



REPLY TO
ATTENTION OF
CELRB-PM-PM

DEPARTMENT OF THE ARMY

BUFFALO DISTRICT, CORPS OF ENGINEERS

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BUFFALO, NEW YORK 14207-3199

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CLEVELAND HARBOR, OHIO DREDGED MATERIAL MANAGEMENT PLAN PRELIMINARY ASSESSMENT SUMMARY OF FINDINGS AND RECOMMENDATIONS

Executive Summary:

The purpose of this preliminary assessment is to answer the following two questions: (1) "Is Cleveland Harbor economically viable?", and (2) "Is there enough space available to hold twenty years of dredged material from Cleveland Harbor?"

Economic viability exists when the benefit to cost ratio is greater than 1.0. An evaluation of just the key Cleveland Harbor receipts of iron ore and stone shows that the benefit to cost ratio is 4.8. Considering only stone, the benefit to cost ratio is still 1.3. Therefore, the continued operation and maintenance of the Cleveland Harbor Federal channel is economically justified. While other bulk commodity benefits at Cleveland Harbor exist, they have not been addressed in this assessment.

Assuming that all sediment dredged will be placed in Confined Disposal Facilities (CDF), that no new beneficial reuses will be found to recycle materials in the Confined Disposal Facility, the space in the existing Federal CDF Dike 10B will be exhausted in approximately 2008, assuming the placement of 330,200 cubic yards per year into the facility. Consequently, USACE will need to work with Cleveland Harbor stakeholders to formulate a Dredged Material Management Plan (DMMP), including interim disposal alternatives and a long term solution to manage dredged material for, at least, the next twenty years.

Section 1 provides a description of the project, and section 2 identifies the project authority. Section 3 provides an economic assessment, describing the harbor and dock locations, bulk traffic at Cleveland Harbor, the future of iron ore movements at Cleveland Harbor, commercial boat traffic, and maintenance dredging. A historical and projected future of maintenance dredging is provided in section 4. Section 5 describes dredged material disposal site capacities and operation and maintenance needs for the open-lake disposal sites, near shore disposal sites, and confined disposal facilities. Section 6 addresses planning and environmental compliance issues. Conclusions and recommendations are provided in sections 7 and 8, respectively.

1. PROJECT NAME AND DESCRIPTION

Cleveland Harbor, Cuyahoga County, Ohio (PWI 003430), is located on the south shore of Lake Erie at the mouth of the Cuyahoga River. The port is 28 miles east of Lorain, Ohio and 33 miles west of Fairport, Ohio (Figure 1). Cleveland Harbor is a major commercial port on Lake Erie. Cleveland Harbor tonnages in 2000 were 14,391,000 short tons and in 2002 11,400,000 short tons. Iron ore and limestone account for 76% of the ports activity. Iron ore receipts (6,746,000 short tons in 2000) are received at Cuyahoga River docks located near the head of navigation and on Whiskey Island for transshipment to inland steel plants. Limestone receipts (4,115,000 short tons in 2000) are destined for docks located on the Old River, and the middle and upper portion of the Cuyahoga River. The limestone is used by a local steel company and the building trades.

The harbor consists of a lakefront, breakwater protected outer harbor (Figure 2) and an inner harbor (Figure 3). The inner harbor is the lower deep draft section of the Cuyahoga River, and the connecting Old River. Authorized and maintained channel dimensions are presented in Table 1.

CWIS NUMBER	REACH OR SEGMENT	NOMINAL CHANNEL DEPTH		NOMINAL CHANNEL WIDTH		MAX. SAILING DRAFT	PROJECT SPONSOR
		(as auth.)	(as maint.)	(as auth.)	(as maint.)		
10060	Lake Approach	29'	29'	600'-750'	600'-750'	29'	N
	Outer Harbor West Basin	28'	28'	1,500'	1,500'	28'	N
	Outer Harbor East Basin	28'-25'	28'-25'	Varies 1,500'-500'	Varies 1,500'-500'	28'-25'	N
	Cuyahoga River	23'	23'	Varies 130'-325'	Varies 130'-325'	23'	N
	Old River	27'	23'-21'	200'-400'	200'-400'	23'-21'	N
	Turning Basins	18'	18'	690'	690'	--	N

The outer harbor is a breakwall-protected area of about 1,300 acres. The outer harbor is 5 miles long, 1,600 to 2,400 feet wide, composed of an east breakwater (20,970 feet long) and a shore connected west breakwater (6,048 feet long). There is a 201-foot gap in the West breakwater about 662 feet from the shore end. The main entrance channel has east and west arrowhead breakwaters, both of which are 1,250 feet long. The arrowhead breakwaters are 600 feet apart.

