Indiana Harbor and Canal (IHC) Confined Disposal Facility (CDF) and Navigational Dredging

Purdue Water Institute

05 November 2013.

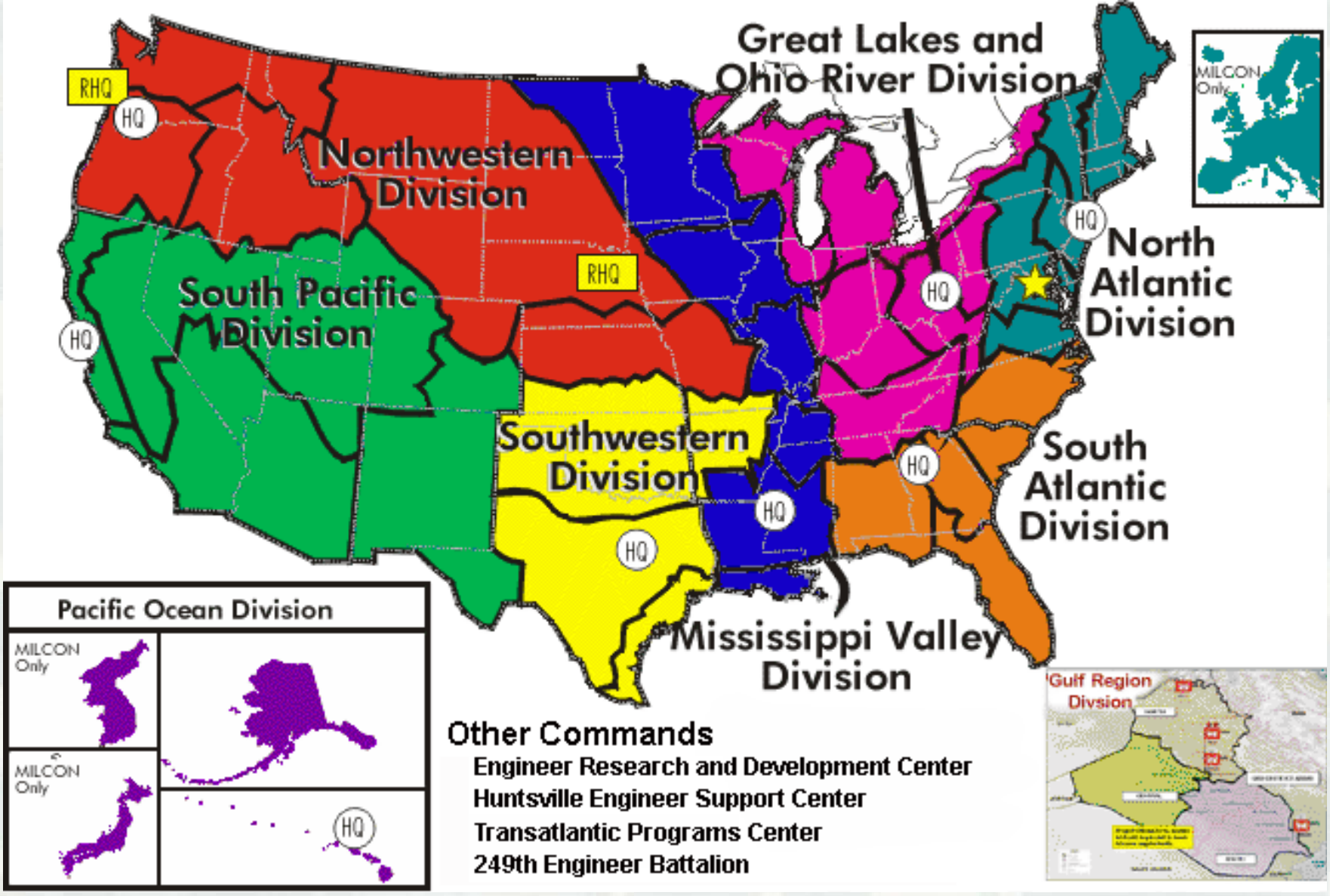
US Army Corps of Engineers
BUILDING STRONG®

