3). A barrier was not included between the sediment and subsurface because of the high cost and the ability of the dredged material to act as a barrier. The contamination in the sediments and at the site are roughly the same and a barrier separating similar containments does not improve environemntal performance.

Topic 6 - (the need for a mechanism..)

Design of piping system will be developed in the design phase and will - take into account maintenance requirements.

Topic 7 - (the effectiveness of the proposed leachate ...)

Leachate treatment will be developed in the design phase. A treatability study is currently to design the leachate treatment facilities.

system for treating PCBs, soluble metals, and oil and grease.

We recommend that mitigation and compensation measures for the citizens living in the vicinity of the confined disposal facility be included in the dredging and disposal plan.

Project Management Issues

Long term success of this cleanup effort depends upon proper management. Key management issues must be addressed prior to final approval of the Indiana Harbor and Ship Canal dredging and disposal project; these include:

1. The role of the Waterway Management District (WMD). The District was created in 1994 to manage and maintain waterways in East Chicago with assistance from other local, state and federal agencies. The WMD is proposed to serve as "local sponsor" of the dredging project and is the owner of the ECI site, the proposed location of the CDF. We are very concerned about the role of the WMD and the capacity of this new entity to manage such a long-term, complex project. The role and responsibility of the WMD must be better defined to assure compliance with state and federal laws.

In addition (due to a lack of authority to raise funds), financial assurance for current and future liability, along with possible RCRA corrective action must be guaranteed. The role of the state of Indiana should have a higher profile in this effort, to provide assurance that the public will be protected, both economically and environmentally.

2. Local Sharing. There is inadequate assurance of local sharing responsibilities for this project. The legislation that established the WMD stresses the WMD's responsibility to manage and supervise "in conjunction with other state and federal authorities." We urge that the role of these authorities be well defined in the final EIS. It is vital that agencies with expertise in these matters take an active role in this project.

3. Host Community Agreement. This project lacks a "host community agreement." Many solid waste proposals include a host agreement to compensate a local community for impacts from such projects. For example, a "homeowners property value guarantee" was a requirement in a landfill project.

Finally we recommend that determination of responsibility for public information and decision-making should be established and the responsible entity should ensure that the following public participation processes are implemented:

PG4, ¶1

The citizens of Northwest Indiana, including residents living in the immediate vicinity should receive indirect yet significant economic benefits from the restoration of the Indiana Harbor and Ship Canal. This dredging and disposal project will lower transporation costs of the heavy manufacturers that rely on Great Lakes shipping. The lowered transportation costs give local industries a competitive advantage, which should help East Chicago maintain and increase its industrial tax base, as it will help to retain existing businesses and bring in new industries. The industrial tax base in turn supports the general operating revenue for the City, including funds for schools, street improvements, libraries, parks, and other vital services for the community.

PG4, Topic 1

The roles of the Local Sponsor and State of Indiana were intentionally unconstrained at the time of the DEIS publication to allow the parties the flexibility to define roles to be fulfilled over the course of the Project. In the case of the East Chicago Waterway Management District (WMD), a local sponsorship agreement will be negotiated prior to project construction to fully define the responsibilities each party will assume. Day to day project management will be the responsibility of the U.S. Army Corps of Engineers (USACE). The WMD will required sufficient expertise to oversee the project, apply for permits that may be required jointly with the USACE, and manage monies generated for local share. In the case of the State of Indiana, their role in the project management can be defined only after they fulfill their roll as independent reviewer of the draft and final EIS. The U.S. EPA Region 5 office has been involved in this project and will continue to be involved over the duration of the project. As the local sponsorship agreement is finalized, the needs of the WMD and the USACE can be assessed and project support sought from any of the State or Federal agencies that have authority and jurisdiction.

PG4, Topic 2

The role and responsibilities of the Corps of Engineers will be clearly stated in the Project Cooperation Agreement. The Corps of Engineers cannot define other state and federal authorities.

PG4, Topic 3

A "Host Community Agreement" has only been associated with the development of private landfills. It is an opportunity for the local community to share in the proceeds of a for-profit landfill. The Indiana Harbor and Ship Canal Project is a public works project that accrues no profit. Without any profits to share, funds to give to the local community from the IHSC Project would necessarily be generated through an increase in local taxes, imposition of disposal fees to generate a profit, or the direct use of Federal or State Funds. An increase in local taxes is not within the authority of USACE to establish, the imposition of disposal fees to generate a profit is beyond the authority of the USACE, and direct compensation would have to be based on a takings claim that would involve demonstrating the incremental economic loss caused by the project. The concept of a "Host Community Agreement" is neither applicable or appropriate for this project.

1. A quarterly newsletter on the activities and meeting times of the waterway management district focusing on the ship canal dredging project will be mailed to all addresses within waterway management district boundaries, all addresses in East Chicago, Hammond and Whiting within 2-3 miles of the proposed Project boundaries, all interested parties who request to be put on the Waterway Management District mailing list, and local media.

2. All announcements of permit applications or permit modifications, periodic project reviews, design presentations and recommendations, and all and any decision making processes having to do with the Ship Canal dredging project and long term management will be mailed to Waterway Management District addresses, addresses within 2-3 miles of the Project boundaries, interested parties, and local media.

3. Every six months, public workshops/question and answer sessions on the progress and processes involved in the Dredging and Disposal Project will be held in a meeting place and time convenient to the public impacted by the project and workshop announcements will be mailed to Waterway Management District addresses, addresses within 2-3 miles of the Project boundaries, interested parties, and local media.

4. If at any time, members of the public wish to have a special meeting with the U.S. ACOE, the U.S. EPA, the IDEM and/or the ECWMD regarding issues of concern on the Ship Canal dredging and Disposal Project, such a meeting will be set up in a timely manner at a time and place convenient to the petitioners if a letter of request with at least 10 signatures is submitted to the designated responsible entity.

5. A public advisory committee on the canal dredging and disposal project shall be created to advise the Waterway management District on environmental and public health issues. The advisory committee could be comprised of the CARE committee for the Remedial Action Plan of the Grand Calumet River/Indiana Harbor Ship Canal and representatives who are residents living within 2-3 miles of the Project boundaries. The WMD is required to hear the advice and recommendation of the advisory committee in their decision making process. If the WMD disregards advice of the public advisory committee that is considered imperative for the protection of public health and the environment, the advisory committee may appeal directly to the U.S. EPA Region V District Administrator and/or the Commissioner of the IDEM.

6. A technical committee on sediment management, remediation and treatment and prevention of sediment loading will be set up for the purpose of advising the public and the entities involved in the Ship Canal project and other dredging and disposal projects on the Grand Calumet River and the Indiana Harbor Ship Canal. This committee could be associated with the CARE committee but would include representatives of sanitary districts and major industrial dischargers to the Grand Calumet River/Indiana Harbor Ship Canal

PG5, ¶1

A public outreach program needs to be crafted for the life of the Project. Specifics of the program can be worked out with the various public agencies; many of the suggested elements are already under discussion in Northwest Indiana. The various permits the dredging project will require all have specific public outreach requirements. Public meetings can be scheduled around significant events in the life of the project and the public already has the ability to request a meeting with the public agencies or appeal to the directors of those agencies without a petition process.

Funding for these items is a critical concern in the present fiscal climate. An efficient and effective plan needs to be developed so that the limited resources of all the stakeholders can be used effectively. For example, the establishment of a good public repository in conjunction with periodic written updates to an established mailing list, or Internet Web Page may be more effective than mass mailing technical announcements. The U.S. EPA and U.S. ACE have a Sediment Team and IDEM and U.S. EPA have a sediments committee with a Web site that are available to answer technical questions about any of the dredging projects within Region 5. East Chicago Waterway Management District has already agreed to meet with the affected stakeholders and establish many of the public input tools suggested by the Federation.

and representatives who are residents living within 2-3 miles of the project boundaries.

7. User friendly public repository for all public documents pertaining to dredging and disposal project.

Once again we appreciate the opportunity to provide these comments for your consideration. Please consider the possibility of meeting with members of our organizations prior to publication of the final EIS and CMP.