Figure 1- Cleveland Harbor Location

Location On Lake Erie

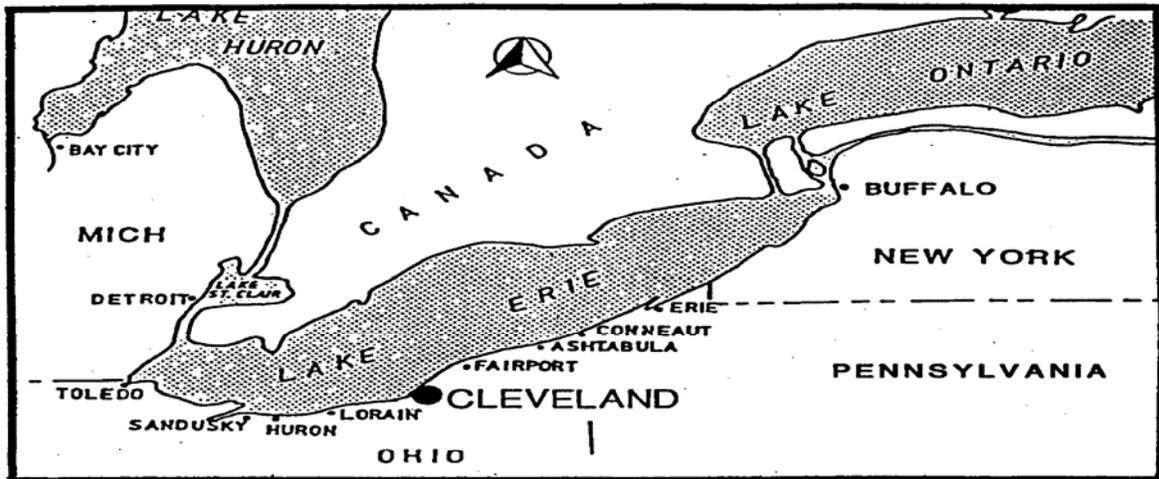


FIGURE 1
LOCATION MAP
SCALE OF MILES
0 25 50

Great Lakes Ports

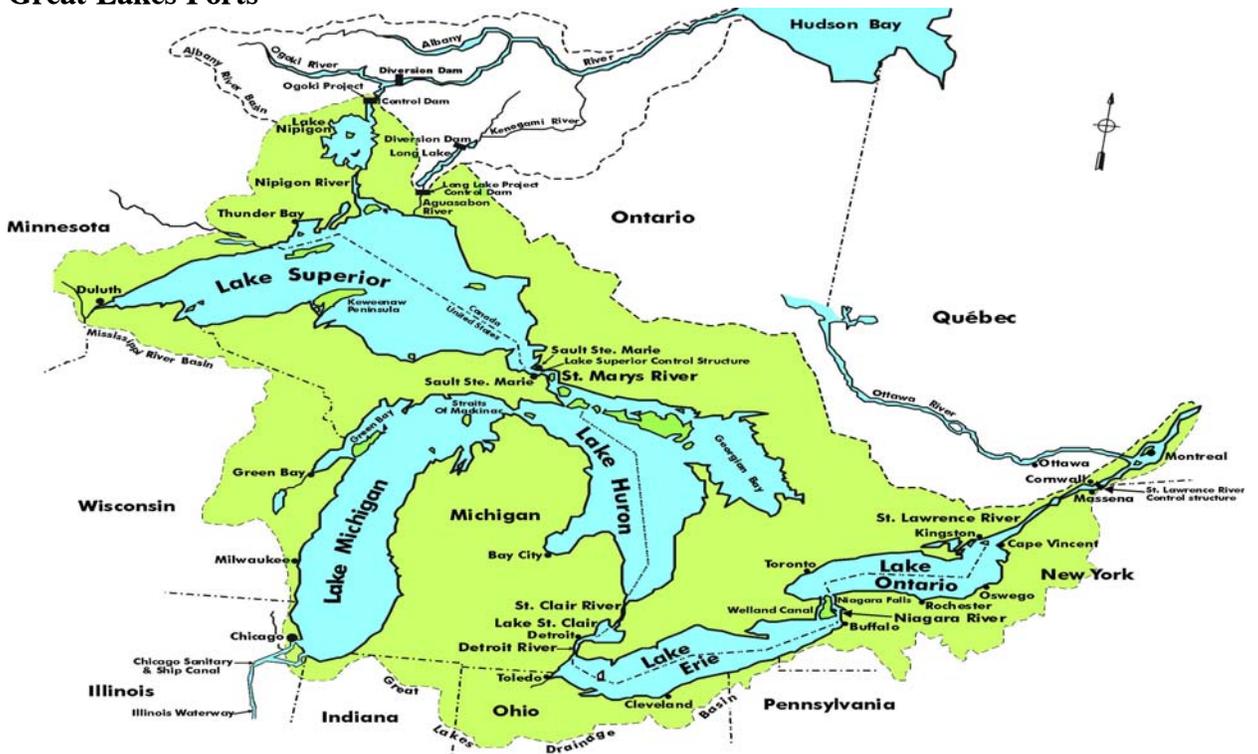


Figure 2.- Cleveland Harbor - Outer Harbor

Cleveland Harbor- Outer Harbor



Outer Harbor- Looking East



Figure 3. Cleveland Harbor- Inner Harbor

Old River



Cuyahoga River



The inner harbor includes the lower 5.8 miles of the Cuyahoga River and approximately one mile of the Old River. The Cuyahoga River is in line with the main entrance to the outer harbor from the lake. The entrance channel is protected by two parallel piers, 325 feet apart. The width of the Cuyahoga River varies from 130 to 325 feet. A turning basin is located approximately 4.8 miles upstream of the Cuyahoga Rivers mouth. The Old River extends westward from a point about 0.4 miles above the mouth of the Cuyahoga River. The Old River varies in width from 200 to 400 feet.

There are two entrances to the outer harbor. The main entrance (the Lake Approach Entrance Channel) is located between the east and west breakwater. The other entrance is at the east end of the east basin, between the east breakwater and the shore. Authorized channel depths in these entrance areas are at least are 29 feet below Low Water Datum (LWD). LWD for Lake Erie is 569.2 feet above mean sea level as measured at Rimouski, Province of Quebec, Canada, IGLD 85. Authorized channel depths in the outer harbor are 28 feet below LWD in the west basin and 28 to 25 feet in the east basin.

The project provides an authorized navigation channel depth of 27 feet in the lowermost part of the Cuyahoga River, from the lakeward end of the piers to a point immediately above the junction with the Old River. Authorized channel depths in the remaining portions of the Cuyahoga River are 23 feet. The Old River navigation channel is maintained to 23 and 21 feet.

Cleveland Harbor is dredged every year. The average dredging volume per dredging event since 1998 is 330,200 cubic yards.

2. AUTHORITY

The existing Federal project was authorized by the 1875, 1886, 1888, 1896, 1899, 1902, 1907, 1910, 1916, 1917, 1935, 1937, 1945, 1946, 1958, 1960 and 1962 River and Harbor Acts and the 1976 Water Resources Development Act.

The project as modified by the 1976 Water Resources Development Act authorized preparation of a Reformulation Phase I Design Memorandum completed in July 1984. Further improvements in the interest of commercial navigation and recreational navigation were authorized in the 1985 Supplemental Appropriations Act (PL-99-88). The commercial navigation improvements of this authorization are on hold.

The 1989 Energy and Water Development Appropriations Act (PL 101-101) authorized the Corps to begin a reconnaissance study of the Cuyahoga River to address the concerns of boat traffic congestion and related risks, accidents and safety of the public. Preliminary plans were studied to alleviate the commercial navigation problem and inadequate channel width and depth in the Old River and the Cuyahoga River. The reconnaissance report recommended a feasibility study for one plan comprised of three structural features. The study is classified as "inactive".