Topics for Today

- **Brief Introduction to USACE**
- **IHC Confined Disposal Facility**
- **Indiana Harbor Dredging and Sediment Placement**

USACE Mission

- Planning, designing, building and operating water resources and other civil works projects (Navigation, Flood Damage Reduction, Environmental Protection, Disaster Response, etc.)
- Designing and managing the construction of military facilities for the Army and Air Force. (Military Construction)
- Providing design and construction management support for other Defense and federal agencies. (Interagency and International Services)


Great Lakes and Ohio River Division
RHQ
HQ
Northwestern Division
RHQ
South Pacific Division
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North Atlantic Division
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Southwestern Division
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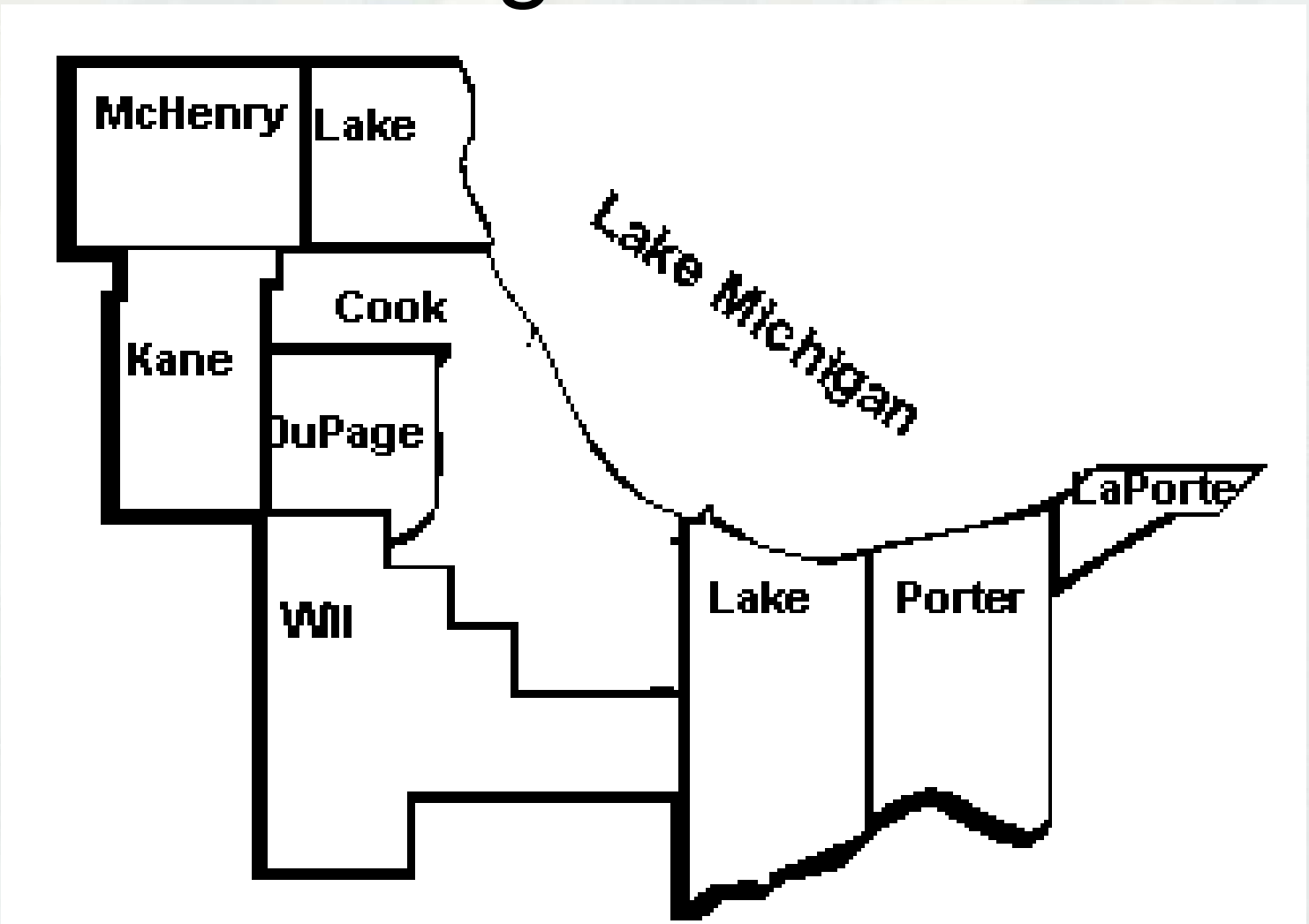
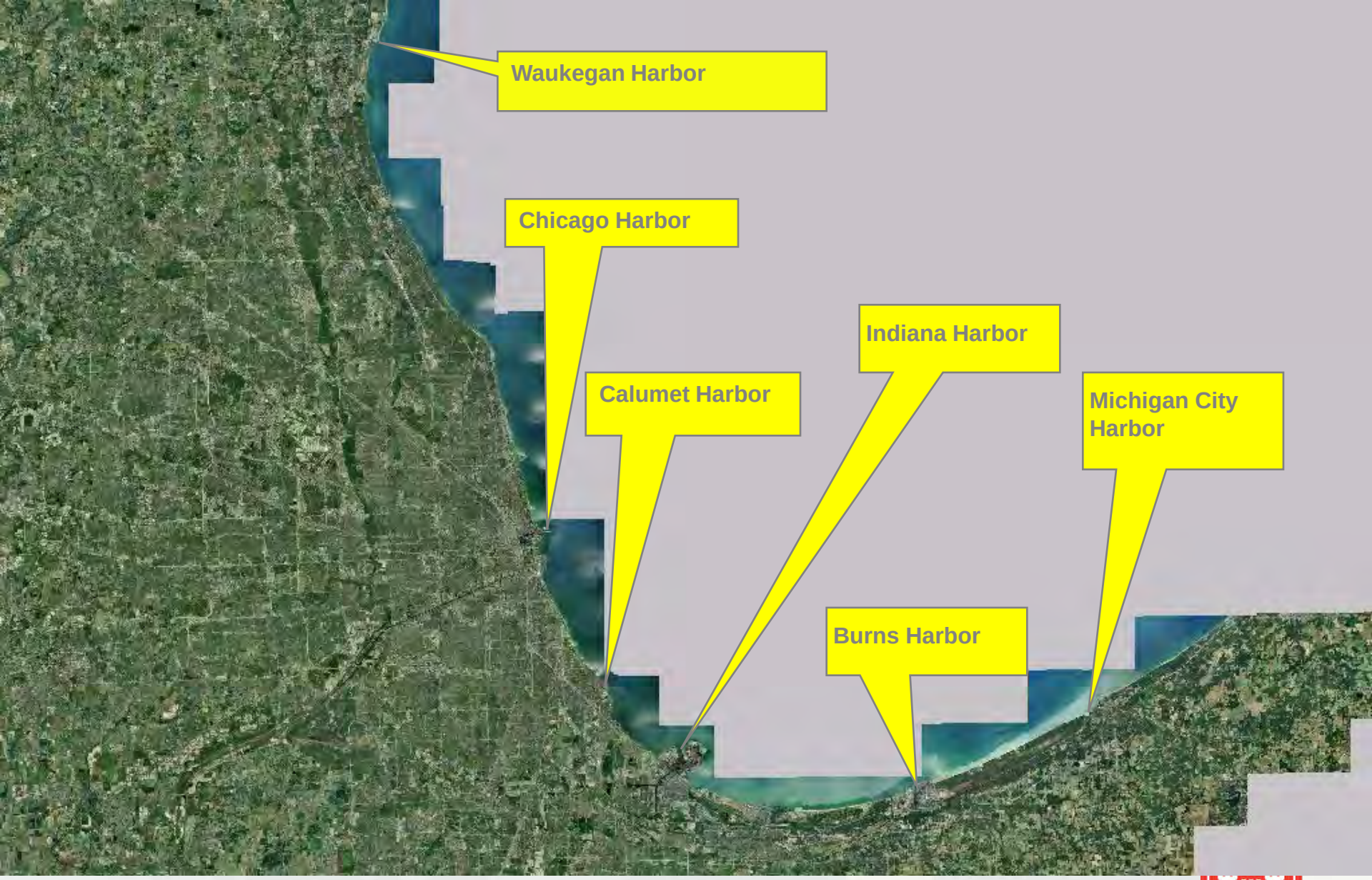
South Atlantic Division
Mississippi Valley Division
MILCON Only
Pacific Ocean Division
MILCON Only
MILCON Only
HQ
Gulf Region Division
Other Commands
Engineer Research and Development Center
Huntsville Engineer Support Center
Transatlantic Programs Center
249th Engineer Battalion