Sincerely,

Steve Skavroneck
Lake Michigan Federation

Tom Anderson
Save the Dunes Council

Dorreen Carey
Grand Cal Task Force

Brett Hulsey
Sierra Club, Great Lakes Office

INDIANA HARBOR AND CANAL
DREDGING AND CONFINED DISPOSAL FACILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT
ATTACHMENT 2 - PUBLIC HEARING
TRANSCRIPT/RESPONSES TO PUBLIC
HEARING COMMENTS

STATE OF INDIANA)
) SS:
COUNTY OF L A K E)

IN RE: PUBLIC HEARING ON THE INDIANA HARBOR AND SHIP CANAL DREDGING AND DISPOSAL PROJECT

RECORD OF PROCEEDINGS, taken in the matter of the Public Hearing, reported by Peggy Sue Zielinski, C.S.R. and Notary Public within and for the County of Lake, State of Indiana, at 1100 West Columbus Drive, East Chicago Central High School Auditorium, East Chicago, Indiana, on the 20th day of March, 1996, commencing at the hour of 7:00 o'clock in the evening.

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Phone (219) 931-7293

PANEL MEMBERS PRESENT:

LIEUTENANT COLONEL ROBERT SLOCKBOWER
Commander of the Chicago District, U.S. Army Corps of Engineers;

MR. ROBERT TOLPA,
Acting Foreman, U.S. EPA;

MR. RICHARD CARLSON,
U.S. Army Corps of Engineers, Project Manager.

* * * *

LT. COL. SLOCKBOWER: Good evening, Ladies and Gentlemen. Thank you for participating in this public hearing. I am Lieutenant Colonel Robert Slockbower, Commander of the Chicago District, Corps of Engineers. I am joined at this table this evening with Bob Tolpa, who will be acting as the foremanager; Mr. Richard Carlson, the Corps of Engineers, Project Manager; and we also have a court reporter and a translator present this evening.

The purpose of this hearing is to gather information on the proposed dredging and disposal activities in Indiana Harbor Canal, which were presented in the draft Environmental Impact Statement prepared by the Corps of Engineers and the U.S. EPA.

We will be accepting both written and oral comments during this hearing, and all comments

will be considered in preparing the final Environmental Impact Statement. Mr. Carlson will be presenting a brief description of the proposed project and I will accept your comments according to the following protocol.

First, Federal elected and appointed officials and Federal agency representatives. Second, State elected and appointment officials and agency representatives. Third, County elected and appointed officials and agency representatives. Then local government officials, organized group representatives, and private citizens.

At this time, Mr. Carlson will now briefly describe the Indiana Harbor and Canal proposal and I will then begin to call for comments following his presentation.

MR. CARLSON: I have given many presentations to many folks. Many of you have come to the meetings we have prepared or we have presented the project at. I'm just going to give a very quick verbal description.

The proposed action is to resume maintenance dredging at Indiana Harbor and Ship Canal. That Harbor has not been dredged since the early 1970s because the materials that would be

dredged are polluted and we do not -- did not have a place in the last 20 some years to place the dredged material. Could not be placed. Years ago we use to place it in the Lake. But after 1970 NEVA Act, we were prohibited from placing it in the Lake -- materials in the lake. So we had to find a place to store the materials, to confine them, and this is what the meeting is about tonight.

The proposal is to build a confined disposal facility at the former ECI site, that's located northwest of Indianapolis Boulevard and the Lake George Canal. The CDF, which is the acronym we use, would be -- would include a cutoff wall from the ground surface down to the hard clay, which is about 30 plus feet below the existing ground surface. We would build a set of dikes around three different cells, around the ECI site, and then we would tie those dikes into the underground cutoff wall. And then we'd begin to place dredge material in the facility.

The facility would be lined with clay or some type of impermeable liner to keep the material from moving off site. We would place wells inside the walls that would be under the ground. We place wells so that we could pump the ground water

inside the dikes or inside the CDF, pump that and capture it, and insure ourselves that the ground water would move into the inground water that would move passed the walls, would move into the CDF area. Take about 30, 30 plus years to fill the confined disposal facility, if it was there and if we went the full 30 year design life.

The CDF would be constructed in stages. We would go -- the first set of dikes would be 15 feet high. After that area was filled with dredge material, we would raise the dikes another ten feet. After that was filled, we would raise them again. This allows us to cut the cost, initially cut the cost. And it allows the CDF to be -- the use of CDF to be ceased if some day alternate dredge material disposal technique should come on line in the next ten to 15 years. It would allow us to go to that technique if some economically justified technique came along. We would. If not, we would continue to fill the dike disposal facility and eventually when it was filled, cap it.

The existing ECI site is a RCRA site. That's a site that's regulated or regulated under the Resource Conservation and Recovery Act and

because of that, that site has to be closed from a RCRA standpoint. And so the project would not be able to be used for confined disposal of dredge materials, but it would also close this site from a RCRA standpoint.

The final enclosure action would be the cap of the CDF. Once the cap goes on, all the dredge material and the ground water under the site would be encapsulated, and we would -- that site would be closed from a RCRA standpoint.

The cost, the present cost based on October '95 dollars, 127 million. This would be a project that would be jointly cost shared by the Federal Government, by the Corps of Engineers, and by not Federal interest, the Waterway Management District, which was created by the State of Indiana, would be the agency that we would work with, and users of the facility, such as industry, so on would share in the cost of building and maintaining this facility.

We completed an extensive environmental study, which is documented in the Environmental Impact Statement and we have done quite a bit of engineering. There is still a substantial amount of engineering. Once we complete

the environmental requirements, we'll then complete the engineering design and then look to the Congress for money to go into construction. Also need funds from the non-Federal interest, that is the people who, the agency or the industry, which might use the site for disposal of their dredge material say from their berthing areas and so on. We would also need funding from those folks too.

That's a very quick, very quick summary. If you'd like more details, in the side room back over here there is several folks who have slides and drawings, charts, that they can go into much more detail. Thank you.

LT. COL. SLOCKBOWER: Okay. Mr. Bob Tolpa will be providing instruction about the actual management of the public hearing and his responsibility as floor management.

MR. TOLPA: Good evening, Ladies and Gentlemen. I am Bob Tolpa from the U.S. Environmental Protection Agency, Chicago office. And tonight I'll be acting as floor manager for this public hearing.

Before the hearing begins, I'd like to set out some ground rules. We are using these ground rules to make sure everyone gets a chance to

deliver their remarks. Now, there is an important difference with this meeting tonight then from meetings in the past. This is a public hearing. We are only accepting comments. We have a stenographer court reporter here who is taking a verbatum record. We will not be responding to any questions. People will not be answering questions. And first, if you wish to speak at this session, you should have registered in the hallway as you walked in. If you haven't done that yet and you wish to speak, please do so now.

Next. When you are called upon to speak, before you begin, please clearly state your name and spell it. This will be for the record. If you are representing a unit of government or a private organization, please state the organization name. Everyones comments will be limited to three minutes and you cannot give your time. You cannot voluntarily seed your time to someone else. Three minutes max. I will be the timekeeper and I'll let you know when you have one minute left.

There will be no cross examination of the speakers tonight. If you hear something that someone says that you disagree with, this is not the meeting for that. This is merely to take comments

on the proposed draft Environmental Impact Statement and to make those comments part of the official public record.

If you have questions of the Corps or the Environmental Protection Agency, or if you need clarification on something you have read or something you have heard, we have a group of people, a group of experts in a room out the door that you came in and to your left, and there will be a sign in front of it. We have people from both the Corps and EPA explaining and can explain for you various aspects of the project.

Please note there is a verbatum record being made of this meeting tonight and it is important for us to keep the noise level down so that the comments can be accurately taken by the recorder.

One more thing.

(All the previous comments by Mr. Tolpa were reiterated in Spanish.)

Now, does anyone have any questions about the ground rules? If not, why don't we start.

LT. COL. SLOCKBOWER: The first speaker this evening will be State Senator Lonnie M. Randolph, representing the Second District. If you

could please come forward, sir, to either one of the two microphones.

SENATOR RANDOLPH: Good evening. I apologize for not being here when everything got started, but I have some serious concerns. As a matter of fact, I wrote a letter to the Amry Corps of Engineers, but I never got a response, but pretty much in a nutshell I will just list an itemization of some of the things that I've got in mind that I am concerned about.