The current project improvements at Cleveland Harbor are 90 percent complete, exclusive of inactive and deferred portions of the project. Work remaining to complete the project consists of the following: 1- enlarging and deepening to 31 feet LWD the east entrance channel, deepening the east basin to 27 feet LWD; 2- the 1960 Rivers and Harbors Act, Stage

II, provided for the deepening of the remainder of the Cuyahoga River from Bridge No. 1 to and including the Old River, has been classified as deferred; 3- the 1958 Rivers and Harbors Act, provided for the planning for the replacement of Bridges 19 and 32, and for the widening of the Cuyahoga and Old River channels, has been classified as deferred; and 4, the 1946 Rivers and Harbors Act provided for the widening of the Cuyahoga River at the downstream end of cut 4, has been classified as inactive.

3. ECONOMIC ASSESSMENT

Information on the original justification of the commercial navigation project is not available.

Waterborne traffic at Cleveland Harbor consists primarily of receipt and shipment of bulk commodities. In 2000, total tonnage at Cleveland Harbor was 14,391,000 tons (Table 2). Receipts accounted for 93% (13,372,000 tons) and shipments accounted for 7% (1,019,000 tons) of all traffic.

TABLE 2 COMPARISON OF CLEVELAND HARBOR AND GREAT LAKES WATERBORNE COMMERCE DATA 1990 & 2000					
CARGO TONNAGE (NET TONS)					
Year	Cleveland Harbor	% Change	Great Lakes	% Change	
1990 ¹	14,368,000	0.16%	167,140,000	12.17%	
2000 ²	14,391,000		187,490,000		
MAJOR COMMODITIES					
Commodity	Year	Cleveland Harbor	% Change	Great Lakes	% Change
Iron Ore	1990 ¹	8,767,000	-23.05%	66,806,000	3.19%
Iron Ore	2000 ²	6,746,000		68,941,000	
Limestone	1990 ¹	2,470,000	66.60%	24,457,000	24.51%
Limestone	2000 ²	4,115,000		30,451,000	
Cement & Concrete	1990 ¹	436,000	50.00%	4,428,000	59.42%
Cement & Concrete	2000 ²	654,000		7,059,000	
Salt	1990 ¹	523,000	9.94%	2,956,000	43.13%
Salt	2000 ²	575,000		4,231,000	
Sand, Gravel, & Crushed Rock	1990 ¹	179,000	134.08%	3,808,000	73.71%
Sand, Gravel & Crushed Rock	2000 ²	419,000		6,615,000	
1. Waterborne Commerce Of the United States, Calendar Year 1990, Part 3-Waterways and Harbors Great Lakes, Department of the Army, Corps of Engineers. 2. Waterborne Commerce Of the United States, Calendar Year 2000, Part 3-Waterways and Harbors Great Lakes, Department of the Army, Corps of Engineers.					

Iron ore has been the dominant commodity moving through Cleveland Harbor. In 2000 iron ore movements accounted for 47% (6,746,000 tons) of all traffic at Cleveland Harbor. The other significant commodity was limestone (4,115,000), which accounted for 29% of the harbors bulk traffic. Other major commodities using Cleveland harbor include: cement and concrete (5%), salt (4%) and sand, gravel and crushed rock (3%).

The waterborne traffic pattern at Cleveland Harbor has varied in the ten years from 1991 through 2000. Bulk commodity traffic has ranged from a low of 13.4 million tons during the recession of 1991 to a high of 18.1 million tons in 1997. Waterborne traffic at the harbor in the future will be near the 12,000,000 tons per year level. The "base load" traffic at the harbor will determine the economic viability of Cleveland Harbor as a Federally maintained harbor.

The Buffalo District recently assessed the economic viability of Cleveland Harbor (Dredging Evaluation, Cleveland Harbor Ohio, March 2003), as part of its on-going program of assessing the economic viability of harbor maintenance for its commercial harbors (Table 3). As part of that evaluation a "base load" of future traffic that utilizes the harbor was projected. This "base load" of future traffic volumes assumes the continuance of iron ore receipts and limestone receipts in the range of receipts that took place in the year 2000. The evaluation was based on the receipt of two commodities: iron ore and limestone. The estimated annual tonnage for these two commodities was placed at 10,350,000 tons. This figure was arrived at through discussions with the individual commercial dock owners. The harbor is projected to receive annually 4,800,000 tons of iron ore and 5,550,000 tons of stone. The "base load" of future traffic volumes assumes continued receipt of iron ore at the harbor, the majority of which is destined for the integrated steel plant located at the head of navigation on the Cuyahoga River.

TABLE 3: DREDGING EVALUATION OF CLEVELAND HARBOR- AVERAGE ANNUAL BENEFITS, AVERAGE ANNUAL DREDGING COSTS, NET BENEFITS AND B/C ¹				
Commodity	AAE Benefits ²	AAE Costs ³	AAE Net Benefits	Benefit/Cost Ratio
Stone ⁴	\$2,387,200	\$1,903,000	\$484,200	1.25
Iron Ore ⁵	\$6,709,000	\$1,903,000	\$4,806,000	3.53
Stone & Iron Ore ⁶	\$9,096,200	\$1,903,000	\$7,193,200	4.78
<ol style="list-style-type: none"> 1. Based on "Dredging Evaluation, Cleveland Harbor Ohio, March 2003". The evaluation looked at maintaining current harbor depths of 28 feet in the outer harbor and 23 feet in the inner harbor. The evaluation looked at the 20 year period 2003 to 2022, used a 5 7/8% annual interest rate and was in March 2003 prices. 2. AAE Benefits are additive. AAE Net Benefits must be computed by subtracting AAE Costs from AAE Benefits for each benefit category. There is only one set of dredging costs and that value is applicable to all combinations of traffic forecasts. 3. Average Annual dredging costs are based on dredging 270,000 cubic yards annually over the 20-year evaluation period. 4. Traffic is based on stone receipts only. Stone receipts were placed at 5,550,000 tons annually over the 20-year evaluation period. 5. Traffic is based on iron ore receipts only. Iron ore receipts were placed at 4,800,000 tons annually over the 20-year evaluation period. 6. Traffic is based on iron ore and stone receipts Both receipts totaled 10,350,000 tons annually over the 20-year evaluation period. 				