Chicago District Area



Chicago District Missions

- **Navigation: maintain harbors, rivers, and associated features.**
- **Flood damage reduction: provide flood damage mitigation projects.**
- **Environmental protection: regulate construction in navigable waterways under Section 10 of the Rivers and Harbors Act of 1899, and over the discharge of dredged or fill material into "waters of the United States" – the term includes wetlands – under Section 404 of the Clean Water Act.**
- **Shore protection: reduce erosion along the Great Lakes shoreline.**
- **Other responsibilities:**
  - **Emergency response (provided trained staff to support FEMA)**
  - **Ecosystem restoration**
  - **Diversion accounting**
  - **Support for others as requested.**



Chicago Area Harbors

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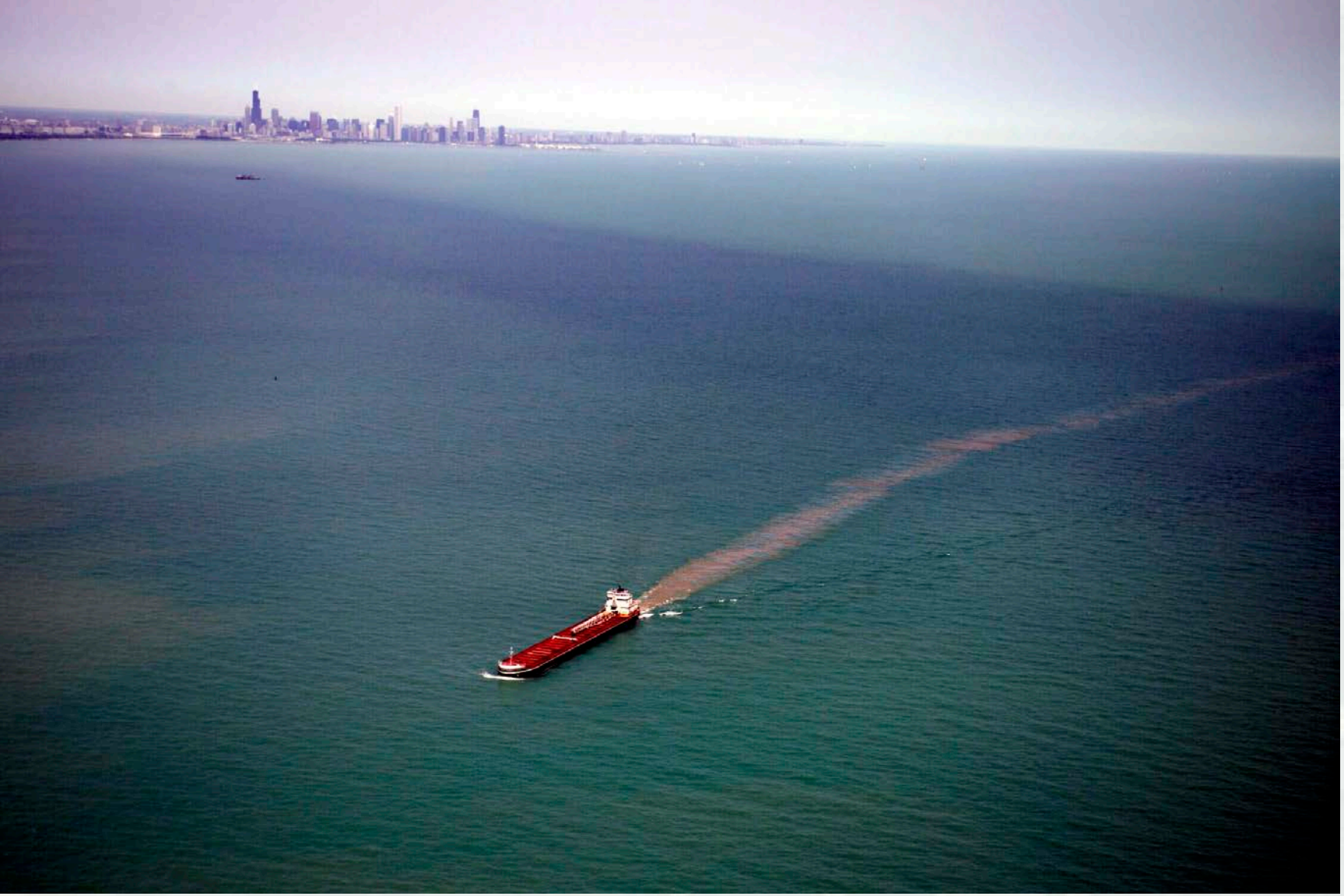
IHC/GC AOC

Present Day – Approach from Lake Michigan

Barge Traffic in Canal



Dragging through shoaled material uses more fuel, reduces loads, and releases pollutants.

Indiana Harbor and Canal:
Project Objectives

1. Restore and maintain the navigable depth of Indiana Harbor and its channels
2. Insure that dredging and disposal activities do not pose an unacceptable risk to the environment or human health during, between, and after implementation
3. Perform the dredging and disposal in a cost-effective manner

Indiana Harbor and Canal

- Constructed in early 1900's (authorized as a federal harbor in 1910).
- Changed the flow of the Grand Calumet River.
- Area is heavily industrialized;
  - ► major steel mills and metal processing during WWII
  - ► petrochemical processing
  - ► regionally significant petroleum refining
- Not dredged from 1972 – 2012, due to lack of sediment disposal site.


Typical Appearance of
Indiana Harbor Sediments

IHC Sediment Constituents

- Oil & grease
- Heavy metals (including arsenic, cadmium, chromium, mercury, lead, selenium, very high iron)
- Nutrients (ammonia, phosphorus)
- PCBs (greater than 50 mg/kg in two spots)
- PAHs (total greater than 200 mg/kg in most areas)
- VOCs
- dioxins and furans, trace pesticides

Where to put the sediment?? In a CDF

What is a “CDF”?

- A confined disposal facility is a dedicated to the confinement (disposal) of contaminated sediment.
- CDFs can be in-lake or upland.
- Future land use must be recreational or other non-disturbing activities.


