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REPORT ON GREAT LAKES CONFINED DISPOSAL FACILITIES

ENVIRONMENTAL REVIEW BRANCH PLANNING AND MANAGEMENT DIVISION UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 5 AUGUST, 1990

# REPORT ON GREAT LAKES CONFINED DISPOSAL FACILITIES

# 1. PURPOSE

This report will provide an overview of the confined disposal facilities for dredged materials on the Great Lakes. The report will discuss the purpose and authority for these facilities, the regulation of dredge and fill activities, the process by which these facilities are planned and constructed, and summarize the design, operation and monitoring of confined disposal facilities. More detailed information about the individual facilities which have been constructed is also provided. This report is a compilation of existing information on confined disposal facilities and is intended to be used as a reference document. Information provided in tabular form will be updated periodically.

# 2. INTRODUCTION

The U.S. Army Corps of Engineers (Corps) is authorized to maintain some 131 navigation projects around the Great Lakes. These projects include harbors and channels for commercial and recreational navigation users. Maintenance requires the repair and rehabilitation of navigation structures, such as breakwaters, piers and locks, and the periodic dredging of sediments from navigation channels. The Corps dredges approximately 4 million cubic yards of sediments annually from navigation projects around the Great Lakes. The amount of sediments dredged, as well as the depths and frequency of dredging are project specific.

Up until the mid 1960's, dredged material was disposed with economics as the key concern. This meant unconfined, open-water disposal in most cases. In the mid 1960's, environmental concerns were raised about the degradation of water quality in the Great Lakes. These concerns primarily focused on the eutrophication of the lakes, and controls on the pollutional loadings of nutrients such as phosphorus and nitrogen. The practice of open water disposal of dredging from polluted harbors and waterways was criticized and called into question.

In 1966, the Corps began investigating the feasibility of using alternate disposal areas at a number of harbors. In 1967, the Corps, in cooperation with the Federal Water Pollution Control Administration (the predecessor of USEPA) initiated a pilot investigation to obtain acceptable solutions to the dredged disposal problem. A variety of disposal alternatives were investigated and pilot projects included the first confined disposal facilities constructed on the Great Lakes.

The Corps completed a two year study <u>Dredging and Water Quality Problems in</u> <u>the Great Lakes</u> in 1969 (USACE, 1969). This 12-volume report examined the pollutional status of the Great Lakes, provided a detailed look at existing dredging and disposal practices, described the effects of these operations on water quality, and examined potential modifications and control measures to abate environmental impacts. This study could not document substantial impacts on water quality or benthic communities. Impacts were of a transient nature. The report concluded, though, that open water disposal of polluted dredged material is "presumptively" undesirable. Recommendations of this report included additional research on the environmental effects of dredging and disposal and the development of a program for the confinement of polluted dredged material around the Great Lakes.

In 1970, Congress authorized two programs which were to have a major impact on the dredging and disposal practices of the Corps through the passage of Public Law 91-611. The Diked Disposal Program was initiated to provide funding for construction of diked disposal facilities to contain polluted dredged materials on the Great Lakes. The same law authorized the program to examine the environmental effects of dredging and disposal. The Corps' Waterways Experiment Station (WES) was tasked to manage this research program.

## 3. DREDGED MATERIAL RESEARCH

The DMRP was conducted between 1973-1978 at a cost of \$33 million. In all, some 270 individual studies were conducted. About two-thirds were completed by universities, private research laboratories, and other federal agencies. About one-third of the studies were completed by the Corps. The major conclusions of the DMRP as summarized in the Executive Overview and Detailed Summary report (USACE, 1978) are as follows:

"The first is that there is no single disposal alternative that presumptively is suitable for a region or group of projects. Correspondingly, there is no single disposal alternative that presumptively results in impacts of such a nature that it can be categorically dismissed from consideration."

"The second basic conclusion is that environmental considerations are acting more strongly than possibly any force to necessitate long-range regional planning as a lasting, effective solution to disposal problems. No longer can disposal alternatives be planned independently for each dredging operation for multiple projects in a given area."

"Turning to inland and coastal waters, the DMRP achieved definite results that soundly substantiate that the most widely held fears over the short-term release of contaminants to disposal site waters are unfounded. As long as the geochemical environment is not basically changed, most contaminants are not released from the sediment particles to the water. However, in contrast, upland disposal often results in a change in the geochemical environment that can lead to contaminant release. Some nutrients, such as ammonium and manganese and iron are released in open-water disposal, but in most cases enough mixing is present to rapidly dilute these to harmless concentrations."

"If a confined disposal site is to be effective from an environmental protection standpoint, it must be efficient in retaining a high percentage of the finer soil particles, for it is these clays and silts that carry the contaminants. These are admittedly the materials most difficult to retain in an area, but if they can be, the effluents should be essentially nontoxic except for occasional situations where nutrient levels and oxygen depletion may be excessive." Since the completion of the DMRP a number of other research programs dealing with dredged materials have been conducted by or for the Corps:

Field Verification Program (FVP) Long-Term Effects of Dredging Operations Program (LEDO) Dredging Operations Technical Support Program (DOTS) Environmental Effects of Dredging Program (EED)

Numerous technical reports and newsletters have been distributed from these programs. In addition, proceedings from seminars and meetings sponsored by a variety of groups dealing with dredging and disposal have been published, such as:

ASCE Conference on Dredging and its Environmental Effects, 1976 US-Japan Experts Meeting on Management of Bottom Sediments Containing Toxic Substances, Annual ASCE Conference on Dredging and Dredged Material Disposal, 1984

In addition, reports from many authors have been presented in scientific and engineering journals dealing with dredging, disposal, and sediment-waterbiological interactions.

# 4. REGULATION OF DREDGE AND FILL ACTIVITIES

Dredge and fill activities are specifically regulated under sections of the Clean Water Act of 1972, as amended (CWA). Section 404 designates the Corps as the lead federal agency in the regulation and enforcement of dredge and fill activities using guidelines and criteria developed by the USEPA. Permits for the placement of fill materials into waters of the United States are issued through Corps District offices. In many places, the Corps and State have cooperative permitting programs.

For the disposal of maintenance dredging conducted by the Corps, the Corps does not issue itself a permit. The Corps must comply with the same procedural requirements as a private citizen and permit authority is transferred to the State.

Section 401 of the CWA provides the State (usually the environmental regulatory agency of the State) authority to issue certification of dredge and fill activities. This certification indicates that the proposed fill or dredged disposal will not violate State water quality standards or criteria. The Corps obtains 401 certification from State agencies for the disposal of dredged materials to the open lake and for the discharge (effluent) from a confined disposal facility.

## 5. DREDGED MATERIAL DISPOSAL GUIDELINES

Section 404(b) directed the USEPA to develop guidelines for dredged material disposal decisionmaking in conjunction with the Corps. The USEPA Region V published its "404 (b) (1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material" on 24 December 1980. These guidelines are published as 40 CFR, Part 230.

The purpose of the 404 (b)(1) guidelines is to "restore and maintain the chemical, physical and biological integrity of material." The guidelines discuss the type of evaluation to conducted, including general guidance as to the chemical, physical and biological testing that should be performed, as well as potential impacts on human water use and the aquatic ecosystem.

The USEPA, Region V, published its "Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments" in 1977. These guidelines are shown in Table 1, and may be consulted as part of the chemical characterization portion of the 404 (b)(1) evaluation. Other information, such as physical properties of the sediments, elutriate tests, bioassays, color, odor, and an assessment of the types of benthic organisms found in the sediment can also be used in the 404 (b)(1) evaluation. These additional tests are summarized in Table 2.

# 6. DREDGED DISPOSAL ALTERNATIVES

Since the mid 1960's maintenance dredging from federal navigation projects in the Great Lakes have been disposed of in one of two ways, unconfined disposal or into a confined disposal facility. Of the approximately 4 million cubic yards dredged annually from the Great Lakes by the Corps in recent years, about half was suitable for unconfined disposal and half placed in existing confined disposal facilities.

Unconfined disposal options include unconfined open water disposal, restricted open water disposal, and unconfined upland disposal. Unconfined disposal of suitable dredged materials can be conducted in several ways. In most cases, dredged material is placed in bottom-dump scows or hoppers which are transported to a disposal site 1-5 miles offshore. Near-shore disposal is the same, except that the dredgings are discharged in shallow water (8-12 feet) in order to alleviate shoreline erosion problems. Beach nourishment is the placement of dredgings directly on a beach to replace eroded material or expand an existing beach. Dredged material may also be placed on land and used in construction or as part of a general fill.

Confined disposal, as the name implies, involves the placement of dredged materials into a site or facility prepared to contain the dredged materials. A confined disposal facility (CDF) is an upland or in-water structure constructed solely for the disposal of polluted dredged materials. The Corps of Engineers has constructed some 30 confined disposal facilities around the Great Lakes since the late 1960's for the disposal of polluted dredged materials from navigation projects. The locations of these CDFs are shown in Figure 1. Five CDFs (not shown) have been constructed in Canada. Of the facilities built by the Corps around the Great Lakes, eight are upland CDFs and 22 are in-water facilities.

Upland confined disposal facilities may be formed by the construction of earthen dikes or use of existing pits or depressions. In-water CDFs are generally formed by stone-filled dikes similar in appearance to a breakwater. The size and shape of a CDF are determined by the required storage capacity and local site conditions.

## 7. CDF PLANNING AND CONSTRUCTION

The majority of existing CDFs on the Great Lakes were constructed under the Diked Disposal Program (PL 91-611, Section 123). This law had specific requirements for the funding of a CDF. Under this law, the Corps was authorized to construct facilities for the disposal of 10-years volume of maintenance dredgings from federal navigation project(s).

The law also required that there must be a local sponsor for the CDF, except for disposal of dredged materials from the Great Lakes Connecting Channels in Michigan. Local sponsors were typically a City, County or State governmental agency. The local sponsor was required to provide all lands, easements, and rights of way to the Corps for the CDF site. The local sponsor was also required to provide 25% of the funds for the construction of the CDF. This local cost share could, however, be waived if the USEPA certified that the area was in compliance with an approved water quality program. The local sponsor would receive title to the CDF after it was filled and be responsible for its maintenance.

In many cases, local sponsors have planned or implemented productive and beneficial uses for CDFs. These uses have included the development of recreation areas, new or expanded marinas, wildlife refuges, etc. The planned development must be compatible with the environmental integrity of the facility and these lands cannot be transferred from the local sponsor without the approval of the Corps.

The process by which most of the existing CDFs on the Great Lakes were planned and constructed can be divided into several key steps.:

Site Selection Identification of Local Sponsor Environmental Impact Statement Detailed Design Local Cooperation Agreement Obtainment of Appropriate Permits Construction

The above is an open, public process with a number of opportunities for input and comment. It is also a very slow process. Site selection alone has taken ten years or longer in a few cases. It is fair to state that the decisions made during site selection are the most difficult and controversial. The responsiblities and priorities of federal and state regulatory agencies must be balanced with the needs of the prospective local sponsors.

In recent years, the Corps has phased out the construction of CDFs under the authority of PL 91-611. Future maintenance dredging will still require confined disposal. Future CDFs will be constructed under the operation and maintenance (O&M) authorities of individual navigation projects. The extent of local participation and cost-sharing for these projects will vary on a project-by-project basis.

# 8. CDF DESIGNS AND OPERATION

There is no single, best CDF design. The structural and environmental design is very site specific. The configuration of a CDF in a particular locale often reflects the intended use of the facility by the local sponsor after filling. CDFs are generally formed by the construction of dikes: upland facilities typically have earthen dikes; in-lake CDFs typically have stone dikes. The purpose of a CDF design is to retain as high a percentage of the sediment particles as practical (basic conclusion of the DMRP).