The above mentioned economic evaluation of dredging at Cleveland Harbor concluded that dredging of the harbor every year, with removal of 270,000 cubic yards of material every year over a 20 year evaluation period, was economically justified with three different traffic scenarios: 1) receipt only of stone (5,550,000 tons per year) had a BC ratio of 1.25; 2) receipt only of iron ore (at 4,800,000 tons per year) had a BC ratio of 3.53 and; 3) receipt of stone and iron ore (10,350,000) had a BC ratio of 4.78. Table 3 presents the results of the evaluation

for maintaining current harbor channel depths (28 feet in the outer harbor and 23 feet in the inner harbor), given the three different traffic scenarios.

a. Harbor Description, Dock Locations

Cleveland Harbors lakefront is very well protected by its east and west breakwaters that extend along the lakefront for a distance of about 5 miles. Vessels enter the harbor via the lake approach channel (600 feet in width) which leads to the outer harbor area. The main channel in the outer harbor leads directly to the Cuyahoga River.

Recreational boating is the most visible form of recreation in the Cleveland Harbor area. Major marinas are located along the Lakefront Harbor's east basin, immediately west of the west breakwater, and at the upper end of the Old River. These facilities accommodate thousands of recreational vessels. Considerable recreational boating activity (including cruising, water-skiing and fishing) occurs both within and outside the Harbor area. Harbor cruises are also available to the general public on the tour ship Goodtime II.

There are forty-eight piers, wharves and docks described in the report " Port Series No. 43, Revised 2000, The Port of Cleveland Ohio" prepared by the Water Resources Support Center of the U.S. Army Corps Of Engineers. Twelve are located in the east and west basins of the Outer Harbor. Six are located along the banks of the Old River. The right and left banks of the Cuyahoga River have 14 and 16 facilities each, respectively.

The location, ownership and type of commodity movements taking place at the more active Cleveland Harbor docks will be discussed. The discussion will focus around the five major bulk commodities using Cleveland Harbor: Iron ore, limestone, cement and concrete, salt and sand and gravel.

Iron ore Iron ore receipts in 2000 were 6,746,000 tons and accounted for 47% of the Harbors total traffic. There are two main destinations of iron ore at Cleveland Harbor. Most of the iron ore received at Cleveland Harbor has historically been destined for the integrated steel mill situated in the City of Cleveland, about 5 miles up the Cuyahoga River. The facility has three docks that it uses for the receipt of iron ore. The Cleveland steel mill was owned and operated by LTV Steel through the previous decade but LTV went bankrupt in 2001. In 2002 the mill was sold and was restarted by the International Steel Group, known as ISG Steel.

The second major destination of iron ore in Cleveland Harbor is a transshipment facility located on Whiskey Island, in the Western Basin. The dock is known as the "C & P" or the "Lakefront" dock. Oglebay Norton Terminals, Inc currently operates the dock. The dock is physically located on the north shore of Whiskey Island 0.6 miles west of the Cuyahoga River Entrance Channel. Greenwood's reports that it has a length of 1,875 feet, which can accommodate two Class 7 or one Class 10 boat; and has storage capacity for 1,000,000 tons of iron ore. The channel depth at the dock is reported to be 27 feet.

The dock receives approximately 1,000,000 tons of iron ore annually which is destined for Weirton Steel, which operates a mill at Steubenville, Ohio and Weirton, West Virginia. The two mills are actually one operating facility lying on either side of the Ohio River. The ore is transported from the Lakeside dock to Steubenville\Weirton by ConRail (and its successor); Norfolk Southern runs the former ConRail Cleveland-Steubenville/Weirton Line. The

Cleveland Port Authority has purchased the iron ore transshipment facility equipment located at Lorain Ohio and intends to move it to Whiskey Island. Oglebay Norton will operate the transshipment facility called the Cleveland Bulk Terminal (CBT).

Limestone Limestone receipts were the second largest commodity using Cleveland Harbor. Limestone receipts in 2000 were 4,115,000 tons and accounted for 29% of the Harbors total traffic. There were ten major docks active in the limestone trade in 2000. Limestone receipts have three major destinations in Cleveland Harbor: docks on the Old River, docks on the middle portion of the Cuyahoga River (from the Carter Road Bridge to the upper end of the turning basin –river mile 4.8) and the ISG steel mill located 5.0 miles up the Cuyahoga River. The major receiver of limestone on the Old River is Ontario Stone Corporation. They have three docks located on the Old River that receive limestone. Their main dock is located at the intersection of the Old and Cuyahoga Rivers. ISG steel has two docks located on the upper portion of the Cuyahoga River that receive limestone.

Cement And Concrete Cement and concrete receipts at Cleveland harbor in 2000 were 654,000 tons. The four major docks engaged in this trade are located on the Old River and the Lower Cuyahoga River (Mouth of the Cuyahoga River up to the Carter Road Bridge).

Salt Salt is the major export of Cleveland Harbor (575,000 tons in 2000). Cargill Salt Division operates a salt dock located on the left bank of the Old River approximately 1,300 feet below the head of navigation. This dock is used to load rock salt for shipment to U.S. and Canadian cities located on the Great Lakes for industrial and road de-icing uses.

Sand And Gravel Sand And Gravel receipts at Cleveland harbor in 2000 were 419,000 tons. There are four major docks engaged in this trade located on the Old River and the Middle Cuyahoga River.

b. Bulk Traffic at Cleveland Harbor

Table 2 presented a snapshot of bulk waterborne traffic at Cleveland Harbor in 1990 and 2000. In the year 2000, Cleveland Harbor handled the most commercial traffic of all 11 commercial Federal Harbors on Lake Erie: 14,391,000 tons. In the eleven years from 1990 through 2000, traffic varied from a low of 13.4 million tons during the recession of 1991 to a high of 18.1 million tons in 1997.

Receipts dominate freight movement at Cleveland Harbor. Receipts accounted for 93% of all movements at Cleveland Harbor in 2000. The receipt of two commodities dominates the traffic movements in Cleveland Harbor: iron ore and limestone. Other major commodities that use the harbor are cement and concrete; salt; and sand, gravel and crushed rock.