One is the overall objective of the program in terms of the dredging. What would it accomplish? Two: What are the affects if something goes wrong? Three is whether or not there is an evacuation plan that's implemented, that the City has in place, that the State or Federal government would require.

Number four is the potential number of people who will be affected if in fact something does go wrong with the site. Number five is, who would be liable? Where would that liability lie? Would it be with the State, the City, or the Federal government. Whether or not anyone would be injured if in fact something did go wrong, would they be evacuated or property or personal injuries are

Pg 10, ¶2.

1 The overall objective of dredging Indiana Harbor and Canal is to restore and maintain the Congressionally authorized deep-draft navigation depths in the Federal channel. This will reduce shipping costs. This project will also reduce the amount of contaminated sediments in the channel and also the sediments being washed into Lake Michigan.

2 Extensive studies and analyses have been undertaken to evaluate the potential impacts and risks associated with the proposed CDF and dredging project. The results of this work are documented in the Indiana Harbor and Canal Maintenance Dredging and Disposal Activities Comprehensive Management Plan and accompanying environmental impact statement.

3 No evacuation plan has been prepared. Based on the environmental impact studies and the health risk assessment that have been completed, preparation of an evaluation plan is not needed.

Pg 10, ¶3.

4 The closest affected population would be 1,900 students attending the East Chicago High School, located approximately 2,050 feet south of the boundary of the confined disposal facility site. The U.S. EPA completed an inhalation risk analysis to assess the human health risks posed by potential air emissions from the proposed CDF (see Appendix T of the Comprehensive Management Plan). The results of the risk analysis show that the additional risk from the CDF does note exceed the risk for the existing air quality at the high school.

5 The issue of liability will be worked out during the negotiations of the Project Cost Sharing Agreement between the Corps of Engineers and the local project sponsor, the East Chicago Waterway Management District.

6 Any injuries related to the CDF dredging project would be handled as any other similar emergency situation.

suffered.

Next question. Number seven is, whether or not this management group that's involved supposedly managing this operation, will be comprised of elected officials of the City of East Chicago. And my eighth question is, what influence will that have in terms of accomplishing the objectivity of the program?

And then I have additional questions in terms of how does that come about in the public not being aware of the search by the Army Corps of Engineers to find an outside independent group to administer the program to make sure it has found a suitable group and carried out correctly.

And the last question I have, if in fact you have got elected officials from the City directly involved in the board, in the management of dredging of this, what affect will that have in terms of creating some kind of a patronage system that will cause them to exclusively -- to the exclusion of the people of the City of East Chicago, allow people to be employed in management positions to their benefit to the detriment of the people here.

I also have a question in terms of

Pg 11, ¶1. 7 The East Chicago Waterway Management District (District is not comprised solely of elected East Chicago officials. Public Law 56-1994 is legislation that establishes the District. This law states that the District's Board of Directors has seven members. The Mayor of East Chicago appoints four members, the Governor of Indiana appoints two members, and the East Chicago City-Council appoints one. Members must be registered to vote in East Chicago Two Board members can represent industries who locate their facilities within the District's boundaries. One of the two industry representatives must be a mayoral appointee and one must be gubernatorial appointee. The Board members serve staggered terms; each member serves three years.

8 Public Law 56-1994 clearly defines the District's role in this project. The Board Members will negotiate a project cooperation agreement with the Corps of Engineers for this project. Since only two members presently hold political office, they will not constitute a majority when the Board votes on resolutions regarding the local sponsorship agreement.

Pg 11, ¶2. 9 The ECWMD is the organization established by the State of Indiana to represent the public and to sponsor this project.

Pg 11, ¶3. 10 The ECWMD advertised to fill an Executive Director and a Secretary position. The Executive Director position attracted six candidates and the Board of Directors held an Executive Session to interview five candidates on July 23, 1996. The Board hired Adriane Esparza, who lives in Gary, as Executive Director. She has worked for the ECWMD since September 23, 1996. The Director hired a Secretary, who lives in East Chicago, on December 9, 1996; the Director advertised this position in the Post Tribune and Hammond Times.

Pg 11, ¶4. 11 Mr. James W. Knight is the East Chicago City Controller and President of the District's Board of Directors. Mr. Knight is not associated with Government Consultants, Inc. ("management consultant firm)". The Board of Directors re-elected Mr. Knight as President during the January 21, 1997 District meeting. Government Consultants, Inc. (GCI), Tom Browne's consulting firms, previously had a contract with the City of ECWMD. However, Mr. James P. Cagnina, Mr. Browne's associate, withdrew GCI's services on December 28, 1995.

why is it that we have our treasurer, who's Jim Knight, being on the board of this management consultant firm. And there's a guy by the name of Brown, who's the executive director, former executive director to the Election Board, who is a special consultant to that program. How did that come about? Were there any applications sent out requiring people to apply to be consultants of this group for the dredging of the Lake. And those are just small minute number of questions, concerns and questions I have got that have not been answered. Thank you.

LT. COL. SLOCKBOWER: Senator, thank you very much. Next speaker will be Steve Skavroneck, representing the Lake Michigan Federation.

MR. SKAVRONECK: I'm Steve Skavroneck, If I spell it I'm going to go over my three minutes, but that's okay, S-k-a-v-r-o-n-e-c-k.

Due to the precedent setting nature of this proposal, the Lake Michigan Federation, Grand Cal Task Force, Save The Dunes Council, and Sierra Club have empowered a technical advisory committee to comment on the EIS. We will submit their full report before the public comment period is over.

We find merit in dredging the Harbor and disposal of sediment in a upland confined disposal facility, but only if it is done right. We do have concerns about the proposal project, some of which I will touch upon now.

Analysis undertaken for the Grand Cal Task Force based on more recent data and core analysis, estimate significant sediment loadings to this area than is what is in the EIS. This has important implications for the design and cost of the project. The estimates in the EIS should be revisited and revised. In addition, monitoring of combined sewer overflows are needed in order to properly design the project.

We believe the sediment sampling described in the EIS is adequate to describe the problem, develope a tenative dredging and remediation plan, and roughly estimate project cost. However, the sampling is not adequate to definitively characterize the sediment for remediation. Based on a rule of thumb formula used elsewhere, we need almost one hundred core samples to be taken during a single episode of sampling in order to provide sufficient information. Adequate sampling analysis could save millions of dollars

Pg 13, ¶2. The sediment yield analysis in DEIS was not at a detailed level and utilized available information to characterize the sources of sediments within the GCR/HC watershed tributary to Lake Michigan. The sediment loadings were characterized with information which was collected from the watershed during the 1980's, or from literature based on studies of other areas in this same tile frame. The only "check" to verify the sediment loading estimates was the historic dredging records and bathymetric measurements from the Federal navigation channel. Clearly, the amount of sediments entering the river system had to be greater than the amount settling in the Federal channel or dredged from it. The analysis presented in the CMP\DEIS estimated sediment loadings 2-3 times greater than the volumes dredged from the Federal channel. This was considered a reasonable check on the sediment loading estimate. We concur with the report that the sources of sediments to the GCR/HC are subject to change over time, and some way be substantially reduced as a result of point and non-point pollution control measures within the basin. Because of the importance of accurate sediment loadings to this project, the Chicago District is developing a mathematical model and is currently working with the USGS to collect the type of data necessary to provide more accurate estimates of sediment loadings.

Pg 13, ¶3. Sediment sampling investigations are outlined in section 4.4.4 of Appendix E. As shown in Tables H-4 and H-5 of Appendix H, the results consistently show that the sediment quality within the HC, with the exception of the contaminant PCB, does not indicate any significant change with depth. Laterally, there is a trend of decreasing levels from upstream to downstream, but this trend is more distinct for some parameters than it is for others and is not applicable to PCBs. More delineation of the two PCB hot spots will occur before dredging. As noted above, sampling has occurred over a 13 year period and consistently has shown similar results laterally and vertically. The sampling data are clearly sufficient for the design of a navigational channel dredging project. The project is not a remediation effort and additional sediment sampling investigations other than at the PCB hot spots will result in substantial cost and time without providing useful information that could significantly effect the project design.

during the life of this project.