In terms of wastewater treatment technology, CDFs function as settling basins. Existing CDFs were designed to retain greater that 99.9% of the sediment particles disposed. This is quite comparable with the efficiencies of advanced municipal wastewater treatment facilities.

The dredged sediments are placed into the facility either mechanically (by clamshell and crane or trucks) or hydraulically (by pipeline). Most of the coarse sediments (sands and gravel) settle rapidly near the point of disposal. Fine grained sediments (silts and clays) may require more time to settle out. Water (effluent) is drained or discharged from the CDF during dredged disposal operations. During non-dredging periods, limited amounts of water may be released from rainfall runoff or seepage.

Most in-lake facilities have stone dikes constructed with layers of stone of increasing size. The center of the dike (core) typically contains sand or gravel. The outer layers of the dike have stone with sizes increasing from several pounds to several tons to protect the facility from wave energy. Most existing, in-lake CDFs have no liners. The stone dikes are permeable upon construction. The in-lake CDF has ponded water in hydrostatic equilibrium with the adjacent harbor, river, or lake.

As dredgings are placed into the CDF, water is moved passively through the dike. The sand or gravel in the core of the dike functions as a filter and retains much of the suspended sediments. As the in-lake CDF becomes filled, portions of the dike become clogged as the sediments are mounded against it. The stone dike becomes progressively less and less permeable. At some point, the stone dike becomes clogged to the stage where water cannot exit as fast as dredgings are disposed. The water level within the CDF begins to rise. In order to control the water level within the CDF a variety of release mechanisms have been used. These include fixed or adjustable overflow weirs and filter cells.

Many variations on the above design have been employed at existing CDFs. Some dikes have liners, including clay, plastic fabrics, and grouted mattresses. Some dikes have steel sheet pile in portions of the design. The design intent is the same, to retain the sediment particles.

Table 3 summarizes facts about the construction date, anticipated fill date, and capacity of the CDFs on the Great Lakes. Also summarized are types of pollutants in the dredged material disposed of in these facilities. Figures 2 and 3 summarize the status of filling (% filled) and available capacity (cubic yards) of the Great Lakes CDFs.

# 9. CDF MONITORING

Monitoring procedures at CDFs are as individual as the designs. There is no single, systematic monitoring program applicable to all facilities. The monitoring program for a CDF is typically the result of comments and coordination with State and Federal regulatory agencies. The final monitoring program may be included in the 401 certification issued by the State.

CDF water quality monitoring is generally conducted during the dredging operation and consists of monitoring the effluent at the weir overflow or filter cells, the mixing zone, dredge discharge, and open water sites near the discharge or around the CDF. Twelve facilities have monitoring wells installed in the dike walls. The type of chemical analysis conducted on water quality samples collected has varied, depending on the type and level of pollutants in the dredged sediments and local or regional water quality priorities.

Special monitoring studies have been conducted at existing CDFs for a variety of purposes. Dye tracer tests have been conducted at seven facilities to test the integrity of liners and dike walls. A demonstration of innovative dredging and disposal equipment was conducted at the Chicago CDF. Diked facility #2 at Buffalo, New York, has been used extensively for scientific investigations on the effects of contaminated dredged materials on flora and fauna at the site.

# 10. SUMMARY

The information provided above was intended to give a broad overview on confined disposal facilities on the Great Lakes. More specific information on the individual CDFs is provided in the remaining section of this report. Data sheets on each facility are contained in Appendix A. Location maps, plan views, typical dike cross sections and other design information is contained in Appendix B.

For additional information about any CDF, contact the USEPA or the Corps District office for the appropriate area.

U.S. Environmental Protection Agency Region V Public Affairs Office 230 South Dearborn Street Chicago, IL 60604

U.S. Army Corps of Engineers Buffalo District Public Affairs Office 1776 Niagara Street Buffalo, NY 14207-3199 U.S. Army Corps of Engineers Chicago District Public Affairs Office 230 South Dearborn Street Chicago, IL 60604-1797

U.S. Army Corps of Engineers Detroit District Public Affairs Office P.O. Box 1027 Detroit, MI 48231-1027

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# TABLE 1. EPA GUIDELINE VALUES FOR HARBOR SEDIMENT CLASSIFICATION

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<u>Compound/Element</u>	<u>Non Polluted</u> (expressed in	Moderately Polluted	<u>Heavily Polluted</u> less specified)
Volatile Solids (%)	<5	5-8	>8
COD	<40,000	40,000-80,000	>80,000
TKN	<1,000	1,000-2,000	>2,000
Oil and Grease	<1,000	1,000-2,000	>2,000
Lead	<40	40-60	>60
Zinc	<90	90-200	>200
Ammonia	<75	75-200	>200
Cyanide	<0.10	0.10-0.25	>0.25
Phosphorus	<420	420-650	>650
Iron	<17,000	17,000-25,000	>25,000
Nickel	<20	20-50	>50
Manganese	<300	300 - 500	>500
Arsenic	<3	3 - 8	>8
Cadmium			>6
Chromium	<25	25-75	>75
Barium	<20	20-60	>60
Copper	<25	25-50	>50
Mercury	•		≥1
Total PCBs			≥10

source: Guideline for the Pollutional Classification of Great Lakes Harbor Sediments, U.S. Environmental Protection Agency, Region V, 1977

# TABLE 2. ADDITIONAL CRITERIA FOR HARBOR SEDIMENT CLASSIFICATION

TEST	METHOD	CONCLUSIONS
Elutriate	1:4 mix of sediment and water, shake 30 min., settle 60 min., filter through 0.45m filter, analyze filtrate	Determines ability of sediment to release toxic substances under aerobic, near neutral pH conditions
<u>Contaminant Source</u>	Determine adjacent land usage, drainage patterns, effluent discharge points	If drainage is from a marshy area and there are limited or no metals, oil and grease and volatile organics, higher levels of TKN, Ammonia N, COD may be natural
Color	Visual Examination	Darker sediment is potentially more contaminated than light-colored sediment
Texture	Size Analysis	Silts are potentially more contaminated than coarser sands. Silts are usually transported out of river mouths through harbors, while sands are usually transported by lateral onshore drift
<u>Odor</u>	Smell	Commonly subjective
<u>Oil and Grease</u>	Visual Examination Chemical Analysis	Samples showing visible oil and grease are commonly highly polluted. If chemical results (Table 1) are marginal, presence of oil and grease classifies the sediment as polluted
<u>96-Hour Acute</u> <u>Bioassay</u>	Species of animals such as daphnids or f athead minnows are exposed to sediment and water for 96 hours.	Depending on the percentage of surviving species, the sediment can be classified

TABLE 3. SUMMARY DATA FOR CONFINED DISPOSAL FACILITIES, U.S. GREAT LAKES

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	Year	Anticipated		Capacity	Approximate Remaining Capacity			TAMINANTS-
	<u>Constructed</u>	<u>Fill Date</u>	% Filled	<u>(CU 40)</u>	<u>(CU 40)</u>	netats	INN, AMM. N, COU. P	<u>rcbs</u>
BUFFALO DISTRICT								
1. Cleveland # 12	1974	1979	100	2,760,000	0	x		
2. Cleveland # 14	1979	1991	40	6,130,000	3,678,000	x		
3. Dike #4 (Buffalo)	1974	1995	40	6,900,000	4,140,000	×(Hg)		
4. Erie	1979	1993	40	1,600,000	960,000	x	x	
5. Kuron	1975	1990	70	2,150,000	645,000	x	×	
6. Lorain	1977	1990	70	1,850,000	555,000	x	x	
7. Small Boat Harbor (Buffalo)	1968	1972	100	1,500,000	0	x		
8. Times Beach (Buffalo)	1972		45	1,500,000	Inactive	×		
9. Toledo (Facility 4)	1976	1992	65	10,000,000	3,500,000	×	x	x
10. Toledo (Grassy Is.)	1967	1978	100	5,000,000	0	x	×	×
CHICAGO DISTRICT								
1. Chicago	1984	1995	10	1,300,000	1,170,000	x(Hg)		
2. Michigan City	1978	1989	80	50,000	10,000	x	<b>X</b>	x
DETROIT DISTRICT								
1. Bayport (Green Bay)	1965	1979	100	650,000	0	x(Hg)	×	
2. Bolles	1977	1990	25	335,000	251,000	x	×	
3. Clinton River	1978		98	370,000	0			
4. Crooked River	1982	1992	20	19,500	15,000	×	×	
5. Dickinson Is. (Lake St. Clair)	1976	1990	48	2,031,000	1,015,000	x(Hg)	x	
6. Erie Pier (Duluth)	1979	1993	50	1,100,000	550,000	×	×	x
7. Frankfort	1982	1990	100	30,000	0		×	
8. Grassy Is. (Detroit R.)	1960	1984	100	4,320,000	0	x(Hg)	×	
9. Harbor Is. (Grand Haven)	1974	1985	97	310,000	0	×	×	
10. Harsen's Is. (Lake St. Clair)				30,000	Inactive			
11. Kawkawlin River	••••			·····	Inactive	×	×	
12. Kenosha	1975	1990	66	750,000	225,000	×	x	x
13. Kewaunee	1982	1992	57	500,000	200,000		×	x
14. Kidney Is. (Green Bay)	1979	1986	97	1,200,000	0	×(Hg)	x	x
15. Manitowoc	1975	1992	61	800,000	280,000		x	
16. Milwaukee	1975	1990	44	1,600,000	800,000	×	x	
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Volatile Contamination Ranking <u>Oil & Grease</u> Organics 2 х 3 x 3 x х х 2/3 х 2/3 x х 3 x x 3 x х 2 х 2 х 3 х 3 х 3 х 1 1

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# TABLE 3. SUMMARY DATA FOR CONFINED DISPOSAL FACILITIES, U.S. GREAT LAKES (Contd)

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				Approximate Remaining	CONTAMINANTS			
	Year <u>Constructed</u>	Anticipated Fill Date	% Filled	Capacity (CU 40)	Capacity (CU_40)	Metals	TKN, AMM. N, COD. P	PCBs
DETROIT DISTRICT (contd)								
17. Monroe (Sterling)	1986	1995		4,200,000		×	x	x
18. Monroe (Edison)		1984		••••••	0	×	×	
19. Pointe Mouille	1979	1993	38	18,640,000	11,184,000	x(Hg)		
20. Port Sanilac	1979	1983	100	143,300	0		x	×
21. Riverview (Holland)	••••	••••		120,000		×	×	
22. Saginaw	1978	1990	48	10,000,000	5,000,000	×	×	
23. Sebewaing	1979	1989	65	84,000	29,000		×	
24. Verplank (Grand Haven)	••••			134,000	Inactive		×	
25. Whirlpool (St. Joseph)		••••	100	25,000	0	×		
26. Windmill Is. (Holland)	1977	1988	75	370,000	92,000	x	x	

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Volatile		Contaminatio
erganics	UTL & Grease	<u>Kanking</u>
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	x	3
×	x	3
		1
x		2
		1
	x	1
	x	



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Note: if site is not labeled, the data was not available.