Iron ore receipts in 2000 were 6,746,000 tons. Most of the iron ore received at Cleveland Harbor has historically been destined for the integrated steel mill situated in the City of Cleveland, located approximately 5 miles up the Cuyahoga River. The Cleveland steel mill, formerly owned and operated by LTV Steel, was sold to the International Steel Group (ISG) in 2002. The outer harbor area (Whiskey Island) receives approximately 1,000,000 tons of iron ore, destined for Weirton Steel's integrated mill at Steubenville, Ohio/Weirton, West Virginia.

Limestone receipts in 2000 were 4,115,000 tons. The limestone received at the harbor is overwhelmingly destined for the construction industry. A comparatively small amount is consumed by ISG in charging its two blast furnaces. The limestone received at Cleveland is distributed throughout northeastern Ohio.

Cement and concrete and sand and gravel receipts in 2000 were 654,000 and 419,000 tons respectively. These commodities are destined for the local area construction industry.

The main export of Cleveland Harbor is salt. Salt exports in 2000 were 575,000 tons. Rock salt is mined at Cleveland and shipped out to many U.S. and Canadian cities situated on the Great Lakes.

Future levels of tonnages using Cleveland Harbor were developed based on the strength of the industries using the bulk commodity. The level of tonnages moving through Cleveland Harbor should continue at a level of about 12,000,000 tons per year. These tonnage levels assume continued operation of the ISG integrated steel mill at Cleveland, continued operation of the Steubenville/Weirton Steel Mill in Ohio and West Virginia and sourcing of its iron ore needs through Cleveland Harbor, continued steady demand for bulk commodities used in the construction industry and continued operation of the salt mines at Cleveland Harbor.

c. The Future of Iron Ore Receipts at Cleveland Harbor

There are numerous factors that will ultimately determine the future of iron ore receipts at Cleveland Harbor. All factors are tied to the viability of the two steel plants that use Cleveland Harbor iron ore receipts: the ISG Steel mill located in Cleveland, and the Weirton Steel Mill located in Steubenville Ohio/Weirton West Virginia. The most significant factors for the steel mills are the steel-making costs at these facilities, legislative tariffs and foreign and domestic competition.

2001 was an extremely difficult year for the US integrated steel industry. A number of mills closed and others downsized. The parent company of the steel mill in Cleveland (at that time LTV Steel) filed for chapter 11 in December 2000 and closed steel making operations at the Cleveland plant in 2001. In May 2002, all the assets of LTV Steel were bought by the International Steel Group (ISG). ISG now owned LTV's two integrated steel mills - the mill in East Chicago (Indiana Harbor), Indiana, and the Cleveland Works mill in Cleveland, Ohio. Since that time, ISG has restarted steel making operations at both of LTV's former plants in Cleveland and Chicago.

ISG is the second largest integrated steel maker in North America. Since April 2002, ISG has acquired LTV and Acme Steel, as well as the assets of Bethlehem Steel (May 2003) which include two operating integrated steel mills-the Burns Harbor Mill in East Chicago Indiana and the Sparrows Point mill outside of Baltimore Maryland. These acquisitions have resulted in an integrated steel making company capable of producing over sixteen million tons of steel annually. ISG has made labor and management cuts at its steel making facilities, negotiated a new labor contract, streamlined production and instituted new management approaches which have increased steel making productivity and have made ISG one of the lowest cost steel producers in the United States. There is no question that the ISG mill in Cleveland will continue producing steel for the foreseeable future and that it will continue to receive iron ore.

Weirton Steel Corporation has its steel making operations in Steubenville Ohio and Weirton West Virginia. The company receives iron ore from Cleveland's outer harbor docks located on Whiskey Island. The company is the sixth largest integrated U.S. steel company and employs 3,500 people. The company produces hot rolled, cold rolled, galvanized and tin mill products (TMP). It is the nations second largest TMP producer.

While the future of Weirton Steel is not as certain, it is projected that it also will continue to receive iron ore from Cleveland Harbor. The company went through a major restructuring in 2001 and 2002. Cost cutting measures were implemented including job eliminations and reduction of its public debt. New labor agreements were negotiated in 2003. Weirton Steel voluntarily entered Chapter 11 creditor protection in May 2003. It will maintain control and ownership of its assets as opposed to having a court appointed trustee operate the company. It has secured a \$225m debtor in possession (DIP) financing to cover its working capital needs during this time. The reorganization will allow the company to improve its liquidity and address its legacy costs.

In the spring of 2002, President Bush imposed a three-year tariff on specific steel imports. This tariff would help eliminate the unfair price advantage foreign steel had in the domestic steel market. The tariff was 30% in the first year. However, the tariff was not 30% for the entire three years. It is 30% for year one, 24% for year two, and 18% for year three, after which it expires.

The tariff scale imposed by President Bush bought the US integrated steel industry up to three years of time in which to reorganize and become more competitive. Reorganization" essentially means combining the larger; more efficient US integrated mills into a smaller number of larger and more efficient producers. The remaining smaller integrated mills need to implement cost cutting measures and become more competitive. However, the tariffs were removed in February 2004.

Another round of tariff protection is not likely to be implemented given the complaints, both domestic and foreign, raised against the current protective tariff. Even if another protective tariff were implemented, it would not protect the older, less efficient smaller integrated mills from the aggressive competition of the electric arc based US mini steel mills.

d. Commercial Fleet Traffic

Waterborne traffic at Cleveland Harbor should continue near the 12,000,000 tons per year range. Cleveland Harbor has a strong base of tonnage in iron ore and limestone receipts. The iron ore needs of the ISG steel plant at Cleveland and the steel mill complex at Steubenville/Weirton, will continue to be serviced through Cleveland Harbor. The strong and stable demand of the building products industry for limestone also contributes to the Harbors projected tonnage levels. A general outline of fleet traffic that will be used to deliver the basic bulk commodities will now be discussed.

Iron ore receipts at Cleveland go to two locations, the transshipment facility located on Whiskey Island and the ISG steel plant located at the head of navigation on the Cuyahoga River. All iron ore delivered to ISG docks will be delivered in Class 5 vessels. This is the maximum sized vessel that can navigate the various bends of the Cuyahoga River. Iron ore delivered to Whiskey Island in the Western Basin will include Class 5,7,8 and 10 vessels. These vessels will be able to take advantage of the deeper vessel drafts that are possible in the Outer Harbor area (28 feet LWD in the Western Basin).