The EIS should contain an analysis of how economies of scale or technology improvements might change the treatment cost picture. We also question why thermal desorption, bio-remediation, and dechlorination were not included in the treatment technology assessment. These can be effective in treating PCBs, PHs and petroleum hydrocarbons. Additional factors, such as higher production rates and not having to barge and truck sediments to the CDF should be considered before ruling out hydraulic dredging as the preferred method of sediment removal.

A few comments on the design of the confined disposal facility. Apparently we have some concerns about a variety of the design aspects, including the apparent failure of the design to account for the water added to the system from the actual dredge materials. We have a concern about constructing portions of the dike from dried sediment without the ability of the CDF to maintain all the necessary hydraulic gradients. The potential for mixing of the sediments placed in the facility with the pollutants already existing below the site, and effectiveness of proposed leechay

Pg14, ¶1. Both thermal desorption and bioremediation were investigated through the USEPA's Assessment and Remediation of Contaminated Sediments (ARCS) Program. However, neither was selected as having the greatest potential for application for application to sediments from the IHC. Thermal desorption is discussed in "Pilot-Scale Demonstration of Thermal Desorption for the Treatment of Buffalo River Sediments" (USEPA, 1993). To date, a report has not been published on the results of the bioremediation findings. The alkali-polyethylene glycol (APEG) process, discussed in Appendix G, is a dechlorination process and APEG dechlor was not ranked high enough for further discussion in the appendix. The procedure used to rank the treatment technologies is in Appendix G.

Pg14, ¶2. (the apparent failure of the design...

The dredge sediment when it is initially placed within the CDF will contain a high water content. This liquid will be removed from the sediment by gravity drainage towards the decant structures or by seepage into the foundation. The seepage component will travel vertically until it arrives at the water table. Mounding of the water table beneath the disposal area system will be designed to accommodate the additional flow quantities contributed by the CDF operations. This water will be removed from the surficial aquifer and sent to the treatment facility. The design of the extraction well system will be included in the Design Analysis and estimates of quantities of water to be handled will be discussed in that document.

(Constructing portions...)

The engineering and hydraulic properties of the sediments will be further evaluated in the design phase.

(the ability of the CDF...

In addition to the perimeter cutoff wall, which will contain the groundwater beneath the site, a line of extraction wells is proposed to be installed inside the cutoff wall. The purpose of this system is to maintain the water level inside the cutoff wall two feet below the water level outside the cutoff wall.. This drawdown will cause a groundwater gradient through the wall into the site. The extraction wells will also induce a slight gradient between the interior of the ECI site and the perimeter with groundwater flow towards the line of wells.

(the potential for mixing of sediments ...)

As stated in section 6.3.3 of Appendix E, the results of permeability testing indicate that the sediment would have a permeability at or below that provided by clay liners (see Table E-3). A barrier was not included between the sediment and subsurface because of the high cost and the ability of the dredged material to act as a barrier. The contamination in the sediments and at the site are roughly the same and a barrier separating similar containments does not improve environmental performance.

(the effectiveness of the proposed leachate ...)

Leachate treatment will be developed in the design phase. A treatability study is currently to design the leachate treatment facilities.

treatment of the system of PCBs and soluable metals.

We again thank the Corps and EPA for your continuing efforts to solicit public input. We hope the ultimate project design will indeed reflect as much of that public input as possible. We look forward to submitting our report by the April 1st deadline.

LT. COL. SLOCKBOWER: Thank you very much, sir. The next speaker, Mrs. Loraine Stasic, representing the Grand Cal Task Force.

MRS. STASIC: Loraine Stasic, president of the Grand Cal Task Force. I have almost five thousand signatures here to present to you and I will read the petition that they have signed. "We, the undersigned demand that sediments dredged from the Grand Cal River and the Indiana Harbor Ship Canal, be treated with multiple techniques, including resource recovery, waste minimization, and destructive technology to eliminate any environmental contamination. Additionally, we demand that the cost be recovered for this project from those responsible for discharges that contributed to the sedimentation of the Grand Canal system."

Now, I've have got three minutes.

Pg 15, ¶3 1 Statement regarding submission of the petition is noted.

This is Loraine Stasic. I live here in East Chicago. I work here in East Chicago. And I am very concerned about the Water Management Group. I know some of them were selected by the Governor and then the Mayor, and I want to know what their terms are. I want to know if eventually they will get some payment or stippends. I would like to see more public input.

If you would please refer them that we would like to see some evening meetings so that there will be more community involvement. This is a most important project. I want to see it happen. But, I don't want it to turn into a thing that is going to fly through the air and disappear. We want to be involved as citizens. We want you to hear our feedback, but the Waterway Management Group has me very concerned because all their meetings are held in the morning.

I would like to see the CARE Committee involved in this. As a member of the CARE Committee, we have spent many, many hours trying to bring out some environmental improvements on the rack. I also would like to see that once this thing, the CDF, is built, that maybe it should be covered more often because I could see children

Pg 16, ¶1. The East Chicago Waterway Management District (ECWMD) is not comprised solely of elected East Chicago officials. Public Law 56-1994 is legislation that establishes the District. This law stats that the District's Board of Directors has seven members. The Mayor of East Chicago appoints four members, the Governor of Indiana appoints two members, and the East Chicago City Council appoints one member must be registered to vote in East Chicago and two Board members can represent industries who locate their facilities within the District's boundaries. One of two industry representatives must be a mayoral appointee and one must be a gubernatorial appointee. The Board members serve staggered terms; each member serves three years. Board members do not get paid for their service, nor do they receive stipends.

Pg 16, ¶2. In a letter to the Chicago District Engineer dated 28 March 1996 the Waterway Management District stated the following: "The District is committed to maintaining and enlarging a public process for the dissemination of information and receipt of comment and other contributions by citizens and affected organizations in the planning, construction, maintenance, and operation of the entire project." The request for some evening meetings will be referred to the Waterway Management District for consideration in the public process.

Pg 16, ¶3. The CDF site will be completely enclosed by a fence to prevent unauthorized access to the site by children. A wildlife exclusion plan will be developed to keep wildlife from feeding in the CDF as dredged material is deposited.

climbing. I could see animals being involved and I don't care whether it's considered toxic or not. I still see it as waste and I don't want to see children over there. So, I think that's one thing that I would like to see you address and I hope that you will continue to keep open meetings for us so that we can be more involved.

I appreciate the way that you have handled it this time, Army Corps of Engineers, because last time, even today, it sort of ruffled my feathers when you start reading Senators and all these people that come before citizens. And I'm sorry, I'm just as important as they are and my opinions are just as important. And I do take some -- have some hostile feelings about it. I think it should have been on first come first serve up to the microphone. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, ma'am. Next speaker will be Kelly Glenn.

MS. GLENN: Kelly Glenn, representing Grand Cal Task Force, on behalf of Grand Cal Task Force read the following recommendation.

Determination of responsibility for public information and decision making estalished -- should be established and the responsible entity

would ensure that the following process is implemented.

One: A quarterly newsletter on the activities and meeting times of the Waterway Management District focusing on the ship canal dredging project will be mailed to all addresses within the Waterway Management District boundaries, all addresses in East Chicago, Hammond, and Whiting within a mile of the proposed Project boundaries. All interested parties who request to be put on the Waterway Management District mailing list and local media.

Two: All announcements of permit application or permit modifications, periodic project review, design presentation and recommendations, and all and any decision making processes having to do with the Ship Canal Dredging Project and long term management will be mailed to Waterway Management District addresses, addresses within a mile of the Project boundaries, interested parties and local media.

Three: Every six months, public workshops/question and answer sessions on the progress and processes involved in the Dredging and Disposal Project will be held in a meeting place and

Pg18, ¶1-3 The suggestions regarding public participation will be furnished to the East Chicago Waterway Management District for consideration.

Pg18, ¶1 The District presently does not publish a quarterly newsletter; however, the District does send a monthly mailing that contains an agenda for the upcoming meeting and minutes for the previous meeting. The District sends these items to interested parties and local media. In addition, the IDEM does include all Districts meetings on its monthly calendar of events. IDEM distributes this calendar to hundreds of addresses throughout northwest Indiana.