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Appendix A

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Data Sheets

Buffalo District

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Name of CDF: Cleveland Dike #12Waterway: Lake ErieCity: ClevelandCounty: CuyahogaState: OHStatus: InactiveType of CDF: In lake, adjacent to land

TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound

Liner Design: None

Dewatering System: None

Effluent Treatment: Natural settling

Capacity (cubic yards): 2,760,000

Area (acres): 56.0

Cap Design: None

#### SETTING

Waterway: Lake Erie

Site Diagram: Attached, Cleveland Harbor

Description of Setting: Located 2.7 miles northeast of the mouth of the Cuyahoga River and about 1.0 miles west of the eastern end of the harbor's east breakwater, adjacent to sites 9 and 13

Adjacent Land Use: Dike disposal area, marina and municipal light company

Special Biological Conditions/Activity: None

Substrate: Lacustrine sands and clays

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Cleveland-Cuyahoga County Port Authority

Intended Ultimate Use: Waterfront development

Continuation of CDF: Cleveland Dike #12

## HISTORY OF OPERATION

Year Constructed: 1974	Anticipated Fill Date: 197	'9
Percent Filled: 100	No. of Dredge Operations:	6

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: Minor repairs to the structure are done on a yearly basis such as replacing or resetting slope protection stone

## DREDGED MATERIAL

Source of Dredged Material: Cleveland and Rocky River Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Oil & Grease

Source of Contaminants: Industrial and Municipal

# MONITORING

Monitoring of Sediment: None

Water Quality Monitoring: Emergency disposal monitoring study CERG

Locations of Monitor Wells: None

#### SPECIAL STUDIES

Biological Studies: Uptake of chlorinated benzenes in earthworms (USFWS)

Dye Tests: None

Other Studies: None

Comments: CERG study analyzed water temperature, Eh, pH, Conductivity, Turbidity, Dissolved Oxygen, Ortho Phosphate, Total Kjeldahl Nitrogen, Suspended Solids and Volatile Suspended Solids

Name of CDF: Cleveland Dike #14	Waterway: Lake Erie	
City: Cleveland	County: Cuyahoga	State: OH

Status: Active Type of CDF: In lake, adjacent to land

#### TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound with sheet pile cutoff wall

Liner Design: None

Dewatering System: Two overflow weirs

Effluent Treatment: Natural settling, granular filter in dike and 2 oil skimmers

Capacity (cubic yards): 6,130,000

Area (acres): 88.0

Cap Design: None

#### SETTING

Waterway: Lake Erie

Site Diagram: Attached, Cleveland Harbor

Description of Setting: 4.5 miles east of the mouth of the Cuyahoga River and about .75 miles east of the end of the harbor's east breakwater

Adjacent Land Use: Gordon Park, marina and residential

Special Biological Conditions/Activity: Special marsh grass added to keep birds away because of botulism problem

Substrate: Lacustrine sands and clay

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Cleveland-Cuyahoga County Port Authority

Intended Ultimate Use: Recreational and parkland

Continuation of CDF: Cleveland Dike #14

## HISTORY OF OPERATION

Year Constructed: 1979 Anticipated Fill Date: 1991

Percent Filled: 40

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: Minor maintenance to stone wall in 1980; in 1982 and 1983 repairs made to pumpout facility

No. of Dredge Operations: 7

#### DREDGED MATERIAL

Source of Dredged Material: Cleveland and Rocky River Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Oil & Grease

Source of Contaminants: Municipal, industrial and steel mills

# MONITORING

Monitoring of Sediment: Pre-dredging grab samples taken; specific tests included temperature, pH, dissolved oxygen, and conductivity

Water Quality Monitoring: Routine monitoring of water just outside CDF and in dike walls

Locations of Monitor Wells: 4 in dike walls

## SPECIAL STUDIES

Biological Studies: Study on botulism, uptake of chlorinated benzenes in earthworms (USFWS)

Dye Tests: None

Other Studies: None

Comments: None at this time

Name of CDF: Dike #4	Waterway: Buffalo	Harbor, Lake Erie
City: Lackawanna	County: Erie	State: NY
Status: Active	Type of CDF: In lake.	adjacent to land

## TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound, layered stone and slag

Liner Design: None

Dewatering System: Through dike filter and by weir overflow

Effluent Treatment: Filtered in dike and natural settling

Capacity (cubic yards): 6,900,000

Area (acres): 100.0

Cap Design: None

# SETTING

Waterway: Buffalo Harbor, Lake Erie

Site Diagram: Attached, Buffalo Harbor

Description of Setting: Located outside breakwater at south entrance to Buffalo Harbor (Stony Point) adjacent to Bethlehem Steel property, ties into existing south entrance arm breakwater

Adjacent Land Use: Bethlehem Steel Company (only coking operations active at this time) and ship channel

Special Biological Conditions/Activity: None

Substrate: Lacustrine clay and sandy silt

# REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Erie County

Intended Ultimate Use: Wildlife area

## HISTORY OF OPERATION

Year Constructed: 1974

Anticipated Fill Date: 1995

Percent Filled: 40

No. of Dredge Operations: 9

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: None

DREDGED MATERIAL

Source of Dredged Material: Buffalo Harbor, Dunkirk Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Copper, Lead, Zinc, Chromium, Mercury, Cadmium, Grease & Oil, PAH's

Source of Contaminants: Not available

# MONITORING

Monitoring of Sediment: USGS and NYDEC sampled CDF

Water Quality Monitoring: Routine sampling of water inside and outside CDF

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Comments: None at this time

Name of CDF: Erie	Waterway: Erie Harbor	, Lake Erie
City: Erie	County: Erie	State: PA

Status: Active Type of CDF: In lake, adjacent to land

## TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound of clay and rip-rap, vertical steel sheet piling installed on each face and capped with concrete

Liner Design: None

Dewatering System: Overflow weir and filtered through dike

Effluent Treatment: Natural settling and filter blanket in dike

Capacity (cubic yards): 1,600,000

Area (acres): 22.0

Cap Design: None

#### SETTING

Waterway: Erie Harbor, Lake Erie

Site Diagram: Attached, Erie Harbor

Description of Setting: Located on south side of bay formed by Presque Isle Penninsula

Adjacent Land Use: Abuts south pier on northern border, filled industrial site to the west and Gulf Oil tank farm and Interlake Steel Corp. (coke plant) to the south

Special Biological Conditions/Activity: None

Substrate: Lacustrine sands and clay

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Erie-Western/Pennsylvania Port Authority

Intended Ultimate Use: Industrial development

Continuation of CDF: Erie

## HISTORY OF OPERATION

Year Constructed: 1979

Percent Filled: 40 No. of Dredge Operations: 1

Anticipated Fill Date: 1993

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Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: In 1980 repairs were made to pumpout facility

DREDGED MATERIAL

Source of Dredged Material: Erie Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Lead, Cadmium, Chromium, Copper, Nickel, Zinc, Phenol, Ammonia Nitrogen

Source of Contaminants: Not available

# MONITORING

Monitoring of Sediment: Pre-dredging grab samples

Water Quality Monitoring: None

Locations of Monitor Wells: None

#### SPECIAL STUDIES

Biological Studies: 96 hour acute bioassay

Dye Tests: None

Other Studies: None

Comments: Most of the sediments dredged in Erie Harbor are uncontaminated by EPA standards and are dumped in open water

Name of CDF: H	luron	Waterway: Lake Er	ie
City: Huron		County: Erie	State: OH

Status: Active Type of CDF: In lake, island

#### TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound & cellular sheet piling with plastic filter cloth made with galvanized woven wire backing

Liner Design: None

Dewatering System: Through dike, pumping and overflow weirs

Effluent Treatment: Water allowed to settle for 1 hour before pumping it back into the lake

Capacity (cubic yards): 2,150,000

Area (acres): 63.0

Cap Design: None

# SETTING

Waterway: Lake Erie

Site Diagram: Attached, Huron Harbor

Description of Setting: Located adjacent to west pier at Huron Harbor at the mouth of Huron River and Lake Erie

Adjacent Land Use: Marina and industrial

Special Biological Conditions/Activity: Near spawning grounds of fish in western basin

Substrate: Lacustrine clay over glacial till

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: City of Huron

Intended Ultimate Use: Marina and park

Continuation of CDF: Huron

#### HISTORY OF OPERATION

Year Constructed: 1975

Anticipated Fill Date: 1990

Percent Filled: 70

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No. of Dredge Operations: 5

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Repairs to pumpout facility in 1980, 1981 and 1983. In 1981 repairs made to overflow weir to prevent damage during winter

DREDGED MATERIAL

Source of Dredged Material: Huron and Vermillion Harbors

History of Placement in CDF: Not available

Contaminants of Concern: Oil & Grease, Phosphorous, Arsenic, Ammonia Nitrogen, COD, Zinc, Manganese, Nickel, Chromium, Copper, Iron

Source of Contaminants: Effluent from Norwalk Sewage Treatment Plant which has exceeded Oil & Grease limitations

## MONITORING

Monitoring of Sediment: Pre-dredging grab sample taken

Water Quality Monitoring: Routine monitoring at dike, inside dike and surrounding water as well as upland

Locations of Monitor Wells: 2 in dike walls, 3 upland

SPECIAL STUDIES

Biological Studies: 96 hour acute bioassay

Dye Tests: None

Other Studies: None

Comments: None at this time

Name of CDF: Lorain Harbor	Waterway: Lake Er	ie
City: Lorain	County: Lorain	State: OH
Status: Active	Type of CDF: In lake,	adjacent to breakwater

## TECHNICAL SPECIFICATIONS

Dike Design: Combination rubblemound and steel sheet pile Liner Design: None Dewatering System: Overflow weir Effluent Treatment: Filtercore in dike and natural settling Capacity (cubic yards): 1,850,000 Area (acres): 58.0

Cap Design: None

## SEITING

Waterway: Lake Erie

Site Diagram: Attached, Lorain Harbor

Description of Setting: South shore of Lake Erie; constructed on the open lake side of the east breakwater shorearm of Lorain Harbor

Adjacent Land Use: Park, residential area, wastewater treatment plant

Special Biological Conditions/Activity: None

Substrate: Lacustrine clay and sand

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: City of Lorain

Intended Ultimate Use: Small boat harbor and recreation

Litigation: None

HISTORY OF OPERATION

Year Constructed: 1977

Anticipated Fill Date: 1990

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Continuation of CDF: Lorain Harbor

Percent Filled: 70

No. of Dredge Operations: 8

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Repairs made to pumpout facility in 1980

## DREDGED MATERIAL

Source of Dredged Material: Lorain Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Zinc, Cyanide, Phosphorus, PAH's, Oil & Grease, Total Kjeldahl Nitrogen, Copper, Iron

Source of Contaminants: Industrial and steel mills

## MONITORING

Monitoring of Sediment: Pre-dredging grab samples taken; specific test include particle size, specific conductance, pH, dissolved oxygen

Water Quality Monitoring: Occasional monitoring inside and outside of dike

Locations of Monitor Wells: Dike walls (not monitored at present)

#### SPECIAL STUDIES

Biological Studies: 96 hour acute bioassay test (daphnids, fathead minnows), uptake of chlorinated benzenes in earthworms (USFWS)

Dye Tests: None

Other Studies: None

Comments: Monitoring of dike wells shows no migration of contaminants

Name of CDF: Small Boat Harbor	Waterway: Buffalo	Harbor, Lake Erie
City: Buffalo	County: Erie	State: NY
Status: Inactive (1972)	Type of CDF: In lake,	adjacent to land

## TECHNICAL SPECIFICATIONS

Dike Design: Limestone rip-rap on an earthen and slag core

Liner Design: None

Dewatering System: Semi-permeable dike construction

Effluent Treatment: Natural settling

Capacity (cubic yards): 1,500,000

Area (acres): 33.0

Cap Design: 6 feet of soil and clean construction debris at north end adjacent to marina

## SETTING

Waterway: Lake Erie

Site Diagram: Attached, Buffalo Harbor

Description of Setting: Located at south end of Buffalo Outer Harbor adjacent to land

Adjacent Land Use: Tift Farm Nature Preserve is located east of the CDF across New York Route 5; Small Boat Marina adjacent to north, open harbor to the south and west

Special Biological Conditions/Activity: South half of CDF is emergent marsh, trees established in southeast corner

Substrate: Sandy silt and clay

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Niagara Frontier Transportation Authority (NFTA)

Intended Ultimate Use: One-half wildlife area, one-half parking for NFTA

Continuation of CDF: Small Boat Harbor

### HISTORY OF OPERATION

Year Constructed: 1968Anticipated Fill Date: 1972Percent Filled: 100No. of Dredge Operations: N/A