CDF
Site


Former Refinery Circa mid-1900's

Site Conditions Before Construction - Tar Filled Surface Depression

Site Conditions Before Construction – Bird Trapped in Surface Tar


Oil Sheen in Canal
Adjacent Sheetpile Wall


Significant Seepage of
Oil Into Canal
2001 5 23

IHC CDF as of April 2013

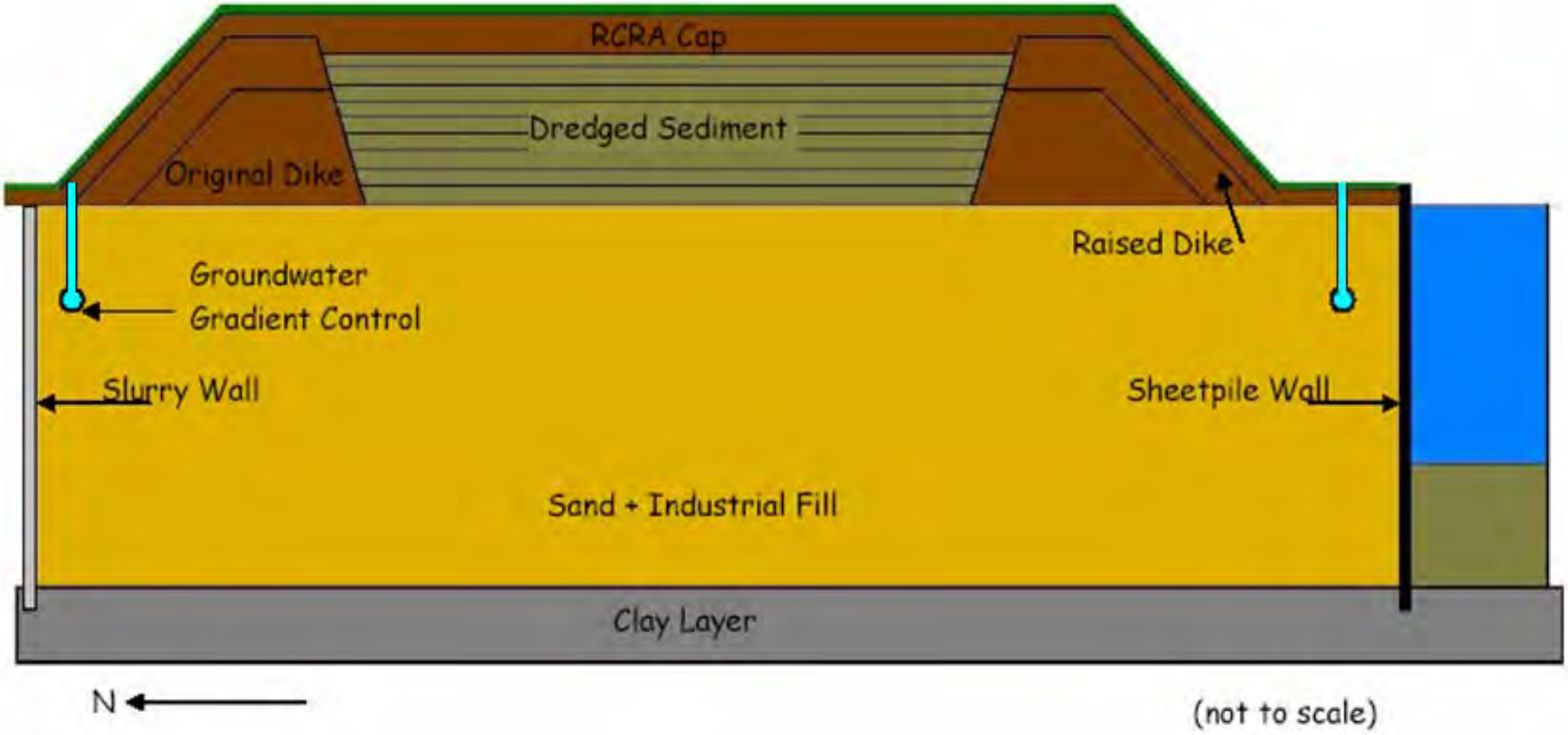
IHC CDF Unique Project Features

- USACE CDF project addresses RCRA closure and corrective action requirements.
- Project partners include:
  - East Chicago Waterway Management District
  - USEPA
  - IDEM
  - Local industry
- USACE's Navigation Authority is aiding in the "remediation" of this waterway
  - Navigation project is 100% federally funded.
- Technical requirements of the CDF are not typical.