Pg18, ¶2 The District will have all permits within its jurisdiction and other related materials in its public depository. The District will send announcements to all parties on its current mailing list. IDEM also will receive such announcements for its Items for Review list that it sends along with the monthly Calendar of Events.

Pg18, ¶3 Suggestion will be furnished to the Waterway Management District.

time convenient to the public impacted by the project and workshop announcements will be mailed to Waterway Management District addresses, addresses within a mile of the Project boundaries, interested parties and local media.

Four: If at any time, members of the public wish to have a special meetings with the Corps of Corps of Engineers, the EPA, the IDEM, and/or the Waterway Management District regarding issues of concern on the Ship Canal Dredging and Disposal Project, such a meeting will be set up in a timely manner at a time and place convenient to the petitioners if a letter of request with at least ten signatures is submitted to the responsible entity.

Five: A public advisory committee on the Canal Dredging and Disposal Project shall be created to advise the Waterway Management District on environmental and public health issues. The advisory committee could be comprised of the CARE Committe for the Remedial Action Plan of the Grand Calumet River, Indiana Harbor Ship Canal and at least three representatives, but not limited to three residents living within two miles of the Project boundaries. The Waterway Management District is required to hear the advice and

Pg19, ¶1 The agencies referred to in the comment have and will continue to participate on special meetings with the public. The request for special meetings should be coordinated through the East Chicago Waterway Management District.

Pg19, ¶2 The District has By-Laws that establish various standing committees, including a finance committee, economic development committee, environmental quality committee, transportation committee, community planning committee, and ad hoc committees. Each committee must include three Board members and four other persons who may be residents or non-residents of East Chicago. The President of the Board of Directors will appoint all members, with the advice and consent of Board members.

recommendation of the advisory committee committee in their decision making process. If the Waterway Management District disregards the advice of the public advisory committee that is considered imperative for the protection of public health and the environment. The advisory committee may appeal directly to the EPA Region V, District Administrator and/or the Commissioner of IDEM.

Six: A technical committee on sediment management, remediation and treatment and prevention of sediment loading will be set up for the purpose of advising the public and the entities involved in the Ship Canal Project and other dredging and disposal projects on the Grand Calumet River and the Indiana Harbor Ship Canal. This committee could be associated with the CARE committee, but would include representatives of the sanitary districts and major industrial dischargers to the Grand Calumet River/Indiana Harbor Ship Canal. This concept needs to be worked on.

Seven: Public repository for all documents pertaining to dredging and disposal project. Thank you.

LT. COL. SLOCKBOWER: Thank you very much. The next speaker will be Thomas R. Anderson,

Pg20, ¶1 See response to pg19, ¶2 comment on previous page.

Pg20, ¶2 A public repository for all documents has been established at the East Chicago Library.

representing Save The Dunes Council.

MR. ANDERSON: Thank you. My name is Tom Anderson, Executive Director of Save the Dunes Council.

The proposed dredging of Indiana Harbor and Ship Canal represents an opportunity for cleanup of some of the most contaminated sediments in the Great Lakes basin. However, proper management of the project is vital to the long term success of this effort.

The Save the Dunes Council, Lake Michigan Federation, Grand Cal Task Force and Sierra Club, have serious concerns about numerous management issues that must be addressed prior to the approval of the Final Environmental Impact Statement. Our written comments will discuss these concerns in depth, however, we are especially concerned with the following items:

Number one. The role of the East Chicago Waterway Management District. The District which was created in 1994 to manage and maintain waterways in East Chicago with assistance from other local, state, and federal agencies. The Waste Water Management District is proposed to serve as local sponsor of the dredging project and is the owner of

Pg21, ¶4 Public Law 56-1994 establishes the powers and duties of the Board of Directors. Specifically, the District may exercise this power and duty: "To assist other agencies of state and local government having jurisdiction over the waterways within the District." As such, the District will not be managing this project alone;rather, the District has authority to work with state and local government. The District can do so because Public Law 56-1994 gives it the authority, "To act as a local sponsor agency under contract or memorandum of understanding with any private party or any agency of the state government or the United States inFurtherance of the purposes, powers, and the duties of the District."

the ECI site, the proposed location of the CDF. We're very concerned about the role of the Waste Management District and the capacity of this new entity to manage such a long term, complex project. The role and responsibility of the Waste Water Management District must be better defined to assure compliance with the state and federal laws.

This project involves complex Resource Conservation and Recovery Act, RCRA, permitting and liability issues, Toxic Substances Control Act issues, as well as the need to obtain numerous state and federal permits.

In addition, due to the lack of authority to raise funds, or at least limited authority to raise funds, financial assurance for current and future liability, along with possible RCRA corrective action must be guaranteed. The role of the State of Indiana should have a higher profile in this effort, to provide assurance that the public will be protected, both economically and environmentally.

Number two. There are inadequate assurances of local sharing responsibility for this project. The Legislation that established the Waste Water Management District stresses that the

Pg22, ¶3 The Indiana Department of Environmental Management does not manage RCRA corrective action; USEPA, Region V has that responsibility. The District will be working with the Corps, IDEM and USEPA, Region V to ensure that the proposed CDF satisfies all RCRA corrective action requirements. Particularly, the District is establishing a mechanism to ensure long-term funding. One of the District's main reasons for pursuing long-term funding is to ensure that it can meet all TSCA and RCRA requirements.

Pg22, ¶4 The role of the District and its cost sharing responsibilities as a local sponsor will be defined when it negotiates a Project Cooperation Agreement with the US Army Corps of Engineers.

District's responsibilities to manage, supervise is, quoted the Legislature, in conjunction with other state and federal authorities. We urge that this role -- that the role of these authorities be well defined in the final EIS. It is vital that the agencies with expertise in these matters take an active long term role in this project.

Number three. This project lacks a host community agreement. Many solid waste proposals include a host agreement to compensate the local community for impacts from such projects. For example, a homeowners property value guarantee has been included in a number of landfill siting agreements to protect homeowners from losses or potential losses in property values because of solid waste projects. We urge serious consideration of such an agreement.

Number four. We request a defined public review process beginning now and continuing during the project. We urge that a citizen's advisory committee be established as soon as possible to advise the Waterway Management District. It is vital to the success.

MR. TOLPA: That's three.

MR. ANDERSON: I guess in conclusion,

Pg23, ¶1 The proposed CDF project is not being constructed to generate revenue as many sanitary landfills. It is a confined disposal facility for dredged materials. There will be no cash profits to be shared with property owners. The benefits to the local community will be a cleaner environment.

Pg23, ¶2 Comment will be referred to the Waterway Management District for consideration.

although this project represents an opportunity to reduce hundreds of thousands of tons of contaminated sediments from entering Lake Michigan each year, we deserve the best and most public project possible. Thank you.

MR. TOLPA: Thank you very much. There has been several people come into the room since the meeting started. If you'd like to speak tonight, please register in the hallway and we'll bring your name forward. If you have a desire to speak, you need to be registered. Thank you.

LT. COL. SLOCKBOWER: The next speaker will be Wilbur Feliciano. The East Chicago Civil Little League.

MR. FELICIANO: My name is Wilbur Feliciano. I live in the First District on the 42nd block of Indianapolis, which is not even a mile away from where you are planning on putting this containment. I also am vice-president of the East Chicago Civil Little League, which we have here over three hundred kids that play in our league every year. And the majority of them are from the First and Second District, which is in this area.

My concerns have been that there is still a lot of questions that have not been

Pg24, ¶4 The ECI site presently has open RCRA status. The proposed CDF project will include construction of RCRA closure and corrective features to assist in mitigating the existing environmental degradation at the ECI site. This will be a substantial improvement compared to existing RCRA conditions. In addition, the CDF dikes will be landscaped during the time that the CDF is being filled with dredged materials to improve the existing setting at the ECI site. Measures such as these are being undertaken so that implementation of the CDF project will not adversely impact property values. The U.S. EPA completed an analysis of the cumulative cancer and non-cancer risk due to inhalation of air emissions from the CDF operation. The analysis shows that health risks related to construction and operation of the CDF are no greater than the risk due to existing air quality.

answered. And I was back here the last time that you had this meeting and I was concerned with property values. The air that our kids breathe. I wasn't here right when the comments started, so I am not sure if I am repeating any other comments, but I feel that you should not build this containment this close to a high school. Even if it's one child that gets cancer over your 30 year span on the studies that you have done, that's still too many. Especially it could be my kid, my child. And I am pretty sure that majority of the people that want to build this containment don't even live in East Chicago. They will not be affected by it.