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: In 1976 some replacement or resetting of dike armor stone

## DREDGED MATERIAL

Source of Dredged Material: Buffalo Harbor, Lake Erie

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Copper, Lead, Zinc, Chromium, Mercury, Cadmium, Grease & Oil, PAH's, Aromatic Amines, Chlorobenzenes

Source of Contaminants: Aromatic Amines derived from dye production

## MONITORING

Monitoring of Sediment: Pre-dredging grab samples taken

Water Quality Monitoring: Occasional monitoring inside CDF

Locations of Monitor Wells: Monitoring wells inside CDF installed by NFTA

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Comments: Listed as a State of New York "Superfund" site, State listing #9-15-127, p. 9-281 class 2

Name of CDF: Times Beach	Waterway: Buffalo	Harbor, Lake Erie
City: Buffalo	County: Erie	State: NY
Status: Inactive	Type of CDF: In water,	adjacent to land

#### TECHNICAL SPECIFICATIONS

Dike Design: Layered slag and stone rubblemound

Liner Design: None

Dewatering System: Permeable wall dike

Effluent Treatment: Natural settling and filtered through dike

Capacity (cubic yards): 1,500,000

Area (acres): 45.0

Cap Design: None

## SETTING

Waterway: Buffalo Harbor

Site Diagram: Attached, Buffalo Harbor

Description of Setting: Located to the southeast of confluence of Buffalo River entrance channel and Buffalo Outer Harbor

Adjacent Land Use: Buffalo Outer Harbor located to west, U.S. Coast Guard Station to north, Seaway Pier No. 1 Complex to south and Norfolk and Western Rail to west

Special Biological Conditions/Activity: Locally unique freshwater marsh area

Substrate: Sandy silt

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: City of Buffalo

Intended Ultimate Use: Filling of CDF terminated due to development of a unique wetland

## HISTORY OF OPERATION

Year Constructed: 1972

Anticipated Fill Date: N/A

Percent Filled: 45

No. of Dredge Operations: 4

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: None

#### DREDGED MATERIAL

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Source of Dredged Material: Buffalo Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Copper, Lead, Zinc, Chromium, Mercury, Cadmium, Oil & Grease, PAH's, Aromatic Amines, Chlorobenzenes

Source of Contaminants: Aromatic Amines derived from dye production

### MONITORING

Monitoring of Sediment: Pre-dredging grab samples taken

Water Quality Monitoring: Routine monitoring of dike wells and groundwater at various levels

Locations of Monitor Wells: Three clusters of three in dike

#### SPECIAL STUDIES

Biological Studies: Long-term study site for plant and animal bioaccumulation

Dye Tests: None

Other Studies: None

Comments: The State of New York listed this site as a "Superfund" site (No. 9-15-080, p. 9-215, class 2)

Name of CDF: Toledo (Facility 4	) Waterway: Toledo 1	Harbor, Lake Erie
City: Toledo	County: Lucas	State: OH
Status: Active	Type of CDF: In lake,	adjacent to land

#### TECHNICAL SPECIFICATIONS

Dike Design: Prepared limestone base with clay dike

Liner Design: Clay core from local construction

Dewatering System: Weir overflow

Effluent Treatment: Natural settling; oil skimmer available

Capacity (cubic yards): 10,000,000

Area (acres): 242.0

Cap Design: None

### SETTING

Waterway: Toledo Harbor, Lake Erie

Site Diagram: Attached, Toledo Harbor

Description of Setting: Located in Maumee Bay, east of the Maumee River mouth and navigation channel

Adjacent Land Use: Adjacent to existing Toledo-Edison diked diposal area (fly ash) and the Toledo-Lucas County Port Authority diked disposal area

Special Biological Conditions/Activity: None

Substrate: Sandy clay (80% silt-clay)

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Toledo - Lucas County Port Authority

Intended Ultimate Use: Industrial park and port facility

Continuation of CDF: Toledo (Facility 4)

#### HISTORY OF OPERATION

Year Constructed: 1976

Anticipated Fill Date: 1992

Percent Filled: 65

No. of Dredge Operations: 9

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Replacment or resetting of armor stone done on a yearly basis, pumpout facilities repaired in 1977, 1982, and 1983. Inner surface of dikes repaired in 1985

#### DREDGED MATERIAL

Source of Dredged Material: Toledo Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Cyanide, Arsenic, Copper, Nickel, Iron, Phosphorus, Zinc, Lead, COD, Ammonia Nitrogen, Phenols, Phenanthrene, Anthracene, Acrolein, Acrylonitrile, Fluoranthene, Benzidine, Total PAH's

Source of Contaminants: Not available

#### MONITORING

Monitoring of Sediment: None

Water Quality Monitoring: Routine monitoring of weir overflow, standing water inside CDF, upstream, downstream, adjacent to dike and open water

Locations of Monitor Wells: None

#### SPECIAL STUDIES

Biological Studies: Cadmium uptake in earthworms, PCB uptake in aquatic bottom species, 96 hour accute bioassay, plant accumulation of heavy metals and organics

Dye Tests: None

Other Studies: None

Comments: Two automatic samples on weir are taken daily during operation
Name of CDF: Toledo (Grassy Island) Waterway: Toledo Harbor, Lake ErieCity: ToledoCounty: LucasStatus: InactiveType of CDF: Island in lake, adjacent to land

### TECHNICAL SPECIFICATIONS

Dike Design: Granular fill (sandy loam)

Liner Design: None

Dewatering System: Overflow weir

Effluent Treatment: Natural settling

Capacity (cubic yards): 5,000,000

Area (acres): 150.0

Cap Design: None

#### SETTING

Waterway: Toledo Harbor, Lake Erie

Site Diagram: Attached, Toledo Harbor

Description of Setting: Located in Maumee Bay northwest of the mouth of the Maumee River

Adjacent Land Use: Bordered on south side by shipping channel, on east, north and west by shallow waters of inner bay

Special Biological Conditions/Activity: None

Substrate: Sandy clay (80% silt-clay)

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Toledo-Lucas County Port Authority

Intended Ultimate Use: Wildlife area and to recycle dredge spoil as topsoil

Continuation of CDF: Toledo (Grassy Island)

#### HISTORY OF OPERATION

Year Constructed: 1967

Anticipated Fill Date: 0

Percent Filled: 100

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No. of Dredge Operations: N/A

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Raising and improvement of the perimeter dike to increase CDF volume completed three times, dikes armored with rip-rap to protect them from erosion

### DREDGED MATERIAL

Source of Dredged Material: Toledo Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Cyanide, Arsenic, Copper, Nickel, Iron, Phosphorus, Zinc, Lead, Ammonia Nitrogen

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging grab samples taken and recently sampled by USACE Buffalo District

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: Cadmium uptake by earthworms

Dye Tests: None

Other Studies: None

Comments: Constructed and completely filled prior to facility being transferred to Buffalo District

Chicago District

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Name of CDF: Chicago Area	Waterway: Lake Mi	chigan, Calumet Harbor
City: Chicago	County: Cook	State: IL
Status: Active	Type of CDF: In lake,	adjacent to land

Dike Design: Stone filled dike with core of prepared limestone

Liner Design: Plastic flexible liner (30 mil) with polyester fabric reinforcement

Dewatering System: Filter cells

Effluent Treatment: Primary & secondary settling sand/carbon filtration

Capacity (cubic yards): 1,300,000

Area (acres): 42.0

Cap Design: Two foot clay liner and one foot of topsoil to cover entire area when site completely filled

#### SETTING

Waterway: Lake Michigan, Calumet Harbor

Site Diagram: Attached

Description of Setting: Located along the north side of Iroquois Landing at the headwaters of the Calumet River

Adjacent Land Use: Port facility and park

Special Biological Conditions/Activity: None

Substrate: Lacustrine sand and clay

## REGULATORY ENVIRONMENT

Permits: See Attachment 1

Local Sponsor: Chicago Regional Port District and the Chicago Park District

Intended Ultimate Use: Port facility and/or park expansion

Continuation of CDF: Chicago Area

HISTORY OF OPERATION

Year Constructed: 1984

Anticipated Fill Date: 1995

Percent Filled: 20

No. of Dredge Operations: 3

Type of Dredging/Disposal: Mechanical

Modifications/Damage/Repairs: Liner damaged during construction; fine sand placed on disposal side of dike; dredged material placed along dike interior to aid sand blanket

### DREDGED MATERIAL

Source of Dredged Material: Calumet River & Harbor, Chicago River & Harbor

History of Placement in CDF: In 1984 and 1985 100,000 cubic yards added; 70,000 cubic yards added in 1986. During construction southeast side of CDF used for disposal of unstable sediments

Contaminants of Concern: Mercury, Lead, Arsenic, Copper, Zinc, Manganese, Chromium, Cyanide, Oil & Grease, PCBs

Source of Contaminants: Steel mills, heavy industry, urban runoff, sewer overflow, waste treatment plant effluents

## MONITORING

Monitoring of Sediment: Pre-dredging bulk analysis (grab & core samples), standard elutriate, EP toxicity. During dredging weekly grab of material as disposed for bulk analysis. No post disposal monitoring

Water Quality Monitoring: Continuous water level measurements inside CDF, surface water quality monitoring of Calumet Harbor & River (5 stations), filter cell influent & effluent (weekly during disposal operations), and monitoring wells in and around CDF (monthly, year round)

Locations of Monitor Wells: 6 along dike, 3 in adjacent land

### SPECIAL STUDIES

Biological Studies: Monthly field observations of wildlife at CDF. Fish and benthos collected and analyzed for PCB body burden

Dye Tests: Conducted during construction to determine liner integrity

Other Studies: Dredge equipment demonstration, including use of submerged diffuser within CDF; special water quality monitoring inside

Comments: Plastic liner damaged by gravel during construction, filter cloth not used in final design although suggested in EIS

Name of CDF: Chicago Area

## Attachment 1

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Permits: Section 401 Certification by State of Illinois, IL WPC pt. Nos. 1982-EA-0325 and 1987-EA-2851, and Illinois DOT Construction Permit

Name of CDF: Michigan City	Waterway: Trail Creek		
City: Michigan City	County: LaPorte	State:	IN
Status: Inactive	Type of CDF: Upland		

Dike Design: Earthen dikes with stone rip-rap Liner Design: Natural clay formation under CDF Dewatering System: Sand filter and drainage pipes Effluent Treatment: Primary settling and sand filtration Capacity (cubic yards): 50,000 Area (acres): 3.3

Cap Design: Clay cap with top soil cover

## SETTING

Waterway: Trail Creek and MI City Harbor, Lake MI

Site Diagram: Attached

Description of Setting: North side of Trail Creek about 1.5 miles up creek from the outlet into Lake Michigan

Adjacent Land Use: A park and lagoon which are used for recreational purposes, Trail Creek, and the Michigan City Sewage Treatment Plant

Special Biological Conditions/Activity: None

Substrate: Silty sand over clay

### REGULATORY ENVIRONMENT

Permits: See Attachment 2

Local Sponsor: City of Michigan City

Intended Ultimate Use: Additional park land

Litigation: Citizens are suing over dredging

## HISTORY OF OPERATION

Year Constructed: 1978

Anticipated Fill Date: 1987

Percent Filled: 100 No. of Dredge Operations: 2

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: Filter dike became clogged during first operation; CDF incompatible with hydraulic dredging; disposal completed using mechanical dredging and trucking

#### DREDGED MATERIAL

Source of Dredged Material: Trail Creek

History of Placement in CDF: In 1978/9, hydraulic dredging and disposal followed by mechanical dredging and trucking (35,000 cy). In 1987, mechanical dredging and trucking (21,000 cy)