Limestone receipts typically originate from ports located on Lake Huron (60% of all harbor limestone receipts) and Lake Erie (40% of all harbor limestone receipts.). Since these vessels deliver limestone to docks located on the Old River and the Cuyahoga River, they will be limited to Class 5 vessels.

Cement and Concrete is typically delivered to docks located on the Old River and the Lower Cuyahoga River (The area from the mouth of the Cuyahoga up to the Carter Road Bridge). Cement carriers are a specialized type of vessel which relies on shoreside equipment to unload the cargo. Vessel Classes 2, 3 and 4 will typically be used to deliver this commodity.

Salt is the major commodity shipped from Cleveland Harbor. All salt shipments from Cleveland harbor originate from the upper end of the Old River. The navigation channel in this area is maintained to 21 feet LWD. Vessels engaged in the salt trade are typically Class 5 vessels. An overwhelming majority of these vessels have mid summer drafts less than 23 feet.

There is a very active construction aggregates trade at Cleveland Harbor, which receives sand, gravel and crushed stone. These commodities are characteristically delivered to docks located on the Old River and the Middle Cuyahoga (The area between the Carter Road Bridge and the upper end of the turning basin –river mile 4.8). The vast majority of the tonnage is carried in class 5 vessels (98%) with the remainder being delivered by class 1 vessels.

e. Maintenance Dredging at Cleveland Harbor

Currently, Cleveland Harbor is dredged every year. All material dredged from Cleveland Harbor is deposited in a Confined Disposal Facility (CDF). The need to dredge portions of the Outer harbor, the Old River and the Cuyahoga River depends upon the continued operation of the various docks that receive the major bulk commodities that use Cleveland Harbor: iron ore, limestone, cement and concrete, salt, and sand, gravel and crushed rock.

The recently completed Operations and Maintenance report (March 2003) indicated dredging of the Cuyahoga River, the Old River and the Outer Harbor to its currently maintained depths is economically justified (See Table 3- Dredging Evaluation Of Cleveland Harbor). The report went further and looked at the justification of continued harbor dredging under the unlikely event that all iron ore receipts at Cleveland Harbor ceased. The report indicated that dredging of the Cuyahoga River, the Old River and the Outer Harbor would still be economically justified even with the cessation of all iron ore receipts to the harbor. The report did not investigate the reduction in cubic yards dredged that this would induce since continued maintenance of the entire Cuyahoga River would no longer be needed. This in turn would reduce the amount of dredged material that would be removed from the river channel and also, the amount of material that must be placed in the Confined Disposal Facility (CDF).

At this time, the Dredge Material Management Plan developed for Cleveland Harbor should assume that all channels and channel depths currently being maintained on the Cuyahoga River, Old River and Outer Harbor area will continue to be maintained. It should also assume continued receipt of iron ore at the harbor. It should assume iron ore will continue to be delivered to the ISG steel mill located at the head of commercial navigation on the Cuyahoga River and to Whiskey Island in the western basin for transshipment to the steel mill located at Steubenville/Weirton.

4. MAINTENANCE DREDGING: HISTORICAL AND PROJECTED FUTURE

The need for maintenance dredging arises from the buildup of shoal material in the navigation channels which leads to the restriction of the flow of commercial navigation. On average, dredging of the Federal channels from 1998 to 2003 resulted in 293,500 cubic yards of material being removed during each dredging event. These cubic yards represent “In Place” volumes. “In Place” volumes are calculated by using channel bottom soundings that are taken before dredging takes place and channel bottom soundings that are taken after dredging has taken place. The difference in the two channel sounding elevations are “In Place” volumes.

Dredging of Non-federal channels during this same time period resulted in an average of 36,700 in place cubic yards being removed per dredging event. Average total in place cubic yards removed (Federal and Non federal) per dredging event for the time period 1998-2003 was 330,200 (Table 4).

	Year 1998	Year 1999	Year 2000	Year 2001	Year 2002	Year 2003	Average	Disposal Site
Federal Dredging	335,900	281,700	225,600	401,800	182,000 ²	333,900 ³	293,500	CDF
Non Federal	24,700	25,100	107,400	23,700	11,800	27,600	36,700	CDF
Total Dredging	360,600	306,800	333,000	425,500	193,800	361,500	330,200	CDF
<ol style="list-style-type: none"> 1. All volumes are “In Place” volumes. 2. Dredging operations were limited by available funds. Actual quantities dredged in 2002 do not necessarily reflect the required dredging volumes if sufficient O&M appropriations were available. 3. Preliminary estimate of in place Federal cubic yards dredged in 2003. 								

Table 5 presents Federal costs for dredging Cleveland Harbor in the recent past. Federal costs have averaged \$1,829,000 per dredging event for the five Federal dredging events in the 1998-2002 interval.

Reach or Segment	Construction/ Acquisition		Dredging Cost ¹						
	Year	Cost		1998	1999	2000	2001	2002	Average ²
Entire Harbor			Dredging	\$1,604,300	\$1,841,900	\$1,499,700	\$2,446,900	\$1,752,000	\$1,829,000
<ol style="list-style-type: none"> 1. All dredging costs are in current dollars as of the year expended. All dredging costs are those costs associated with Federal dredging only. These costs do not include Non Federal dredging costs. 2. Average reflects costs per dredging event for Federal dredging costs only. 									

Table 6 presents the future dredging schedule with the anticipated volume of material that will be dredged. Approximately 293,500 in place cubic yards are to be removed each year from 2004 to 2013 under Federal channel maintenance. Non-federal dredging needs during this time frame were placed at 36,700 in place cubic yards annually. These are the average number of in place cubic yards removed by Federal and Non-federal users over the six-year period 1998 to 2003. These projections of dredging quantities presumes continuation of present conditions - with continued receipt of iron ore at the ISG steel mill on the Cuyahoga River and at Weirton Steels facility in Steubenville/Weirton. These facilities combined receive approximately 4.8 million tons of iron ore annually through Cleveland Harbor.