I have many concerns and until you show me that my property value is not going to go down, that my kids are going to be safe, I am against this containment.

And I ask everybody here in the City of East Chicago, that knows other individuals, it is a shame that we don't have as many people as we should have here. I don't know how many elected officials we have here, Councilmen, but you have some State Reps not even here either, but when it comes election time, you'll see them walking and knocking on doors. And they should be here

representing us and asking these questions too. So that's all I have to say for tonight. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, sir. The next speaker will be Maria Hibbs, representing Inland Steel Company.

MS. HIBBS: Good evening, and thank you for this opportunity. My name is Maria Hibbs, H-i-b-b-s. I have a statement that I will read and also a copy that I will be leaving with you.

Inland Steel Company strongly supports the dredging of the Indiana Harbor Ship Canal by the U.S. Army Corps of Engineers for both economic and environmental reasons. Shipping on the canal has been adversely impacted by the level of water and the depth of sediment that has accumulated since the canal was last dredged in 1972.

Not only has the condition of the canal seriously impeded shipping, but it has also deterred the development of brownfield sites in East Chicago. The development of these sites near the canal could help revitalize the area, increase employment, and expand the tax base in East Chicago.

Dredging of the canal is also an important element in improving the ecosystem of the Grand Calumet River and the Indiana Harbor Ship

Pg26, ¶3 Statement is noted.

Canal. Dredging will restore the canal's vital environmental function as a sediment trap, inhibiting the direct impact of sediment flow into Lake Michigan.

We are confident that in the decade that this project has been planned and studied, the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers have thoroughly reviewed the appropriateness of the proposed disposal site. Thank you.

LT. COL. SLOCKBOWER: Thank you. Next speaker, Donald Kolowski.

(No response.)

The next speaker will be Jose Cisneros.

MR. CISNEROS: My name is Jose Cisneros, C-i-s-n-e-r-o-s. I was a candidate for Mayor in the last general election for City of East Chicago. What I have to say is quite simple and emotional. March 20, 1996, mark this date within your hearts. That's the saddest and ugliest time within the history of the City of East Chicago.

My community once known as the crucipal of ethicacy. The mecca of econcomic opportunity will now become a toxic waste dump of

Pg27, ¶4 Statement is noted.

America. For commercial and economic reasons, we the citizens of East Chicago, have left down our guard and the future of our children with our lack of participation in civic affairs and nightmares that are associated with this.

In Pensacola, Florida, I bring your attention to a community, which is predominantly composed of blacks and hispanics, which generations of families have been ruined due to the toxic dump which was built there about four years ago. With time this predominantly minority community has suffered many maladies, starting with respiration abnormalities to birth defects.

To my fellow citizens within East Chicago, I ask you to look around. Check to see where your elected officials are at now. Not here obviously. And now recognize that it is the time for us to fight, not only this toxic dump, but the fate dealt to our children with genetic defects. Thank you.

LT. COL. SLOCKBOWER: Thank you, sir. The next speaker will be Mr. John Bakota.

MR. BAKOTA: John Bakota, B-a-k-o-t-a. I live in the immediate neighborhood. I would like to have them get a real estate consultant to report to

Pg28, ¶4 The ECI site presently has open RCRA status. The proposed CDF project will include construction of RCRA closure and corrective features to assist in mitigating the existing environmental degradation at the ECI site. This will be a substantial improvement compared to existing RCRA conditions. In addition, the CDF dikes will be landscaped during the time that the CDF is being filled with dredged materials to improve the existing setting at the ECI site. Measures such as these are being undertaken so that implementation of the CDF project will not adversely impact property values.

the citizens of East Chicago on the impact of property values as a result of the CDF. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, sir. The next speaker will be Mr. Paul Horst. Mr. Horst here?

(No response.)

I will move to the next speaker. Melissa Ravelle. It's very hard to read this.

MS. RAVELLE: I have no comment at this time.

LT. COL. SLOCKBOWER: Okay. The next speaker will be Harry Halletts.

MR. HALLETTS: Halletts.

LT. COL. SLOCKBOWER: Sorry. Mr. Halletts.

MR. HALLETTS: I'm in favor of the project going ahead as soon as possible. I'm with Inland Steel's opinion that the sooner it is done, the better. The latest technology on the site is after it's deposited on the St. Clair property, there in Australia, they are making aggregut out of the dumpings. After they burn it off, later on they can make it safe. It can be used for road construction as an aggregut and it will benefit Inland Steel and the rest of them, and the sooner the better.

LT. COL. SLOCKBOWER: Thank you very much, sir.

MR. HALLETTS: Here is a picture --

LT. COL. SLOCKBOWER: You can put this in testimony. If anyone has any particular technical questions, we do have some of the technical experts working in the back, in the small auditorium to the rear.

The next speaker will be Josh Batista.

MR. BATISTA: Good evening. My name is Josh Batista. I'm here for the residents of this neighborhood. We, the residents, of this neighborhood have met, discussed, and are concerned of the following issues. We are afraid that once the project has begun, funds are not sufficient, and we, the residents, would have to take the burden.

We also would like to have residents involved with a say on all issues that would affect this project. We are concerned that once the contaminants are placed in the container, if left in open air, can birds, rats, and other small animals be able to spread contaminants around our neighborhood. Also will it smell.

As concerned residents we would like

Pg30, ¶5 Funding for this project will not come from the local residents or local taxes.

Pg30, ¶6 A wildlife exclusion plan will be developed to keep animals and birds out of the CDF as discussed on pages 102h of the CMP. An odor analysis was also completed which indicates that the ground level (worst case) chemical air concentration for various compounds that were analyzed could not be distinguished from "background" conditions at a distance of 100 meters from the CDF.

Pg30, ¶7 The Corps of Engineers has over one hundred CDF's across the nation which contain contaminated sediments. This is not an experimental project.

to know if this type of dredging and disposal activity has been done before. If done before, how has it resulted or is this an experimental project where we, the residents of this neighborhood, are the mice.

LT. COL. SLOCKBOWER: Thank you, sir. The next speaker will be Enrique Bellarina.

MR. BELLARINA: Good evening. I'm just over here to reinforce what Joshua Batista said. In one of the meetings that people ask if the CDF, this big container, can be done in a way that looks good because we don't want to be identified as East Chicago the dumping place. Where's East Chicago? Close to the dumping place. But like to put -- to make something that looks nice when it's finished, with a nice finish. Not empty thing that comes up and doesn't look that right.

Also, to put something along the river, like trees. We know that the trees helps a lot for the health of the people. In some countries they force a lot to plant trees because there's been a lot of good things for health. And we are concerned very much before to start this, we have the children that start over here. We have a lot of children in the neighborhood. People brought up if

Pg31, ¶2 The CDF will be landscaped on the exterior dike slopes during filling. Once filled the site will be capped and landscaped.

you know this is not safe. We have our children and there is no money, no money given, or because we make some money, we sacrifice the health of our children. That's all.

LT. COL. SHOCKBOWER: Thank you very much, sir. The next speaker will be Colleen Aguire.

MS. AGUIRE: My name is Colleen Aguire. I live in East Chicago. I have some great concerns about this. I don't consider this design a responsible design. The sides will be lined, but not the bottom. No lining on the bottom of the CDF with heavy equipment moving things around could cause cracks in the bottom. It's like trying to drink a cup of coffee with no bottom on it.

Number two. Will the CDF have to be completed before the dredging is started? If not, where will the dredge be stored.

Three. Have bids been provided by construction companies to build this CDF and will these be made public.

Four. Will the Army Corps, the city, the county, or the state be responsible for any accidents, slash, damages that occur during this project? Insurance documents, may we the residents see a copy of this. Will a health risk assessment

Pg32, ¶2 The proposed slurry wall will extend down approximately 33 feet from the ground surface into the existing underlying clay till. The till will act as an impermeable bottom of the CDF facility.

Pg32-3,¶2 No; The CDF will include several cells separated by dikes. Dredging will be initiated as soon as construction of the first cell is completed.