Contaminants of Concern: Cyanide, Nickel, Arsenic, Chromium, Phosphorus, Cadmium, Oil & Grease, Nitrogen (TKN and Ammonia)

Source of Contaminants: Sewer overflows and wastewater treatment plant effluent, Waste Inc., NPL site

#### MONITORING

Monitoring of Sediment: Pre-dredging grab and core samples in 1970/1975/1983/1986/1987, and weekly grab samples of sediments during dredging. Borings made in dike after clogging during first operation

Water Quality Monitoring: Surface water samples from Trail Creek during dredging and disposal. Groundwater monitoring on a quarterly basis

Locations of Monitor Wells: 3 wells, 1 upgradient, 2 downgradient of CDF

SPECIAL STUDIES

Biological Studies: USFWS collected earthworms from CDF for tissue analysis

Dye Tests: None

Other Studies: None

Name of CDF: Michigan City

# Attachment 2

Permits: Certification, Section 401 Clean Water Act - State waived

Detroit District

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Name of CDF: Bayport	Waterway: Green Ba	y, Lake Michigan
City: Green Bay	County: Brown	State: WI
Status: Active	Type of CDF: In lake,	adjacent to land

Dike Design: Constructed of on-site material

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): 5,500,000

Area (acres): 400.0

Cap Design: City of Green Bay plans to cap site

### SETTING

Waterway: Green Bay, Lake Michigan

Site Diagram: Attached, Green Bay Harbor

Description of Setting: Located west of the mouth of the Fox River in Green Bay bounded on the southwest by I-43

Adjacent Land Use: Wetlands, sanitary landfills and incinerator to the west on former wetland site, fuel tank farm to southeast

Special Biological Conditions/Activity: Southern Bald Eagle, American Peregrine Falcon, Double Crested Commorant nest in the area

Substrate: Clays and silts

## REGULATORY ENVIRONMENT

Permits: WPDES

Local Sponsor: City of Green Bay

Intended Ultimate Use: Industrial development, marine terminal facility

Continuation of CDF: Bayport

#### HISTORY OF OPERATION

Year Constructed: 1965

Anticipated Fill Date: 1979

No. of Dredge Operations: 15+

Percent Filled: 95

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: In 1977 USACE raised the height of the existing dike from 11 to 14.5 feet

### DREDGED MATERIAL

Source of Dredged Material: Green Bay Harbor

History of Placement in CDF: North central portion used by Wisconsin Public Service Corp. for fly ash disposal; 1985-86, 100,000 cu. yd. deposited in 25 acre site; 1987-88, 250,000 cu. yd. to be placed in west half

Contaminants of Concern: COD, Total Kjeldahl Nitrogen, Oil & Grease, Mercury, Lead, Phosphorus, Arsenic, Chromium, Copper, Cadmium, Cobalt, Nickel, Cyanide and PCBs

Source of Contaminants: Not available

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Phosphorus, Metals, Organics, and PCBs

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Bolles Harbor	Waterway: Lake Er	ie
City: Bolles	County: Monroe	State: MI
Status: Active	Type of CDF: In lake,	adjacent to land

Dike Design: Prepared limestone with clay core, coverstone, steel sheet pile revetments, rubblemound jetty and plastic filter cloth

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling and oil skimmer

Capacity (cubic yards): 335,000

Area (acres): 25.0

Cap Design: None

#### SETTING

Waterway: Lake Erie

Site Diagram: Attached, Bolles Harbor

Description of Setting: Located on flat coastal lands of Lake Erie, situated at the mouth of La Plaisence Creek

Adjacent Land Use: Utility company (Enrico Fermi II nuclear power plant), marina, residential

Special Biological Conditions/Activity: None

Substrate: Lacustrine sand and clay

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Michigan Department of Natural Resources

Intended Ultimate Use: Marina expansion

### HISTORY OF OPERATION

Year Constructed: 1978

Anticipated Fill Date: 1990

Percent Filled: 25

No. of Dredge Operations: 2

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Replaced washed out cover stone, stone rip-rap placed inside where needed

### DREDGED MATERIAL

Source of Dredged Material: Bolles Harbor, La Plaisance Creek to deepwater in Lake Erie

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Copper, Iron, Ammonia Nitrogen, Total Kjeldahl Nitrogen

Source of Contaminants: Septic tanks, agricultural runoff

## MONITORING

Monitoring of Sediment: Pre-dredging core samples taken, analyzed for Nutrients, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Clinton River	Waterway: Clinton	River
City: Mount Clemens	County: Macomb	State: MI
Status: Inactive	Type of CDF: In water,	adjacent to breakwater

Dike Design: Constructed from material dredged from navigation channel of Clinton River, also includes rip-rap

Liner Design: On-site Clay

Dewatering System: None

Effluent Treatment: Natural settling, oil skimmer

Capacity (cubic yards): 370,000

Area (acres): 30.0

Cap Design: Clay

### SETTING

Waterway: Clinton River

Site Diagram: Attached, Clinton River

Description of Setting: At mouth of Clinton River

Adjacent Land Use: Offshore, attached to south breakwater

Special Biological Conditions/Activity: None

Substrate: Lacustrine clay and silt

#### REGULATORY ENVIRONMENT

Permits: Information to be provided Local Sponsor: State of Michigan Intended Ultimate Use: Public access site and MDNR field station Litigation: None

## HISTORY OF OPERATION

Year Constructed: 1978 Anticipated Fill Date: N/A

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Continuation of CDF: Clinton River

Percent Filled: 98

## No. of Dredge Operations: 2

Type of Dredging/Disposal: Mechanical

Modifications/Damage/Repairs: None

#### DREDGED MATERIAL

Source of Dredged Material: Lower portion of Clinton River, eroded banks and agricultural soil erosion

History of Placement in CDF: Not available

Contaminants of Concern: Not available

Source of Contaminants: Red Run, a discharge canal carrying heavy industrial waste loading enters the Clinton River above Mt. Clemens

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Dickinson IslandWaterway: Channels in Lake St. ClairCity: Clay TownshipCounty: St. ClairState: MIStatus: ActiveType of CDF: On island (two sites)

## TECHNICAL SPECIFICATIONS

Dike Design: Earthen clay dikes

Liner Design: None

Dewatering System: Weir overflow with oil skimmer

Effluent Treatment: Natural settling

Capacity (cubic yards): 2,031,000

Area (acres): 174.0

Cap Design: None

## SETTING

Waterway: Lake St. Clair (LSC)

Site Diagram: Attached, Channels in LSC

Description of Setting: North end of Dickenson Island, adjacent to north channel

Adjacent Land Use: Michigan Department of Natural Resources Wildlife area adjacent to the south

Special Biological Conditions/Activity: Acts as a fish spawning area, which consists of a wet prairie habitat that contains rare plants

Substrate: Silty sand

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: No sponsor required, to be acquired by the State of Michigan

Intended Ultimate Use: Will be incorporated into St. Clair Flats Wildlife Area

## HISTORY OF OPERATION

Year Constructed: 1976

Anticipated Fill Date: 1990

Percent Filled: 48 No. of Dredge Operations: 10

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: None

### DREDGED MATERIAL

Source of Dredged Material: Channels in Lake St. Clair

History of Placement in CDF: Not available

Contaminants of Concern: Ammonia Nitrogen, Total Kjeldahl Nitrogen, Lead, Arsenic, Magnesium, Mercury

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Wells monitored, dredge discharge, weir overflow, mixing zone, upstream, downstream

Locations of Monitor Wells: Wells in dike perimeter

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Erie Pier	Waterway: Duluth-Superior Harbor, Lake Superior
City: Duluth	County: St. Louis State: MN
Status: Active	Type of CDF: In lake adjacent to land

Dike Design: Constructed of on site material and dredged material with stone rip-rap with a 300 foot steel bulkhead on southeast side

Liner Design: None

Dewatering System: None

Effluent Treatment: None, no outlet for effluent

Capacity (cubic yards): 1,100,000

Area (acres): 82.0

Cap Design: None

#### SETTING

Waterway: Duluth-Superior Harbor, Lake Superior

Site Diagram: Attached, Duluth-Superior

Description of Setting: Located in west Duluth at about 45th Avenue W. at Erie Pier

Adjacent Land Use: Bounded to northwest by Burlington Northern Railyard, marsh and shallow open water on northeast, and St. Louis River to southeast and southwest

Special Biological Conditions/Activity: None

Substrate: Soft organic bottom sediments

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: City of Duluth and Seaway Port Authority of Duluth

Intended Ultimate Use: Recreational

HISTORY OF OPERATION

Year Constructed: 1979

Anticipated Fill Date: 1993

Percent Filled: 65

No. of Dredge Operations: 10+

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Type of Dredging/Disposal: Mechanical

Modifications/Damage/Repairs: None

## DREDGED MATERIAL

Source of Dredged Material: Duluth-Superior Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Oil & Grease, Phosphorus, Arsenic, Manganese, Lead, Zinc, Ammonia Nitrogen

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Frankfort HarborWaterway: Lake MichiganCity: Crystal Lake TownshipCounty: BenzieState: MIStatus: ActiveType of CDF: Upland

## TECHNICAL SPECIFICATIONS

Dike Design: No dikes required

Liner Design: None

Dewatering System: None

Effluent Treatment: None

Capacity (cubic yards): 70,000

Area (acres): 80.0

Cap Design: Site to be seeded when completed

## SETTING

Waterway: Lake Michigan

Site Diagram: Attached

Description of Setting: Fife Lake State Resort located 15 miles southeast of Frankfort off Hwy M-115

Adjacent Land Use: Cherry orchards

Special Biological Conditions/Activity: None

Substrate: Sand and gravel

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Cherry orchard

Litigation: None

#### HISTORY OF OPERATION

Year Constructed: N/A

Anticipated Fill Date: N/A

Continuation of CDF: Frankfort Harbor

Percent Filled: 100

No. of Dredge Operations: 1

Type of Dredging/Disposal: Mechanical

Modifications/Damage/Repairs: None

DREDGED MATERIAL

Source of Dredged Material: Frankfort Harbor

History of Placement in CDF: Not used to date

Contaminants of Concern: Total Kjeldahl Nitrogen, Ammonia Nitrogen, Manganese, Barium, Phosphorus, Oil & Grease

Source of Contaminants: Agricultural runoff

#### MONITORING

Monitoring of Sediment: None

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Comments: This site was selected by the contractor

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Name of CDF: Grassy Island	Waterway: Detroit	River
City: Wyandotte	County: Wayne	State: MI
Status: Inactive	Type of CDF: CDF isla	nd adjacent to nav. channel

Dike Design: Sand and clay dikes

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): 1,900,000

Area (acres): 80.0

Cap Design: None

### SETTING

Waterway: Detroit River

Site Diagram: Attached, Detroit River

Description of Setting: East of city of Wyandotte in Detroit River abutting U.S. border with Ontario Canada

Adjacent Land Use: Wyandotte National Wildlife Refuge

Special Biological Conditions/Activity: Used by wintering ducks including scaup, redheads, canvasbacks, mergansers

Substrate: Glacial sandy till and soil

### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: U.S. Fish and Wildlife Service owns land; no sponsor

Intended Ultimate Use: Wildlife Area

Continuation of CDF: Grassy Island

## HISTORY OF OPERATION

Year Constructed: 1960 Anticipated Fill Date: 1984

Percent Filled: 100 No. of Dredge Operations: 9+

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: Dike raised in 1960's, capacity expanded in 1971, currently planning stone rip-rap and filter cloth on outer face

### DREDGED MATERIAL

Source of Dredged Material: Detroit and Rouge Rivers

History of Placement in CDF: Disposal Site for Rouge River sediments dredged annually from 1965 to 1984

Contaminants of Concern: Oil & Grease, Copper, Cadmium, Chromium, Mercury, Lead, Ammonia Nitrogen, and Zinc

