

Indiana Harbor and Canal (IHC) Environmental Maintenance Dredging



Prepared for the WEDA Midwest Chapter Meeting
April 2014 - Cincinnati, OH

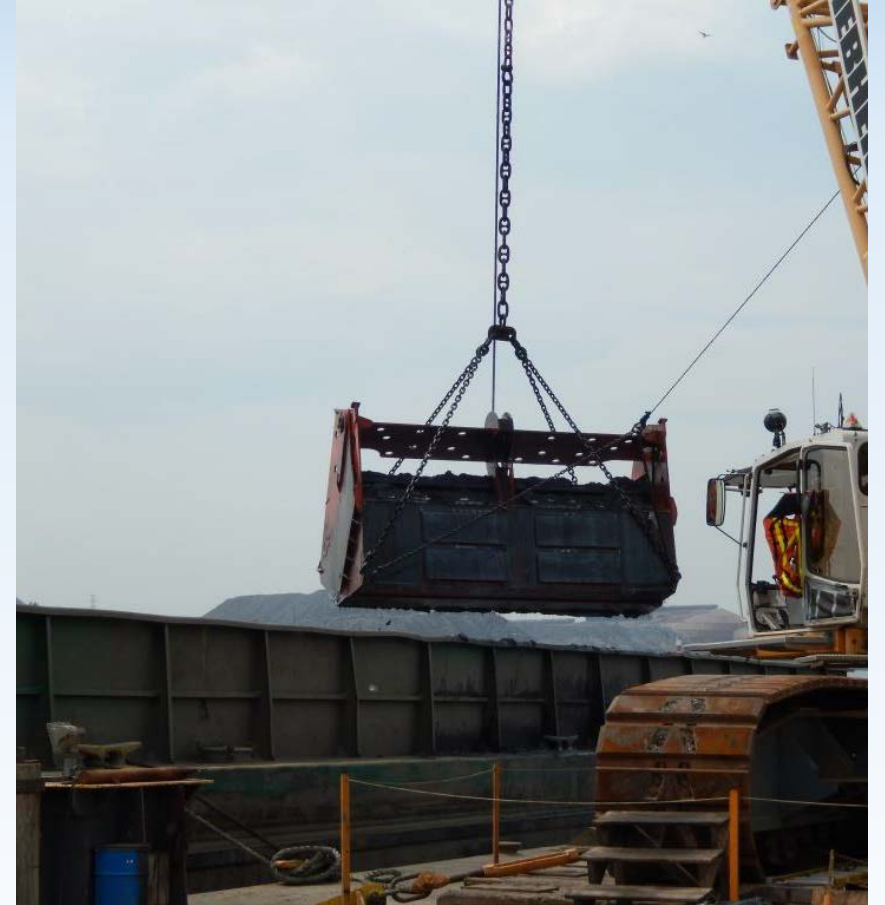
IHC Facility Operations & Dredging

- ❖ Contract was awarded on 30 Sept, 2011 by the USACE – Chicago District
- ❖ Located in Northwest Indiana in the city of East Chicago, IN
- ❖ Starting second contract option year Joint Venture between Kokosing Construction Co. and O'Brien & Gere.
- ❖ Dredging is currently in progress for the 2014 season.



Contact Consists of:

- ❖ Contract was awarded on September 30, 2011
 - ❖ (1 year contract renewable up to 5 years, dredge up to 400,000 Cubic Yards (CY)/year based on funding)
- ❖ 2014 Option year 2
 - ❖ Planning to dredge ~180,000 CY in the Federal Channel
- ❖ Environmental monitoring
- ❖ Site maintenance
- ❖ Operation of the Gradient Control System



Dredging and Placement

- ❖ Mechanical dredging with environmental bucket
 - Turbidity monitoring up and downstream
 - Oil booms around dredging operation



- ❖ Hydraulic off-loading with water recirculation from the CDF
 - Real time air monitoring, dock-face air monitoring
 - Emissions controls at the CDF as needed