TABLE 6 ANTICIPATED DREDGING													
Reach or Segment	Programmed Dredging ("In Place" Cubic Yards-000's, consistent with 10-year O &M maintenance plan and historical Non Federal dredging needs)											Disposal Sites to be Used	
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average		
Federal Dredging	293.5	293.5	293.5	293.5	293.5	293.5	293.5	293.5	293.5	293.5	293.5	293.5	Confined Disposal
Non Federal Dredging	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	Confined Disposal
Total Dredging	330.2	330.2	330.2	330.2	330.2	330.2	330.2	330.2	330.2	330.2	330.2	330.2	Confined Disposal

Table 7 presents future Federal dredging costs. Federal dredging is projected to remove, on average, 293,500 in place cubic yards per dredging event each year during the 10-year interval 2004 to 2013. This projection of Federal dredging costs presumes continuation of present conditions - with continued production of hot metal at the ISG steel mill and continued reception of 4.8 million tons of iron ore per year at the harbor. The average total Federal cost per dredging event is projected to be \$1,707,000.

TABLE 7 FEDERAL CHANNEL MAINTENANCE COST PROJECTIONS												
Programmed Federal Dredging Cost (\$000's per year, consistent with 10-year project O&M maintenance schedule)												
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average. ¹	
Federal Dredging	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700
Economic Evaluation	\$35	\$0	\$0	\$0	\$0	\$35	\$0	\$0	\$0	\$0	\$0	\$7
Total:	\$1,735	\$1,700	\$1,700	\$1,700	\$1,700	\$1,735	\$1,700	\$1,700	\$1,700	\$1,700	\$1,700	\$1,707

1. Average total dredging cost per dredging event. All dredging costs are those costs associated with Federal dredging only.

5. DREDGED MATERIAL DISPOSAL SITE CAPACITY AND USAGE

a. Open-Lake Disposal Site

The Cleveland Harbor open-lake disposal site (1,280 acres in area) is located 9 miles north of the east arrowhead breakwater. Since 1970, almost all dredged material from the harbor has been discharged into Confined Disposal Facilities located at Cleveland Harbor because tests of dredged materials indicates unsuitability for open lake disposal.

b. Nearshore Disposal Sites

The vast majority of dredged material from Cleveland Harbor has been determined to be not suitable for nearshore disposal.

c. Confined Disposal Facility

The U.S. Army Corps Of Engineers, Buffalo District, in coordination with the U.S. Environmental Protection Agency and Ohio EPA have determined that, with the exception of some sandy material which accumulates at the upstream limit of the Cuyahoga River channel that may be used as beach nourishment material depending upon most recent test results, sediments dredged from Federal navigation channels at Cleveland Harbor would not be open lake disposed. All dredged material is placed in Confined Disposal Facilities.

Virtually all of the material dredged between 1970 and 1974 was placed in two dike disposal areas constructed in the late 1960s. Public Law 91-611 in 1970 authorized the construction of spoil disposal facilities for a period to not exceed 10 years. Two facilities were built: Site 12 and Dike 14 opposite Gordon Park.

Dike 14 is an 88-acre facility with an estimated capacity of 6,130,000 cubic yards. This site was turned over to the non Federal Sponsor in 1999. The site at that time was 95% filled.

A new CDF (Site 10B) was completed in 1998 adjacent to the Burke Lakefront Airport (Table 8). The Dike 10B footprint is 68 acres and cost \$17,500,000 to build. The actual physical inside capacity of the facility covers 58 acres. The 58-acre site provides storage for

**TABLE 8
SITE 10B DISPOSAL SITE DATA**

Disposal Site(s) (Name or Identifier)	Site Type	Disposal Site Capacity		Beneficial Uses (CY/Year)		Other Users	Disposal Site Sponsor (Y/N)
		Physical Capacity (CY)	Percent Filled	Existing	Anticipated		
CDF	Confined Disposal	2,900,000 ¹	Being Evaluated	None	None	N/A	Y

1. Based on a recent capacity evaluation performed by the Buffalo District (January 2004). Site 10 B has a 68 acre footprint. Usable acres for storage of dredged material is 58 acres. The 2,900,000 cubic yard capacity does not reflect the existence of sewage pipe passing through the CDF, which reduces the sites storage capacity by 60,000 cubic yards.

2,900,000 cubic yards of in place sediment. This CDF provides approximately 11 years of storage capacity assuming the placement of 330,200 in place cubic yards annually between 2004 and 2008, and a consolidation factor of .78. A study is currently underway to determine its remaining capacity.

All deep water aquatic habitat within the CDF's 68-acre footprint will eventually be filled-in with dredged material and therefore, be eliminated from further utilization by fish as spawning and/or feeding habitat. Displacement of benthic and planktonic organisms and associated habitat, and loss of aquatic submergent vegetation will also occur. However, the submerged outside portion of the CDF dike exposed to the lake proper, will provide about 9 acres of irregular long-term stone substrate as habitat for fish, benthic invertebrate and planktonic colonization. Submerged stone along the inside slope of the dike will also provide substrate for benthic and planktonic colonization. Submerged stone on outside dike slopes of the CDF will provide long-term hard substrate for aquatic vegetation, specifically filamentous algae. Eventual conversion of the deep water site to terrestrial land, if left undeveloped, would become invaded with native grasses, forbs, shrubs, and trees.

In recent years, since 1998, all sediment dredged at Cleveland Harbor has been deposited in Site 10B. (Table 9).

**TABLE 9.
PLACEMENT HISTORY ¹**

	Year 1998	Year 1999	Year 2000	Year 2001	Year 2002	Year 2003	Average	Disposal Site
Federal Dredging	335,900	281,700	225,600	401,800	182,000 ²	333,900 ³	293,500	CDF
Non Federal	24,700	25,100	107,400	23,700	11,800	27,600	36,700	CDF
Total Dredging	360,600	306,800	333,000	425,500	193,800	361,500	330,200	CDF

1. All volumes are "In Place" volumes.
 2. Dredging operations were limited by available funds. Actual quantities dredged in 2002 do not necessarily reflect the required dredging volumes if sufficient O&M appropriations were available.
 3. Preliminary estimate of in place Federal cubic yards dredged in 2003.

Mechanical or hydraulic dredges are generally used to dredge the navigation channels. Dredged material is deposited into the CDF.

6. ENVIRONMENTAL COMPLIANCE

National Environmental Policy Act (NEPA) documents which evaluate existing dredging and discharge activities for Cleveland Harbor are listed in Table 10. The Buffalo District will remain in compliance with applicable environmental laws and regulations for dredging and dredged material disposal at Cleveland Harbor.