Source of Contaminants: Heavy industry including steel and automobile manufacture

### MONITORING

Monitoring of Sediment: Pre-dreging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Dredge discharge, weir overflow, mixing zone, upstream, downstream

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: Chlorinated benzene uptake in earthworms (USFWS)

Dye Tests: None

Other Studies: None

Name of CDF: Harbor Island	Waterway: Grand Haven	h Harbor, Lake Michigan
City: Grand Haven	County: Ottawa	State: MI
Status: Active	Type of CDF: Upland, on i	sland in Grand River

Dike Design: Earthen clay berm Liner Design: None Dewatering System: Weir overflow Effluent Treatment: Natural settling and oil skimmer Capacity (cubic yards): 310,000 Area (acres): 36.0 Cap Design: None

## SETTING

Waterway: Grand Haven Harbor, Lake Michigan Site Diagram: Attached, Grand Haven Harbor Description of Setting: An existing land fill area on Harbor Island Adjacent Land Use: Generating plant, Shell Oil tank farm, marshland Special Biological Conditions/Activity: None Substrate: Sandy till

## REGULATORY ENVIRONMENT

Permits: Information to be provided Local Sponsor: State of Michigan Intended Ultimate Use: Public use Litigation: None

## HISTORY OF OPERATION

Year Constructed: 1974

Anticipated Fill Date: 1985

Percent Filled: 97

No. of Dredge Operations: 10

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: Raised exterior on dike

DREDGED MATERIAL

Source of Dredged Material: Grand Haven Harbor

History of Placement in CDF: Dredged material placed annually from 1978 through 1986

Contaminants of Concern: Arsenic, Chromium, Copper, Lead, Nickel, Zinc, Ammonia Nitrogen

Source of Contaminants: Untreated or partially treated domestic and industrial waste, agricultural and urban runoff

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Routine monitoring of dredge discharge, weir overflow, mixing zone, upstream and downstream. Adjacent waterway monitored by the EPA.

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Harsen's Island	Waterway: St. Clair	River
City: Algonac	County: St. Clair	State: MI
Status: Inactive	Type of CDF: Upland	

Dike Design: Clay dikes

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): 100,000

Area (acres): 17.2

Cap Design: Will be restored to former soil level and revegetated by State of Michigan

#### SETTING

Waterway: St. Clair River

Site Diagram: Attached, Channels in LSC

Description of Setting: Located on Harsen's Island at the mouth of the St. Clair River at the North end of Lake St. Clair (LSC). The northwest margin of the island is near the middle channel of St. Clair Flats Wildlife Area

Adjacent Land Use: Wildlife habitat, Mid Channel Golf Club to the north, marsh to the south, middle channel to the west

Special Biological Conditions/Activity: Acts as a major migration stop-over point for swans, ducks, coots, rails, jacksnipe and blue heron

Substrate: Sandy loam

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Revegetated upland nesting habitat for waterfowl

### HISTORY OF OPERATION

Year Constructed: 1975

Percent Filled: 100

Anticipated Fill Date: N/A

No. of Dredge Operations: 4

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: None

### DREDGED MATERIAL

Source of Dredged Material: Navigation channel in the St. Clair River

History of Placement in CDF: Last used in 1980, sand from the site will be used to repair dikes along Muscamoot Bay shoreline

Contaminants of Concern: Not available

Source of Contaminants: Not available

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Inland Rte-Crooked Riv Waterway: Crooked River

City: Brutus County: Emmet State: MI

Status: Active Type of CDF: Upland

## TECHNICAL SPECIFICATIONS

Dike Design: Earthen dike using on site materials

Liner Design: None

Dewatering System: None

Effluent Treatment: None

Capacity (cubic yards): 19,500

Area (acres): 9.0

Cap Design: None

## SEITTING

Waterway: Crooked River

Site Diagram: Attached, Inland Route

Description of Setting: North of Crooked River near outlet into Burt Lake, open fields in Hardwood State Forest operated by Michigan Dept. of Natural Resources

Adjacent Land Use: Residential and recreational

Special Biological Conditions/Activity: None

Substrate: Sandy soil

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: N/A

Continuation of CDF: Inland Rte-Crooked Riv

HISTORY OF OPERATION

Year Constructed: 1982

Anticipated Fill Date: 1992

Percent Filled: 32

No. of Dredge Operations: 1

Type of Dredging/Disposal: Mechanical

Modifications/Damage/Repairs: None

#### DREDGED MATERIAL

Source of Dredged Material: Crooked River navigational channel

History of Placement in CDF: 9 inches inches of dredged material initially deposited and seeded; 9,500 cu. yds. to be added in 5 years and 5,000 cu. yds. to be added in 10 years

Contaminants of Concern: COD, Total Kjeldahl Nitrogen, Lead, Barium

Source of Contaminants: Agricultural runoff

### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Kawkawlin RiverWaterway: Kawkawlin River, Lake MichiganCity: KawkawlinCounty: BayState: MIStatus: InactiveType of CDF: Upland

## TECHNICAL SPECIFICATIONS

Dike Design: Clay and sand berm

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): N/A

Area (acres): N/A

Cap Design: None

#### SETTING

Waterway: Kawkawlin River, Lake Michigan

Site Diagram: Attached, Saginaw River

Description of Setting: East bank of Kawkawlin River near mouth at Saginaw Bay

Adjacent Land Use: N/A

Special Biological Conditions/Activity: None

Substrate: Sandy loam

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Bay County, MI

Intended Ultimate Use: N/A

Litigation: None

## HISTORY OF OPERATION

Year Constructed: N/A

Anticipated Fill Date: N/A

Continuation of CDF: Kawkawlin River

Percent Filled: 100

No. of Dredge Operations: 1

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: None

DREDGED MATERIAL

Source of Dredged Material: Mouth of Kawkawlin River

History of Placement in CDF: Not available

Contaminants of Concern: Total Kjeldahl Nitrogen, Ammonia Nitrogen, Arsenic, Zinc

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples taken, specific tests include PCB Aroclor, TOC, Particle size, Density

Water Quality Monitoring: Routine monitoring at dredge discharge, weir overflow, mixing zone, upstream and downstream

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Kenosha	Waterway: Kenosha Harl	oor, Lake Michigan
City: Kenosha	County: Kenosha	State: WI

Status: Active Type of CDF: In water, adjacent to land

#### TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound construction with sheet pile cutoff wall and graded filter core

Liner Design: None

Dewatering System: Through dike core and filter cell

Effluent Treatment: Natural settling and filtration through dike and filter cell

Capacity (cubic yards): 750,000

Area (acres): 32.0

Cap Design: None

### SETTING

Waterway: Kenosha Harbor, Lake Michigan

Site Diagram: Attached, Kenosha Harbor

Description of Setting: In Lake Michigan adjacent to shore, south of mouth of Pike Creek

Adjacent Land Use: Simmons Island Park, Kenosha Harbor, American Motors Corporation, Morelli Export Company and Wolfenbuttel Park

Special Biological Conditions/Activity: None

Substrate: Lacustrine clay and sand

## REGULATORY ENVIRONMENT

Permits: WPDES

Local Sponsor: City of Kenosha

Intended Ultimate Use: To be developed as a public recreation area

Continuation of CDF: Kenosha

## HISTORY OF OPERATION

Year Constructed: 1975

Percent Filled: 66

No. of Dredge Operations; 6

Anticipated Fill Date: 1990

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: Leaks repaired in 1984. In 1986 prepared limestone placed on leaking sections of dike

### DREDGED MATERIAL

Source of Dredged Material: Racine and Kenosha Harbors

History of Placement in CDF: Not available

Contaminants of Concern: COD, Oil & Grease, Ammonia Nitrogen, Total Kjeldahl Nitrogen, Lead, Manganese and Zinc

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Dredge discharge, inside dike near filter cells, mixing zone, open water, 3 lake sites adjacent to wells, 3 dike wells

Locations of Monitor Wells: 3 in dike

SPECIAL STUDIES

Biological Studies: None

Dye Tests: Integrity test 1984

Other Studies: None

Comments: Several areas of high permeability noted in 1984 dye test

Name of CDF: Kewaunee	Waterway: Kewaunee Harbor, Lake Michigan
City: Kewaunee	County: Kewaunee State: WI
Status: Active	Type of CDF: In lake, adjacent to land

Dike Design: Prepared limestone core with cover stone and a filter discharge cell, rip-rap for wave protection

Liner Design: None

Dewatering System: Through dike core and four filter cells

Effluent Treatment: Natural settling and filtration through filter cells

Capacity (cubic yards): 500,000

Area (acres): 28.0

Cap Design: None

## SETTING

Waterway: Kewaunee Harbor, Lake Michigan

Site Diagram: Attached, Kewaunee Harbor

Description of Setting: Located on Lake Michigan adjacent to shore and breakwater, north of Kewaunee River mouth

Adjacent Land Use: Agricultural and open land

Special Biological Conditions/Activity: None

Substrate: Sandy silt

## REGULATORY ENVIRONMENT

Permits: WPDES

Local Sponsor: City of Kewaunee

Intended Ultimate Use: Recreational facility

### HISTORY OF OPERATION

Year Constructed:1982Anticipated Fill Date:1992Percent Filled:57No. of Dredge Operations:4

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: Sand and clay placed in leak areas in 1984

#### DREDGED MATERIAL

Source of Dredged Material: Kewaunee Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Total Kjeldahl Nitrogen, Ammonia Nitrogen

Source of Contaminants: Agricultural runoff

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Three wells in dike monitored, dredge discharge, mixing zone, two open water sites, one inside CDF near filter cell

Locations of Monitor Wells: 3 in dike, 1 in filter cell

### SPECIAL STUDIES

Biological Studies: Chlorinated benzene uptake in earthworms (USFWS)

Dye Tests: Integrity test conducted in May 1985

Other Studies: None

Comments: May 1985 dye test showed that seepage occurred as designed except at two spots
Name of CDF: Kidney Island	Waterway: Green Bay	Harbor, Lake Michigan
City: Green Bay	County: Door	State: WI

Status: Active Type of CDF: In water, island

#### TECHNICAL SPECIFICATIONS

Dike Design: Rubblemound with steel sheet pile cutoff wall and filterstone core

Liner Design: None

Dewatering System: Through core and filter cell discharge

Effluent Treatment: Natural settling and filtration

Capacity (cubic yards): 1,200,000

Area (acres): 60.0

Cap Design: None

#### SETTING

Waterway: Green Bay Harbor, Lake Michigan

Site Diagram: Attached, Green Bay Harbor

Description of Setting: Kidney-shaped island in Green Bay about 800 feet offshore and immediately northwest of Bay Beach Park

Adjacent Land Use: Green Bay Harbor

Special Biological Conditions/Activity: None

Substrate: Lacustrine sandy silt

### REGULATORY ENVIRONMENT

Permits: WPDES

Local Sponsor: City of Green Bay

Intended Ultimate Use: Wildlife habitat

Litigation: Litigation involving proposed expansion

## HISTORY OF OPERATION

Year Constructed: 1979

Anticipated Fill Date: 1986

Percent Filled: 97

No. of Dredge Operations: 12

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: None

## DREDGED MATERIAL

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Source of Dredged Material: Fox River and Grassy Island Channels

History of Placement in CDF: Not available

Contaminants of Concern: Total Volatile Solids, COD, Oil & Grease, Cyanide, Phosphorus, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Copper, Lead, Mercury, Zinc, Arsenic, Chromium, Nickel, Total PCB's

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Routine monitoring at dredge discharge, standing water inside CDF near filter cells, wells in dike, mixing zone, open water

Locations of Monitor Wells: Two wells in dike, one well in filter cell

#### SPECIAL STUDIES

Biological Studies: Bird monitoring (FWS) and plant survey (UWGB)