Pg32-4, ¶ 3 No; request for bids for construction of the CDF will not be advertised until late 1999 or 2000.

Pg32-5, ¶4 The construction contractors are required to provide liability and other insurance coverage. The United States and the Waterway Management District will be named as additional insureds. Insurance documents can be made public. An inhalation risk assessment has been completed as described on pages 98-100 of the CMP. The cancer risk analysis showed that the risk is no greater than under existing air quality conditions.

be done? Remember risk means potential danger. Will the residents be allowed to participate? Remember the CDF is going to be built right next to our high school. And who would be responsible for any adverse health affects that people should have to suffer. I would like all of these questions answered in writing please. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, ma'am. The next speaker will be Terrence Amos.

MR. AMOS: I have no comment at this time.

LT. COL. SLOCKBOWER: Sir, repeat that. I couldn't hear.

MR. AMOS: I have no comment.

LT. COL. SLOCKBOWER: Thank you, sir. The next speaker will be John Meyers.

MR. MEYERS: No comment.

LT. COL. SLOCKBOWER: Thank you, sir. The next speaker is Leon Ruiz. Sir, come forward please.

MR. RUIZ: Hello. My name is Leon Ruiz. I am not only a concerned citizen of East Chicago, I am also a teacher here at Central High School. I have got some real concerns here. For one I am worried and the reason is, from what I heard a little bit earlier, I heard this project is going to

bring a lot of money into the area, a lot of jobs. It's going to be perfectly safe for the environment and everything is going to be hunky dorey.

The question is, if this is going to be such a great project, how come it's being kept such a big secret. I'm a science teacher and I didn't know about this project going on a stones throw away from our school. It worries me to death that the citizens of East Chicago might be harmed in some way. I'd like some definite things on paper that I could see so that I can understand the project. Once again I can't stress enough that I am very worried for the people of East Chicago. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, sir. The next speaker will be John Haluski.

MR HALUSKA: My name is John Haluski. I just had a few questions. I was wondering how come the material that's in the public library that I was reviewing, is it only going to be in there until the 30th of this month. Because I was looking through the thick book when you first started in 1990, looking through a smaller one at the public library. It was public information, but it was stated on there that they received it like January 6, of '96

Pg34-1, ¶1 Information regarding this project has been discussed and distributed throughout the East Chicago area since the late 1980's. The project and its impacts are documented in the Comprehensive Management Plan which has been distributed to agencies, individuals and libraries in the northwest Indiana region.

and that the date was 3-30-96.

Does that mean that that's as long as that's going to be available for the public to review? Until the end of this month and that's it. And then this paper work is going to be discarded at the public library. I was just curious because they told me at the Library --

LT. COL. SLOCKBOWER: Sir, this is really an opportunity to put information to the official record if there is particular questions --

MR. HALUSKI: I am asking you a question about public information --

LT. COL. SLOCKBOWER: Sir, this is --

MR. HALUSKI: This stuff about the dredging of the canal. And how long it's going to be accessible to the public. Is it only for 90 days and that's it.

MR. TOLPA: Right now we are taking comments for the public record. Per your question, materials will stay there. But if you have material, you have questions that you want us to answer in writing or that you want to put forward and make sure it is in the public record. That's the purpose of this.

We also have a small group of people,

technical experts, some of whom were at the same meeting that you and I were at last time, through the door and to the left. If you have a specific technical issue, they can answer those for you there. This one is just to submit to us -- this is the formal public aspect.

MR. HALUSKI: Okay. My question was going to be the style of the dredging that you are going to use on the canal. I know that I reviewed there was a vacuum type dredge. There was a clam bucket dredging and another one. I thought there was three of them there, which I am not too familiar with there. Is it going to be a combination of these, combination of these three or just going to be the clam shell or the vacuum one? I am wondering because that's going to be pulling up the soil.

They talk about putting a skim of oil on top of the water, which I hope they skim off somehow around the facility as they are doing it, you know, so this skim of oil doesn't go out to the main Lake. Also it is going to be building up debris in the water underneath and I don't know if the underground currents of the canal is going to pull this out into the Lake.

As water comes up through the ground,

Pg36-1,¶1 The recommended plan provides for mechanical dredging with a closed clamshell bucket to reduce resuspension of sediments.

Pg36-2,¶2 Oil which may collect on water surface during dredging operation will be contained by oil booms.Debris will be contained in closed clamshell bucket.

you are going to be opening and dredging the top soil, which is actually like a cement or something, or caked soil on the bottom of the canal. You are going to be removing this. You are going to have light sand underneath that. Now, this light sand is going to be shifted and moved with the currents of the canal, and also you know, dredged up along the side. You'll probably end up dredging it again in another ten years or so.

But they talk about capping the CDF, the site with clay and with soil after they are done. But what about capping that light sand that's underneath on the bottom of the canal. Is there some kind of ore or something like that, they put some kind of heavier base or something that stays at the bottom of the water and not flow up with the water, to seal the bottom of the canal itself, you know, so the contaminants are contained.

I know you got to talk to the professionals. One thing I wanted to bring up about it, are you going to dike off the canal off the Lake where this water that's churning, and as the debris and the contaminants are starting to come up as you dredge this, you're not going to --

MR. TOLPA: Sir, that's your three

Pg37-1,¶3 After dredging of the canal to project depths, cleaner sediments from upstream will cover contaminated sediments.

Pg37-2, ¶4 The canal will not be diked off from Lake Michigan. Oil booms and the closed clamshell bucket will reduce the movement of contaminants toward Lake Michigan.

minutes.

MR. HALUSKI: Okay. Thank you for the floor.

MR. TOLPA: If you have continuing questions of a technical nature, the people in the back are the technical experts.

MR. HALUSKI: What I wanted to ask, who gets, if you find any historical stuff buried in the soil down in there, say Al Capone's car after he robbed a bank over in East Chicago or something, who gets the responsibility of that? Waterway Management District, the City of East Chicago --

MR. TOLPA: Sir, you are cutting into other people's time.

MR. HALUSKI: Who gets to claim that though, the person dredging the canal.

MR. TOLPA: You can submit your comments in writing too.

LT. COL. SLOCKBOWER: The next speaker will be Jess Ortiz.

MR. ORTIZ: Good afternoon. I am speaking as a concerned citizen. I read most of the two thousand page report or so in the Library, most of it. I think most of the negatives that we have heard today have been addressed. However, I haven't

Pg38-8, ¶1 Statement is noted.

heard a truly negative side yet. So I will refrain final judgment. But I would say I'd like to say, as I see it, this is our mess and responsibility. The mess won't get any better if we don't do anything. And I do appreciate the Army Corps technical and financial assistance. I understand the citizens will bear no financial burden. However, I am concerned about long term management and I question the current method of management board selection. Thank you.

LT. COL. SLOCKBOWER: Okay. Thank you very much, sir. Is there anybody who has filed to speak this evening and who has not spoken so far?

MR. SHAY: Yes.

LT. COL. SLOCKBOWER: Have you filled out forms already, sir?

MR. SHAY: Yes.

LT. COL. SLOCKBOWER: Sir, give your full name please so we can make that a matter of the record.

MR. SHAY: My name is Joseph Shay. I'm a science teacher here at East Chicago Central High School. I'm mainly here to listen, but I also want to go on record as expressing my concern, perhaps grave concern, about how they are going to contain

Pg39-6, ¶1 The Comprehensive Management Plan and environmental impact statement describe the proposed plan and its impacts.

this material that they dredge up. I am really worried about the two thousand or more students here at Central High School, as well as the neighborhood right here. I am very concerned about it and I want to go on record for that. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, sir. Was there any others? Sir, please come forward.

MR. KALABOWSKI: I'm Donald Kalabowski.

LT. COL. SLOCKBOWER: Oh, yes. I think I called you earlier. You may have been outside for a few minutes. Please go ahead, sir.

MR. KALABOWSKI: My name is Tom Kalabowski. I'm a citizen of the First District here. I've been a life long resident, 35 years living within one-tenth of a mile of this proposed storage facility. I'd like to start off with a direct quote from J. Summer, Head of Environmental Engineering Section of the Army Corps of Engineers, Chicago office, out of the Chicago Tribune article from 1995. And his direct quote is, Indiana Harbor sediments are the sediments from hell. I agree with this statement.