Mechanical Dredging Operation

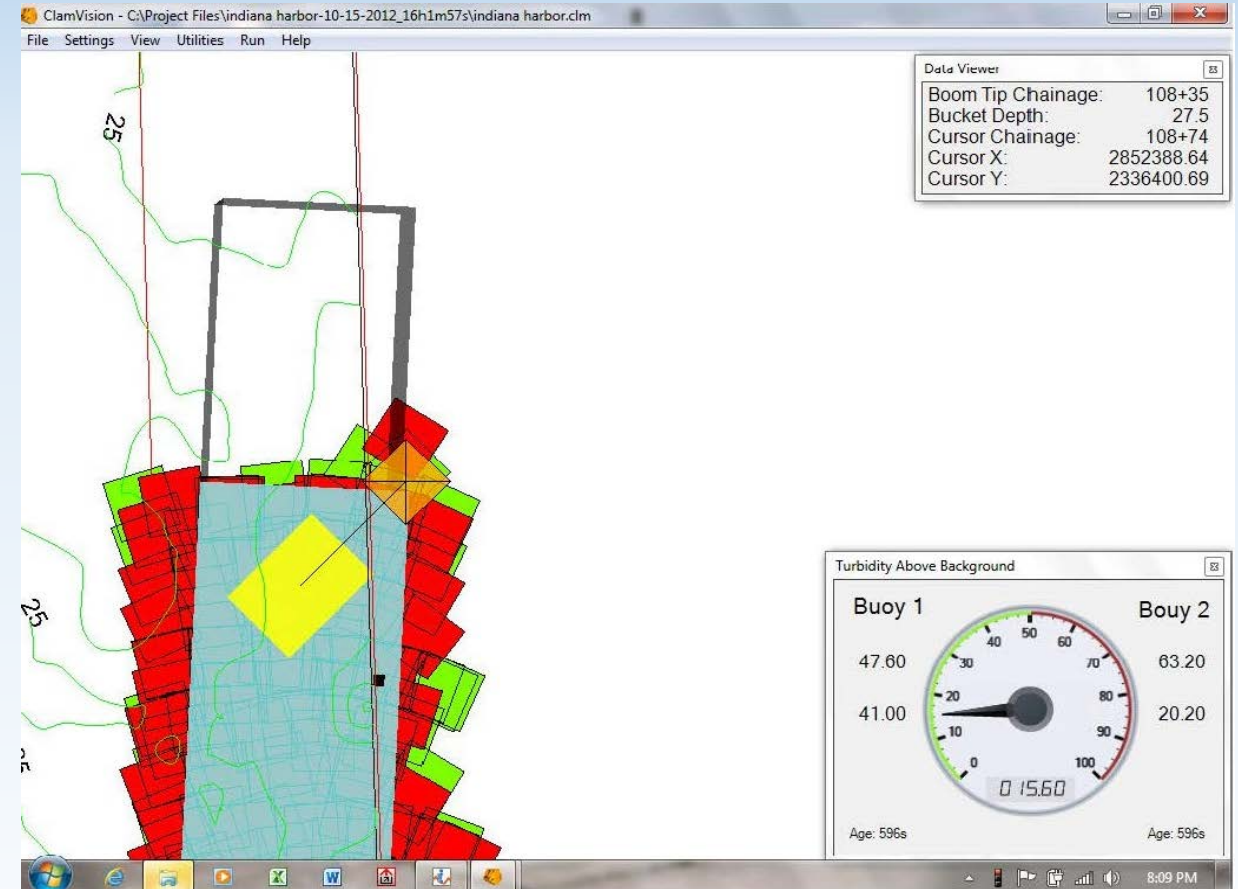


Mechanical Dredging Operation



Dredging Quality Control

- ❖ Controlled using ClamVision® software
- ❖ Allows for integration of real time turbidity and XYZ positioning