Dye Tests: None

Other Studies: None

Name of CDF: Manitowoc Harbor	Waterway: Lake Michie	gan	
City: Manitowoc	County: Manitowoc	State:	WI
Status: Active	Type of CDF: In water		

Dike Design: Rubblemound with steel sheet pile cutoff wall and filter stone core covered by filtercloth

Liner Design: None

Dewatering System: Through core and filter cell discharge

Effluent Treatment: Natural settling, filtration

Capacity (cubic yards): 800,000

Area (acres): 24.0

Cap Design: None

## SETTING

Waterway: Lake Michigan

Site Diagram: Attached, Manitowoc Harbor

Description of Setting: Located immediately north of the north breakwater at Manitowoc Harbor at the mouth of Manitowoc River

Adjacent Land Use: Manitowoc Harbor, Small Boat Harbor

Special Biological Conditions/Activity: None

Substrate: Lacustrine clay and sand

#### REGULATORY ENVIRONMENT

Permits: WPDES

Local Sponsor: City of Manitowoc

Intended Ultimate Use: Marina and lakefront park

Continuation of CDF: Manitowoc Harbor

## HISTORY OF OPERATION

Year Constructed: 1975 Anticipated Fill Date: 1992

Percent Filled: 61

No. of Dredge Operations: 8

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Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: Leaks sealed

#### DREDGED MATERIAL

Source of Dredged Material: Manitowoc and Two Rivers Harbors

History of Placement in CDF: 600,000 cu. yds. from Manitowoc, 200,000 cu. yds. from Two Rivers

Contaminants of Concern: COD, Ammonia Nitrogen, Total Kjeldahl Nitrogen

Source of Contaminants: Not available

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Routine monitoring of standing water inside CDF near filter cells, wells in dike walls, mixing zone, open water

Locations of Monitor Wells: Two wells in dike wall, one in filter cell

SPECIAL STUDIES

Biological Studies: None

Dye Tests: Integrity test conducted in 1984

Other Studies: None

Name of CDF: Milwaukee	Waterway: Milwaukee Harbor, Lake Michigan
City: Milwaukee	County: Milwaukee State: WI
Status: Active	Type of CDF: In lake, adjacent to land

Dike Design: Sand filter with limestone core and coverstone on granular fill; south dike steel sheet pile bulkhead

Liner Design: None

Dewatering System: Through dike core and filter cell discharge

Effluent Treatment: Natural settling

Capacity (cubic yards): 1,600,000

Area (acres): 44.0

Cap Design: None

#### SETTING

Waterway: Milwaukee Harbor, Lake Michigan

Site Diagram: Attached, Milwaukee Harbor

Description of Setting: At the south end of Milwaukee Harbor

Adjacent Land Use: Milwaukee Harbor to the north and east, petroleum tank farms to the west, flushing tunnel intake to the south

Special Biological Conditions/Activity: None

Substrate: Lacustrine sands and clays

#### REGULATORY ENVIRONMENT

Permits: WPDES

Local Sponsor: City of Milwaukee

Intended Ultimate Use: None

## HISTORY OF OPERATION

Year Constructed: 1975 Anticipated Fill Date: 1990

Percent Filled: 44

No. of Dredge Operations: 9+

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: Filter cloth damaged by covering it with concrete

#### DREDGED MATERIAL

Source of Dredged Material: Milwaukee and Port Washington harbors

History of Placement in CDF: Not available

Contaminants of Concern: Arsenic, Lead, Cadmium, Copper, Chromium, Zinc, Oil & Grease, Ammonia Nitrogen, Total Kjeldahl Nitrogen, Cyanide, Phosphorus, COD

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Wells monitored

Locations of Monitor Wells: In dike, one in filter cell

## SPECIAL STUDIES

Biological Studies: Chlorinated benzene uptake in earthworms (USFWS)

Dye Tests: Integrity test conducted in 1984

Other Studies: None

Comments: The 1984 dye test showed a 90% uniform seepage through dike walls and filter cells

Name of CDF:	Monroe (Edison)	Waterway: Monroe	Harbor, Lake Erie
City: Monroe		County: Monroe	State: MI

Status: Inactive Type of CDF: Upland

## TECHNICAL SPECIFICATIONS

Dike Design: Pre-existing containment facility on Detroit Edison property, earthen berms with clay on filled side

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): N/A

Area (acres): 43.0

Cap Design: None

#### SETTING

Waterway: Lake Erie

Site Diagram: Attached, Monroe Harbor

Description of Setting: Site located to south of Raisin River on shore of Lake Erie

Adjacent Land Use: Landfill and fly ash disposal sites, Detroit Edison coal fired plant, Consolidated Paper Co. mill, Ford Motor Co., Union Camp paper mill

Special Biological Conditions/Activity: Habitat for the American Lotus (Water Lily), an endangered species in Michigan

Substrate: Sandy silt

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Not applicable--private site

Intended Ultimate Use: Detroit Edison

Continuation of CDF: Monroe (Edison)

HISTORY OF OPERATION

Year Constructed: N/A

Anticipated Fill Date: 1984

Percent Filled: 100

No. of Dredge Operations: 8

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: None

## DREDGED MATERIAL

Source of Dredged Material: Monroe Harbor and Channel

History of Placement in CDF: Not available

Contaminants of Concern: COD, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Oil & Grease, Lead, Zinc, Phosphorus, Manganese, Nickel, Arsenic, Copper, Cadmium, Chromium, Magnesium

Source of Contaminants: Paper mills, shipping, seepage from ash pits

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Dredge discharge, Edison CDF discharge, four sites in lagoon, Edison Lagoon Weir

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Comments: The USACE dredged this site under contract for Detroit Edison; this is not a USACE-managed CDF

Name of CDF: Monroe	(Sterling Park) Waterway: Monroe 1	Harbor, Lake Erie
City: Monroe	County: Monroe	State: MI
Status: Active	Type of CDF: In lake,	adjacent to land

Dike Design: Prepared limestone core with grouted mattress cover on fill side and stone rip-rap on lake side

Liner Design: Two feet of bentonite and granular fill

Dewatering System: Weir overflow and filter cell discharge

Effluent Treatment: Natural settling and filtration

Capacity (cubic yards): 4,200,000

Area (acres): 89.0

Cap Design: None

## SETTING

Waterway: Monroe Harbor, Lake Michigan

Site Diagram: Attached, Monroe Harbor

Description of Setting: North end of Sterling State Park along shoreline of intermittent marshes

Adjacent Land Use: Sterling State Park to the south and west, Lake Erie to the east, a river to the north

Special Biological Conditions/Activity: None

Substrate: Sand and silt

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Nature and wildlife area

Continuation of CDF: Monroe (Sterling Park)

HISTORY OF OPERATION

Year Constructed:	1986	Anticipated Fill Date: 1995
Percent Filled:	0	No. of Dredge Operations: 2

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Plan to repair cover stone displaced from cell #1

DREDGED MATERIAL

Source of Dredged Material: Monroe Harbor

History of Placement in CDF: Dredged material placed annually

Contaminants of Concern: Copper, Cyanide, Lead, Manganese, Nickel, Zinc, Ammonia Nitrogen

Source of Contaminants: Not Available

#### MONITORING

Monitoring of Sediment: Pre-dreging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: Integrity test of cell # 2 in 1985

Other Studies: Leakage from cell # 1 monitored in 1985

Name of CDF: Pointe Moui	llee Waterway: Lake Erie		
City: Rockwood	County: Monroe	State:	MI

Status: Active Type of CDF: In lake, Island

## TECHNICAL SPECIFICATIONS

Dike Design: Prepared limestone and/or clay core and cover stone, consists of five cells

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): 18,640,000

Area (acres): 700.0

Cap Design: None

## SETTING

Waterway: Lake Erie

Site Diagram: Attached, Detroit River

Description of Setting: Barrier island off flooded wetlands at mouth of Huron River

Adjacent Land Use: Pointe Mouillee Game Area

Special Biological Conditions/Activity: Contamination of fish and wildlife from Detroit River is documented

Substrate: Sandy silt, organic humus

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Hunting, fishing and marsh reclamation

Continuation of CDF: Pointe Mouillee

#### HISTORY OF OPERATION

Year Constructed: 1979

Percent Filled: 38 No. of Dredge Operations: 20+

Type of Dredging/Disposal: Hydraulic and mechanical

Modifications/Damage/Repairs: Interior stone repaired, repair of inner dike adjacent to State Game Area with clay backing

Anticipated Fill Date: 1993

#### DREDGED MATERIAL

Source of Dredged Material: Detroit and Rouge Rivers

History of Placement in CDF: Detroit River dredge spoils placed in cells 1,2,5; Rouge River dredge spoils placed in cell 5; dredged material placed annually

Contaminants of Concern: Cyanide, Arsenic, Mercury, PCB, DDT, Chlordane, Chlorinated Benzenes, Octachlorostyrene, Dioxins, Dibenzofurans, Copper, Cadmium, Lead, Oil & Grease

Source of Contaminants: Not available

#### MONITORING

Monitoring of Sediment: Samples tested for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Routine water quality monitoring of dredge discharge, weir overflow, mixing zone, upstream downstream and one open water site

Locations of Monitor Wells: None

#### SPECIAL STUDIES

Biological Studies: Chlorinated benzene uptake in earthworms (USFWS) from cells 1 & 2. In cells 3, 4, & 5 no earthworms were found in Spring 1987

Dye Tests: None

Other Studies: None

Name of CDF: Port Sanilac Village	Waterway: Lake Huron		
City: Port Sanilac	County: Sanilac	State:	MI
Status: Inactive Ty	/pe of CDF: Upland		

Dike Design: Raised berm using on-site materials with clay cover on berms Liner Design: None Dewatering System: None Effluent Treatment: None Capacity (cubic yards): 143,300 Area (acres): 13.0 Cap Design: None

## SETTING

Waterway: Lake Huron Site Diagram: Attached, Port Sanilac Description of Setting: Hillside area Adjacent Land Use: Countryside Special Biological Conditions/Activity: None Substrate: Glacial sandy till

## REGULATORY ENVIRONMENT

Permits: Information to be provided Local Sponsor: Village of Port Sanilac Intended Ultimate Use: Municipal landfill Litigation: None

# HISTORY OF OPERATION Year Constructed: 1979 Anticipated Fill Date: 1983

Continuation of CDF: Port Sanilac Village

Percent Filled: 100

No. of Dredge Operations: 1

Type of Dredging/Disposal: Mechanical

Modifications/Damage/Repairs: None

DREDGED MATERIAL

Source of Dredged Material: Port Sanilac Harbor

History of Placement in CDF: Not available

Contaminants of Concern: Total Kjeldahl Nitrogen, COD, PCB Aroclors

Source of Contaminants: Agricultural runoff

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Riverview	Waterway: Holland	Harbor, Lake Michigan
City: Holland	County: Allegan	State: MI
Status: Active	Type of CDF: In water.	adjacent to land

Dike Design: Earthen clay dike with four foot bentonite slurry wall

Liner Design: None

Dewatering System: Weir overflow, in 1982 interior underdrain system added

Effluent Treatment: Natural settling with oil skimmer

Capacity (cubic yards): 120,000

Area (acres): 11.0

Cap Design: None

## SETTING

Waterway: Holland Harbor, Lake Michigan

Site Diagram: Attached, Holland Harbor

Description of Setting: N/A

Adjacent Land Use: Located near a city utility facility, waste treatment plant and a commercial radio station

Special Biological Conditions/Activity: None

Substrate: Lacustrine sands and clays

REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: City of Holland

Intended Ultimate Use: Park and government service center

Litigation: None

HISTORY OF OPERATION

Year Constructed: 1978

Anticipated Fill Date: N/A

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Continuation of CDF: Riverview

Percent Filled: 84

No. of Dredge Operations: 4

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: In 1982 an interior underdrain system added for dewatering