The people that did the testing, there's an indication of how contaminated the

sediments are. Measurements of the toxic substances in the samples are not expressed in parts per billion as customary, but in parts per million, which is one thousand times greater.

I agree that getting such noxious sediment out of the Harbor is a major concern for everybody involved in the environment. I have agreed that first major step to cleaning up our area could be this project, but it also creates a major problem that concerns me as resident here of this area, that as to what to do with this stuff.

I have a concern the fact that the storage facility being proposed will be one-tenth of a mile from our 23 acre McArthur Park, one-tenth of a mile from our 20 acre Todd Park, our ten acre City Hall Park, our six acre Edward Bell Park, our high school, our junior high school, and two-tenths of a mile from three elementary schools.

The citizens of East Chicago I feel will not benefit from this storage facility one bit. I'd also like to quote Steve Garbechek, EPA environmental engineer, economics is still the big driving factor. Yeah, you can do this and we can put a man on the moon too. Well, I'd like to say that we don't want to go to the moon. We want to

stay here, in East Chicago, where it's clean.

I am totally against this project because I have two children. My son and I golf at McArthur Golf Course and you can stand on the fifth tee and you are less than one hundred yards from the canal. I have a problem with the fact that there will be dusting. And on a day like today with 40 mile per hour winds coming out of the north, that dust has to go somewhere. I feel it will fall on the citizens of the First District.

And I also like to make a point, that the people overseeing this project are the people controlling our city, our administrators. We do not have faith in these people. I do not feel they can adequately be assigned to watch over this storage facility. Thank you.

LT. COL. SLOCKBOWER: Thank you very much, sir. Is there any other comments that we didn't have filed earlier?

(No response.)

I just want to encourage all of you. I do appreciate your participation today in being able to put this information in the record. We have taken these written statements here. We will also be taking any written statements, in addition to the

oral statements that have taken place.

Also, I want to make note to you that we have our experts back there to be able to talk with one on one basis on any issues of particular concern to you. And we appreciate your participation in this process. It's very valuable to us.

SENATOR RANDOLPH: I need to ask one question. How will the questions be responded to? How will we get that information? Are you going to send personal letters responding to the questions, print it in the newspapers, public notice, how will we get those answers?

LT. COL. SLOCKBOWER: Sir, to explain the process that will be going through from here, the draft report has already been issued. This was the point, part of the process, to take comments on the draft report.

What we are then going to do is take all this information, I can't tell you how long it is going to take right now. It is critical that the process driving, we need to answer every one of these questions. We need to be sure we have addressed every one of these questions laid before us, both this evening and in the series of other

meetings we had regarding this project.

What we will then do is file a Final Environmental Impact Statement, which will have all of the comments that have been made, and all of the responses of those comments, and any revisions that will be made in that report is based upon those comments that then go into the public review process. As a matter of fact, if you have checked the block today that you wanted to be able to get follow up copies. You will receive a copy of the final impact statement which will address all of those issues laid out here.

SENATOR RANDOLPH: We have to sign something requesting --

MR. TOLPA: You've done that.

LT. COL. SLOCKBOWER: You've done that by registering in here today.

MR. TOLPA: Your response will be found in the comment and response section of the final Environmental Impact Statement.

SENATOR RANDOLPH: Time span 30 days, 60, 90 days, what?

LT. COL. SLOCKBOWER: Sir, I just want to emphasize, I think the key issue right now is what drives the amount of time it will take to do the

review process from here is not time driven. We will drive with thoroughness being able to address every comment that has been addressed here today.

MR. TOLPA: One last comment, one of the people that we have sitting in our small auditorium, who's available to answer questions, is associated with East Chicago Water Waste Management District. And if you have questions concerning the role of the Management -- Water Waste Management District, its structure, its Board, Matt is there. He functions as the secretary to the Water Waste Management District and is available for questions

MS. AGUIRE: Thank you for allowing us this time. Is there ever going to be a time when we are going to be able to ask questions -- I understand this is a public comment hearing, I understand that. But when are we going to be able to get answers to what we asked.

You talk about a draft and this coming back, but when are we actually going to get the answers we asked. I don't want to wait till it's all done and over with. I want to know is there going to be a health risk assessment? Are the residents going to have a part in that? You are saying we can't ask questions, strictly for comment.

It's going to be too late if we have to wait for the final report.

MR. TOLPA: Ma'am, this is the fifth meeting we have here.

MS. AGUIRE: I know. I've been to all of them and never gotten a direct answer. I've never gotten correspondence that responded to my direct questions and I have been to just about all of these. And these are some good questions that were asked. These are questions asked by residents that have to live here with what you are doing. We are very concerned. Concerned about the health of our community. When are we going to get the direct answer to what we've come to ask? Are you going to actually send us a paper, a letter saying, okay, so and so asked the following questions. Here are the answers. That's what we want. That's what we are here for tonight.

MR. TOLPA: I'm afraid I'm going to disappoint you with this answer. We are not going to send you a personal letter. The comments with the responses will be contained in the final Environmental Impact Statement. Your comment will be responded to, but it won't be a personalized statement.

MS. AGUIRE: Final impact statement that we get, that's a done deal, right? I mean we need you to respond to these questions that we have asked at all of these meetings so we can deal with them in the way we feel we have to do it, in order to get something accomplished. That's what we are here for.

I mean these people here they work. They're tired. A lot of them are, but they come here because they are concerned about their community. We aren't getting -- you think we are having direct contact with you because you are here and we are here. But the direct contact goes nowhere when we don't get answers before it is over so that we can deal with what you have to say to us, come back and ask more questions if need be and work with you. You are not working with us. You are giving us your time. We are giving you our time. We are not getting answers in a timely manner when we need to have them.

MR. TOLPA: We have the air risk specialist next door. Have you chatted with her?

MS. AGUIRE: No. Who?

MR. TOLPA: Air risk management. Health assessment expert.

MS. AGUIRE: Look, these people came here tonight, most of these people, they are asking questions that they didn't get -- nobody wrote on a piece of paper, go ask this technical question. These people came here tonight. We got teachers from the high school that are here that I didn't even know that were going to be here. I don't know these people. I am very impressed with the fact that they would come here to ask questions about the students of the high school, the citizens of East Chicago. I don't want to talk to somebody about air risk. The questions I put to you tonight, the questions that the environmental organization put to you tonight, the questions that the teachers put to you tonight, are the questions we want answers to.

MR. TOLPA: To the best of our ability they will be responded in the final Environmental Impact Statement.

MS. AGUIRE: In the final Environmental Impact Statement, but that means it's a done deal, right? You have made your decisions.

MR. TOLPA: No. The decision hasn't been made yet. However, we started this process in 1990 and we have been available since then and we have been responding to questions. So --

MS. AGUIRE: I never got an answer to any of the questions that I have asked. And like I say, I have been to most of these meetings. I have seen other people that have been to most of these meetings. Have any of you gotten direct answers to any of the questions you asked? No, we didn't. That's what I am saying. We want some direct involvement. We have to live here with the health affects, the property values, and everything else that's going to happen with this. You don't. We do. So you owe us. You owe us some answers.

MR. TOLPA: Thank you.

This will conclude the public hearing. This again was a formal public hearing. We have a verbatum record of all the comments that were made this evening. This record will appear in the final environmental impact statement. If you have comments that were not presented here this evening, please present them, mail them to the United States Army Corps of Engineers. The address is available in the hallway. You can also pick up a fax sheet on your way out. We have fax sheets available in both English and Spanish and you can still call us on this. Thank you.

(PUBLIC HEARING CONCLUDED.)

C E R T I F I C A T E

I, Peggy Sue Zielinski, being a duly competent and qualified court reporter, C.S.R., do hereby certify that I did report in machine shorthand the foregoing proceedings, and that my shorthand notes so taken at said time and place were thereafter reduced to typewriting under my personal direction;

I further certify that the foregoing typewritten transcript constitutes a complete record of the said proceedings taken at said time and place, so ordered to be transcribed.

Dated at Hammond, Indiana, this 16th day of April, 1996.

Peggy Sue Zielinski

Peggy Sue Zielinski