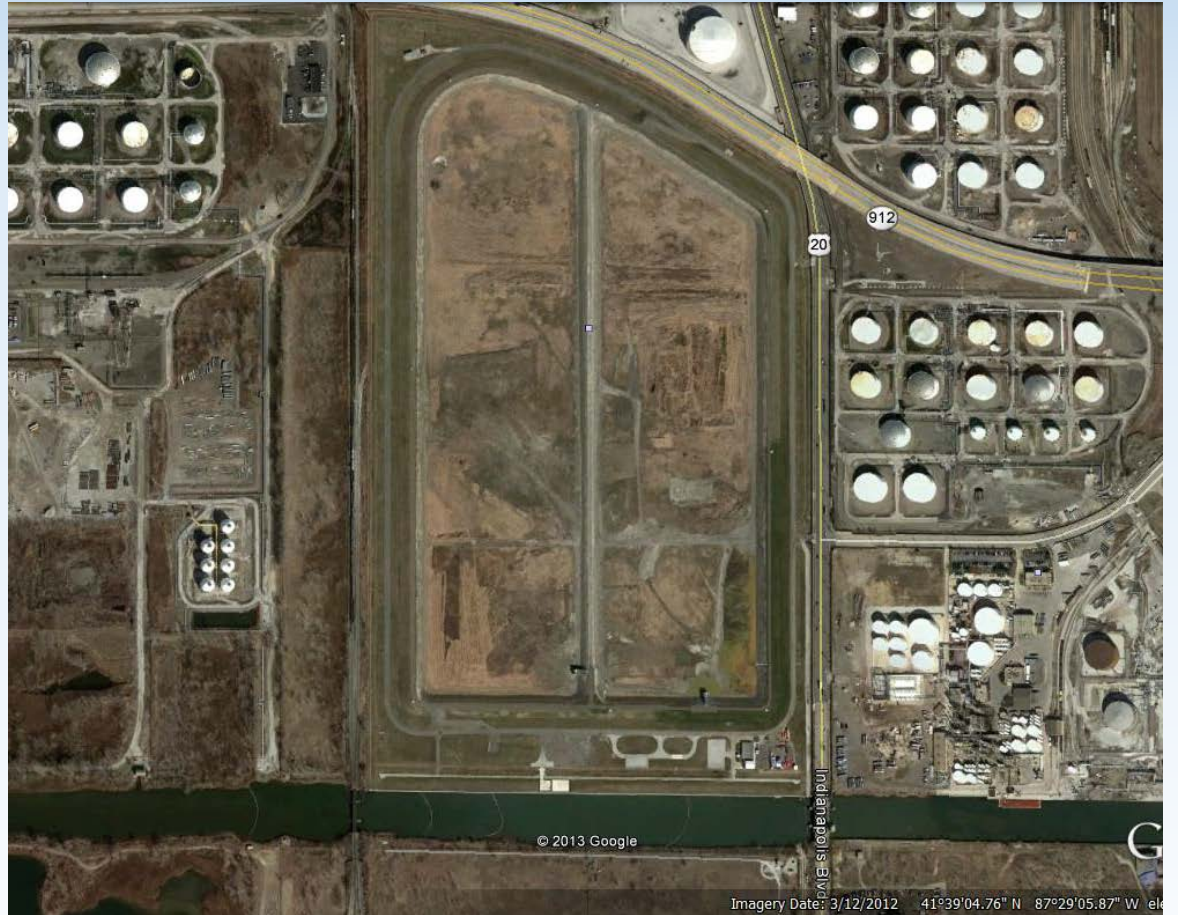
Bridges

- ❖ Six low bridges
 - ❖ Two passenger car bridges, four train bridges
 - ❖ Bridge restrictions on Indianapolis Boulevard weekdays from 5:45am – 7:45am and 3:15pm to 4:45pm



Confined Disposal Facility

- ❖ Located on the site of a former refinery
- ❖ ~90 acre CDF facility
 - ❖ Split into two ~45 acre cells
- ❖ Ability to store in excess of 2.5 million cubic yards



Offloading Operation



Unloading and Debris Separation

- ❖ Hopper barges are unloaded with a Komatsu PC1250 excavator
- ❖ Sediment is screened to prevent debris from entering the submersible pumps
- ❖ Debris is stored in the debris separation barge until limiting draft requires the debris to be offloaded into the CDF.