Site Legacy Issues and the CDF Features

Legacy		CDF Feature
Free Product on Groundwater	→	Groundwater cut-off walls and gradient system
Extensive soil contamination	→	Perimeter cover on site, future clay closure cap
Buried waste and debris left on site	→	No digging in center of site; no waste removal
Poor groundwater and surface water quality	→	Plant on site for GW and surface water treatment
Poor regional air quality	→	Air monitoring and emissions controls

Cross-Section of Capped CDF



Mechanical Dredging Operation

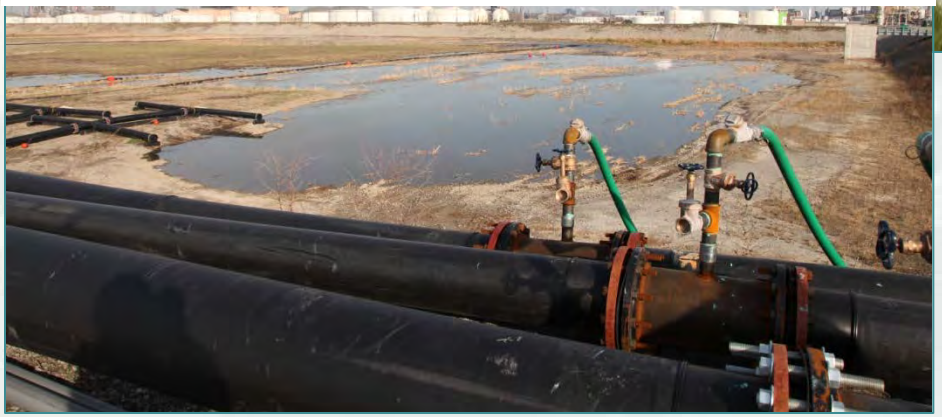

LIEBHERR
11/17/2012

Mechanical Dredging Operation

MOONPOOL OIL BOOM

Environmental Clam Bucket

Hydraulic off-loading with water recirculation from the CDF

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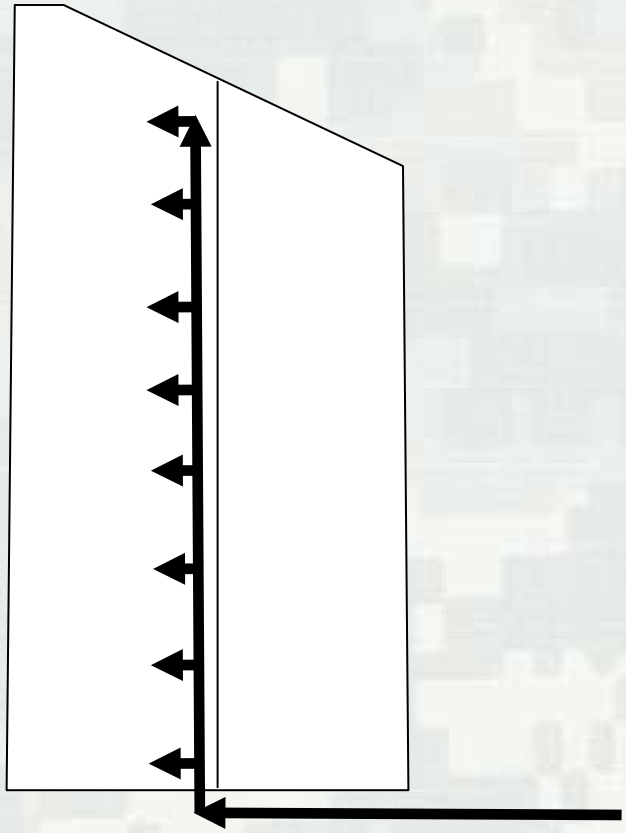
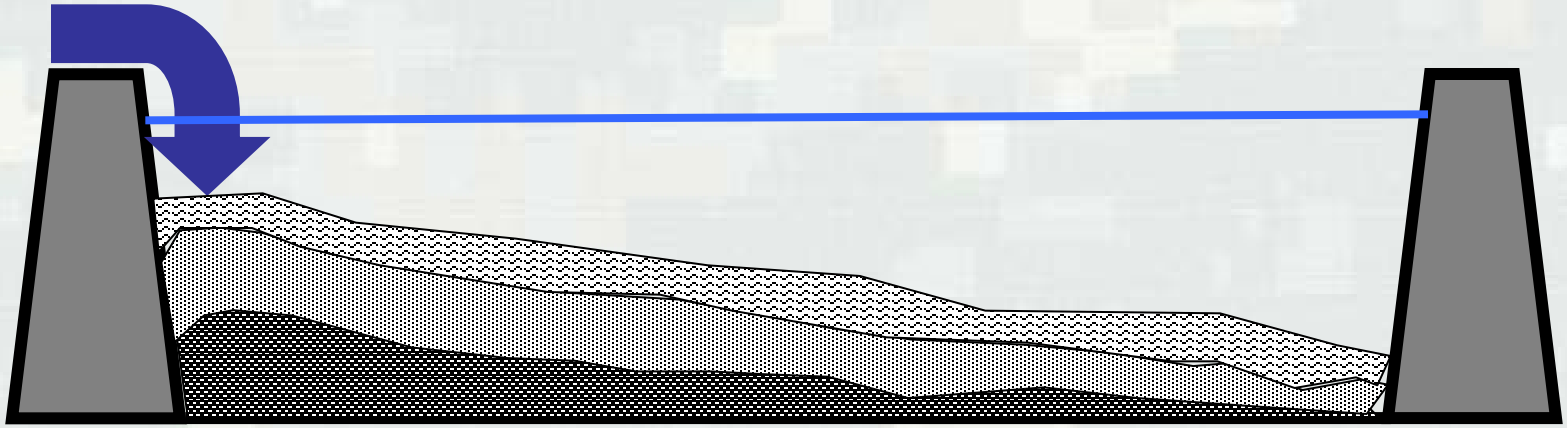
Sediment placement in the ponded CDF

multiple discharge points will be used to place sediment evenly in the CDF



slurry flows into the CDF cell by pipeline

How sediment will behave in the ponded CDF



The estimated angle of repose of the slurried sediment is about a 1’ drop across a 300’ horizontal area. The maximum discharge spacing will be about 600’, to minimize the elevation difference across the sediment.

IHC CDF as of April 2013

Real Time Air Monitoring Website

- ❖ 4 Air Monitoring Stations at the CDF
  - ➢ Naphthalene
  - ➢ Particulate matter
- ❖ Dockface volatile emission monitoring
- ❖ Real Time Air Monitoring Website
  http://www.indianaharbordredge.com

Ambient Air Monitoring Station

- 4 air monitoring stations at perimeter of CDF
- 1 air monitoring station at High School
- Sampled for 24 hours every 6 days
- Follows the National Ambient Air Monitoring Program

Real Time Air Monitoring Website

- Website link:

http://www.indianaharbordredge.com

Questions? Comments?

For More information, contact:

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USACE Ecosystem Restoration

- Restore ecosystem function, structure & dynamic process
- Partially or fully re-establish the attributes of a naturalistic, functioning and self regulating system
- Restoration includes protection
- Resources restored or protected should be nationally or regionally significant
- Restoration of aquatic, wetland, riparian, floodplain & aquatic habitats are the most appropriate

Calumet & Ivanhoe

Red Mill Pond, Indiana