DREDGED MATERIAL

Source of Dredged Material: A shipping channel within Lake Macatawa and the Black River

History of Placement in CDF: Not available

Contaminants of Concern: COD, Ammonia, Nitrogen, Iron and Cadmium

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Dredge discharge, weir overflow, mixing zone, upstream, downstream

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Saginaw	Waterway: Saginaw	Harbor, Lake Michigan	
City: Bay City	County: Bay	State: MI	
Status: Active	Type of CDF: In lake,	island adjacent to nav. channel	l

Dike Design: Prepared limestone dike with coverstone

Liner Design: None

Dewatering System: Two discharge weirs with oil skimmers

Effluent Treatment: Natural settling

Capacity (cubic yards): 10,000,000

Area (acres): 283.0

Cap Design: Heavily polluted sediments (PCB contamination) capped with less polluted sediments

## SEITING

Waterway: Saginaw River, Lake Huron

Site Diagram: Attached, Saginaw River

Description of Setting: Located near Shelter and Channel Islands North-northeast of the mouth of the Saginaw River in Saginaw Bay

Adjacent Land Use: Boating and fishing

Special Biological Conditions/Activity: Aquatic wildlife includes perch/alewife/spottail shiner/bluntnose shiner, nesting area-caspian/common terms

Substrate: Lacustrine sands and silts

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Wildlife habitat

#### HISTORY OF OPERATION

Year Constructed: 1978

Anticipated Fill Date: 1990

Percent Filled: 48

No. of Dredge Operations: 10+

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Added grout filled mattress to eroded areas 1979 and 1980. Repairs to dike scheduled for Fall 1987

## DREDGED MATERIAL

Source of Dredged Material: Navigation channel in Saginaw River

History of Placement in CDF: Dredged material placed annually

Contaminants of Concern: Total Volatiles, Ammonia Nitrogen, Total Kjeldahl Nitrogen, Phosphorus, Arsenic, Copper, Chromium, Lead, Manganese, Nickel, Zinc, PCBs

Source of Contaminants: Domestic and industrial wastes, effluents from Saginaw and Bay City sewage treatment plant, agricultural and stornwater runoff

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

#### SPECIAL STUDIES

Biological Studies: Chlorinated benzene uptake in earthworms (USFWS), study to determine biologic uptake of contaminants outside dike walls (1987)

Dye Tests: None

Other Studies: FWS/COE/EPA CDF leakage study

Name of CDF: Sebewaing	Waterway: Sebewain	g River, Lake Huron
City: Sebewaing	County: Huron	State: MI
Status: Active	Type of CDF: Upland	

Dike Design: Dike with clay core, stone rip-rap over filter cloth, steel sheet piling

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling and oil skimmer

Capacity (cubic yards): 84,000

Area (acres): 9.0

Cap Design: None

## SETTING

Waterway: Sebewaing River, Lake Huron

Site Diagram: Attached, Sebewaing River

Description of Setting: Near Sebewaing Airport on eastern edge of Saginaw Bay

Adjacent Land Use: Sebewaing County Airport, wetlands

Special Biological Conditions/Activity: Waterfowl nesting habitat

Substrate: Glacial till and wetland organic debris

#### REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Extension of Sebewaing County Airport runway and wildlife habitat

Continuation of CDF: Sebewaing

## HISTORY OF OPERATION

Year Constructed: 1979 Anticipated Fill Date: 1989

Percent Filled: 54 No. of Dredge Operations: 2

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: 1987, repairs to west and north dike walls

DREDGED MATERIAL

Source of Dredged Material: Sebewaing Harbor & River

History of Placement in CDF: Not available

Contaminants of Concern: COD, Total Kjeldahl Nitrogen, Phosphorus, Ammonia Nitrogen

Source of Contaminants: Agricultural runoff

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Comments: None

Name of CDF: VerplankWaterway: Grand Haven HarborCity: Grand HavenCounty: OttawaState: MIStatus: InactiveType of CDF: Upland, adjacent to Grand River

TECHNICAL SPECIFICATIONS

Dike Design: Earthen clay berm

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: Natural settling and oil skimmer

Capacity (cubic yards): 134,000

Area (acres): 19.0

Cap Design: None

#### SEITING

Waterway: Grand Haven Harbor, Lake Michigan

Site Diagram: Attached, Grand Haven Harbor

Description of Setting: Located on Grand River opposite Harbor Island

Adjacent Land Use: Verplank Coal & Dock Company, Murphy Oil Corporation and Atlantic Richfield Company

Special Biological Conditions/Activity: None

Substrate: Silt

REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: Verplank Coal & Dock Company

Intended Ultimate Use: Not available

Litigation: None

HISTORY OF OPERATION

Year Constructed: 1974

Anticipated Fill Date: N/A

Continuation of CDF: Verplank

Percent Filled: 100

No. of Dredge Operations: 4

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: None

DREDGED MATERIAL

Source of Dredged Material: Grand Haven Harbor

History of Placement in CDF: Dredged material last placed in 1977

Contaminants of Concern: Phosphorus, Oil & Grease, Total Kjeldahl Nitrogen, COD

Source of Contaminants: Untreated or partially treated domestic and industrial wastes, agricultural and urban runoff and shipping traffic

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: None

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: WhirlpoolWaterway: St. Joseph HarborCity: Benton HarborCounty: BerrienState: MIStatus: Interim FacilityType of CDF: Upland, adjacent to river

TECHNICAL SPECIFICATIONS

Dike Design: Clay dikes

Liner Design: Impermeable plastic

Dewatering System: Weir overflow

Effluent Treatment: Natural settling

Capacity (cubic yards): 25,000

Area (acres): 14.0

Cap Design: None

## SEITING

Waterway: Paw Paw River

Site Diagram: Attached, St. Joseph River

Description of Setting: Located on Whirlpool Corporation land on the east bank of the Paw Paw River at the juncture with the St. Joseph River

Adjacent Land Use: Industrial, Whirlpool Corporation

Special Biological Conditions/Activity: None

Substrate: Glacial sandy till

REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: N/A

Litigation: None

HISTORY OF OPERATION

Year Constructed: 1978

Anticipated Fill Date: N/A

Continuation of CDF: Whirlpool

Percent Filled: 100

No. of Dredge Operations: 8

Type of Dredging/Disposal: Mechanical and hydraulic

Modifications/Damage/Repairs: Raised dikes

DREDGED MATERIAL

Source of Dredged Material: St. Joseph Harbor

History of Placement in CDF: Material placed annually until filled

Contaminants of Concern: Arsenic, Cadmium, Copper, Lead, Manganese, Zinc, Total Kjeldahl Nitrogen

Source of Contaminants: Not available

## MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Routine monitoring at dredge discharge, weir overflow, mouth of drainage pipe, mixing zone, upstream and downstream

Locations of Monitor Wells: None

SPECIAL STUDIES

Biological Studies: None

Dye Tests: None

Other Studies: None

Name of CDF: Windmill IslandWaterway: Holland Harbor, Lake MichiganCity: HollandCounty: OttawaState: MIStatus: InactiveType of CDF: Upland, adjacent to the Black River

TECHNICAL SPECIFICATIONS

Dike Design: Earthen clay dike

Liner Design: None

Dewatering System: Weir overflow

Effluent Treatment: None

Capacity (cubic yards): 160,000

Area (acres): 16.0

Cap Design: None

## SETTING

Waterway: Black River

Site Diagram: Attached, Holland Harbor

Description of Setting: On Windmill Island in Black River, northeast of Holland

Adjacent Land Use: Surrounded by the Black River and marsh

Special Biological Conditions/Activity: None

Substrate: Sand and silt

## REGULATORY ENVIRONMENT

Permits: Information to be provided

Local Sponsor: State of Michigan

Intended Ultimate Use: Park facility

Litigation: None

HISTORY OF OPERATION

Year Constructed: 1978

Anticipated Fill Date: 1988

Continuation of CDF: Windmill Island

Percent Filled: 100

No. of Dredge Operations: 2

Type of Dredging/Disposal: Hydraulic

Modifications/Damage/Repairs: Weir added after construction to allow for hydraulic disposal

#### DREDGED MATERIAL

Source of Dredged Material: Shipping channel within Lake Macatawa and Black River

History of Placement in CDF: Site filled in 1984

Contaminants of Concern: COD, Ammonia Nitrogen, Iron, Cadmium

Source of Contaminants: Direct industrial discharge, municipal wave ewater treatment plant discharge, urban and rural runoff

#### MONITORING

Monitoring of Sediment: Pre-dredging core samples analyzed for Total Kjeldahl Nitrogen, Ammonia Nitrogen, Phosphorus, Metals, Organics

Water Quality Monitoring: Routine monitoring of dredge discharge, weir overflow, mixing zone, upstream and downstream

Locations of Monitor Wells: None

SPECIAL STUDIES

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Biological Studies: None

Dye Tests: None

Other Studies: None

Appendix B

## Design Information

Buffalo District

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**TYPICAL SECTION - RUBBLE MOUND ALTERNATE** 

Dike #4 (Buffalo)



DIKED DISPOSAL AREAS FOR HARBOR DREDGINGS BUFFALO, NEW YORK SITE PLAN-SITE 4 B-5



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ERIE CONFINED DISPOSAL FACILITY



## ERIE CONFINED DISPOSAL FACILITY




HURON CONFINED DISPOSAL FACILITY



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Chicago District

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CHICAGO CONFINED DISPOSAL FACILITY



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USE 0 - 2300' FROM SHORELINE BASELINE "ITH TRANSITIONS FACH END

plate no. 5

Chicago

# DUAL WELL INSTALLATION







Detroit District





Bayport (Green Ba





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Clinton River

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Clinton River





CROOKED RIVER CONFINED DISPOSAL FACILITY

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DISPOSAL FACILITY PLAN SCALE: 1"= 75"

LEGEND.

----- UNPAVED ROAD





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DICKENSON ISLAND CDF





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Grassy Is.





Harbor Is. (Grand Haven)



### **KENOSHA CDF**

**DIKE CROSS SECTION** 



LEGEND

TYPE "A" STONE = 10 to 16 TONS 75% to WEIGH MORE THAN 13 TONS TYPE "B" BEDDING STONE = SAME AS "F" STONE TYPE "C" STONE = CORE STONE 3 LBS to 130 LBS TYPE "F" STONE = CORE STONE 1 LB to 50 LBS TYPE "H" 60% to 75% TYPE F & FILTER SAND

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## **KENOSHA CDF**

### FILTER CELL CROSS SECTION



Kenosha (& Manitowoc)







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### KEWAUNEE CDF DIKE CROSS SECTION

DISPOSAL SIDE

LAKE SIDE





### **KEWAUNEE CDF** FILTER CELL CROSS SECTION



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# MANITOWOC CDF WEST DIKE CROSS SECTION





D-STONE 200 TO 400 LBS. AVG. 300 LBS. E- II 50 LBS. TO CHIPS F II 60 % TO 75 % TYPE E 6 FILTER SAND

### MANITOWOC CDF EAST DIKE CROSS SECTION



## MANITOWOC CDF

#### FILTER CELL CROSS SECTION



SCALE OF FEET



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SCALE OF FEET

14" DIA. STAINLESS STEEL MONITORING WELL LAKE BIDE DISPOSAL SIDE + 10.0 + 7.5 TOP OF WELL SCREEN 0.00 .+2.5 FILTER HOLES SAND L.W.D' PINE COARSE APPROX LAKE BOTTOM -10.0 BOTTOM OF WELL -9.0 mmm - 38.0 ю 20 30 ю SCALE OF FEET

B-54

MILWAUKEE CDF

FILTER CELL CROSS SECTION

### MILWAUKEE CDF

MONITORING WELL CROSS SECTION



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PORT STREAC CONFINED DISPOSAL FACILITY



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