TABLE 10 PROJECT COMPLIANCE				
Harbor Reach & Discharge Site(s)	Document	Date	Expiration Date	Scheduled Update
Diked Disposal Site No. 12	FEIS	1973-74	-	-
Operations & Maintenance	FEIS	April 1974	-	-
Diked Disposal Facility Site No. 14	FEIS	December 1975	-	-
Diked Disposal Facility Site No. 14	Statement of Findings	February 1976	-	-
Diked Disposal Facility Site No. 14	Supplemental Information Report	January 1980	-	-
Littoral Drift Nourishment at Bratenahl and Perkins Beach	EA/FONSI	February 1985	-	-
Modification to Dike 14 CDF	FEIS	September 1993	-	-
Modification to Dike 14 CDF	Record of Decision	December 1993	-	-
Confined Disposal Facility (Site 10B - 15-Year)	FEIS	March 1994	-	-
Confined Disposal Facility (Site 10B - 15-Year)	Record of Decision	August 1994	-	-
Operations & Maintenance Dredging & Discharge into Dike 10B	Section 401 Water Quality Certification	March 2003	March 2004	March 2004

The major problem relating to dredging at the harbor is that Dike 10B, originally projected to reach capacity in 2013, is now expected to reach capacity in 2008. Lower lake levels, increased quantities of Federal dredging, dredging by private entities, and other factors, have reduced the lifespan of the CDF.

CDF Dike 10B, located adjacent to, and to the north of, Burke Lakefront Airport was completed in 1998. However, construction of the South Perimeter Wall/Berm, a component of the original design, was deferred for Value Engineering purposes. The actual physical capacity, with the berm in-place, of the CDF is estimated to be 2,900,000 cubic yards less the space occupied by the storm sewers within the dike. Usage of the design capacity of the Dike is now thought to be possible through dredge material management where excavating equipment would be used to contour dry dredged material. The future management of dredge material in Dike 10B could begin as soon as FY05. The future management of dredge material placed into Dike 10B would allow for complete utilization of Dike 10 B's design capacity.

Investigations are underway, including topographic and marine surveys, that will more precisely estimate dredged material settlement and consolidation, and the year Dike 10B is likely to reach design capacity. Preliminary results indicate that Dike 10 B will reach capacity

in 2008, presuming approximately 330,200 cubic yards of dredged material is placed annually.

A Final Environmental Impact Statement was completed for the construction of Dike 10B in 1994. The south perimeter dike was part of the original design and was therefore evaluated in the 1994 FEIS. It is the opinion of Buffalo District that the construction of the dike is in compliance with NEPA. Therefore, the District Environmental Coordinator distributed a Record of Environmental Consideration for public comment as the method of coordination and determined that a “categorical exclusion” for the proposed Dike 10B operational Filling Management Plan is appropriate.

Required documents for future activities would depend on the dredging and discharge methods selected, expansion of dredging limits, updated information on sediment contamination levels, changes to or expansion of the CDF or significant changes in existing environmental conditions. The Buffalo District normally conducts sediment analyses every five years. The EIS for harbor operations and maintenance activities is updated via an environmental assessment or Supplement to the EIS when these activities substantially change or significant new information on the environmental effects of these activities becomes available.

Future environmental compliance requirements could include NEPA documentation, Section 404(b)(1) evaluation, Section 401 State Water Quality Certification, and Ohio Coastal Management (CZM) Program Federal Consistency Determination.

7. CONCLUSIONS

Cleveland Harbor is economically viable as documented in this assessment. In addition, there is insufficient space in the operational CDF, Dike 10B, to hold dredged material for the next 20 years.

The Cleveland CDF Dike 10B is rapidly approaching capacity. The facility, initially projected to have a fifteen-year life (1999 thru 2013), is currently projected to reach capacity in 2008, presuming annual dredged material placement is approximately 330,200 cubic yards. There are several factors that affect the useful life of Dike 10B, including the decision to cease placement of material into Dike 14 which has remaining capacity; placement of dredged materials into Dike 10B in 1998; significantly greater quantities of Federal dredging materials; larger quantities of non-Federal dredging placement into Dike 10B; impacts of larger quantities on settlement and consolidation rates; and changes in dredged material composition that also affect settlement and consolidation rates.

The quantity of dredged material placed into Dike 10B must be closely managed over the next four years to minimize quantities while meeting the needs of commercial navigation. Federal and non-Federal dredged material placement must be minimized to extend the remaining life of the facility. Less annual quantity will reduce ‘lifts’ which will have a beneficial impact on settlement and consolidation rates, tending to increase remaining capacity.

Meanwhile, planning efforts are underway for interim disposal solutions during the

years following Dike 10B reaching capacity and before a new twenty-year CDF becomes operational. Solutions would likely include upland disposal, evaluating the capacity of former CDFs 9, 12, and 13 to accept additional dredged material, and potential beneficial reuse of dredged material. Expansion of Dike 12 vertically is considered a likely course of action. Although there is remaining capacity in Dike 14, municipal and state agencies are pursuing a course of recreational and wildlife use of that facility and the conclusion is not to pursue detailed investigation of that option.

The long term, twenty-year CDF, is projected to be available for receipt of dredged material in the year 2013. The management plan developed during the DMMP must reflect community desires for the Cleveland Lakefront and meet the requirements for the Federal Aviation Administration for safe operation of Burke Lakefront Airport.

The challenge of uninterrupted navigation channel maintenance dredging at Cleveland Harbor requires effective communication and coordination among the various regulatory agencies, customers and stakeholders to ensure technical approach and solutions consensus. The critical challenges are financing improvements, avian management, consistency with lakefront development plans, and a cost-effective twenty-year dredged materials management solution. Balancing competing requirements and ensuring that effective strategies are in motion will assure uninterrupted operations at Cleveland Harbor.

TABLE 11 CONCLUSIONS	
The ability to maintain this project for the next 20 years is limited by:	
Disposal Site Capacity	Y
Economic Viability	N
Environmental Compliance	N

8. RECOMMENDATIONS

Significant issues to the continued maintenance of this project have been identified in this assessment, conducted during the Phase I DMMP investigation. A study proposal for the development of a Dredged Material Management Plan is underway along with a cost estimate. I recommend that the Phase II DMMP investigation be initiated to develop a long term (twenty year) solution of dredged material disposal at Cleveland Harbor.

JEFFREY M. HALL
LTC, EN

Commanding