Pumping System

- ❖ Two separate pumping trains
 - ❖ One submersible and one booster pump in each train
 - ❖ Each train controlled with Variable Frequency Drives to regulate the flow desired by the operator
- ❖ Can be operated with a wireless tablet, in an auxiliary control booth, or at the SCADA computer
- ❖ Farthest discharge is over 3000' from pump out barge



Dredge Material Placement

- ❖ 10 discharge locations in each cell
- ❖ Material is discharged evenly to initially seal the CDF and to minimize unnecessary shoaling and island creation
- ❖ Maximum allowable exposed sediment is 15% of CDF area to prevent airborne contamination
 - ❖ Maximum exposed sediment to date : 10%

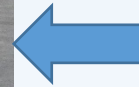


Recirculation

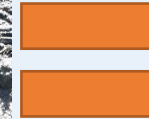
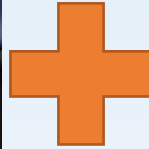
- ❖ Water is recirculated to provide the necessary water to make a slurry without drawing additional water from the canal.



- ❖ Water is also used in a manifold system to break up sediment placed on the debris screen to allow its passage to the submersible pumps.



Debris Encountered



Solution

- ❖ By experimenting with different screen sizes an ideal size was selected
- ❖ Factors for determining screen size:
 - ❖ Ability to prevent material large enough to pass through the screen, but not the pumps
 - ❖ Ability to let sediment flow through the screen

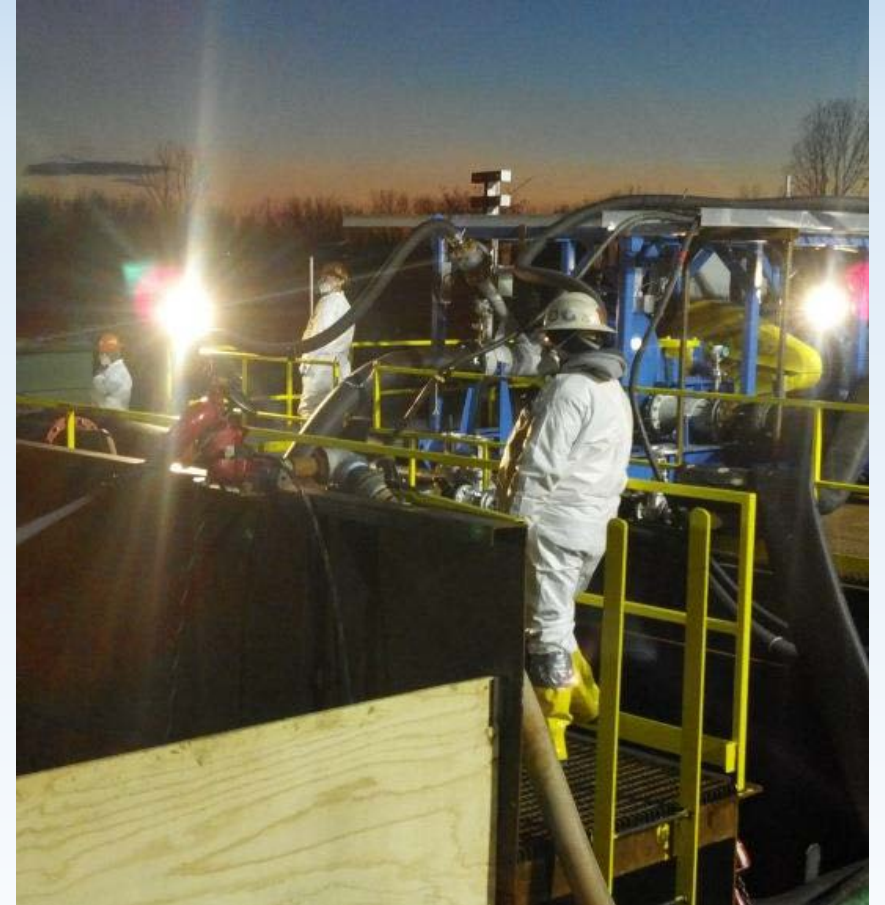


Debris



Tentative Schedule

- ❖ Resume dredging start in Spring 2014 (first week in April 2014, if ice conditions allow)
- ❖ 180,000 +/- CY to be dredged at the turning basin and entrance channel
- ❖ 6 to 7 days a week,
 - ❖ Two 12 hour (24 hour) shifts
- ❖ Approximately two months to complete dredging in 2014



2012 Dredging Map ~94,000 CY



2013 Dredging Map ~306,000 CY



2014 Dredging Map ~180,000 CY



Environmental Monitoring



❖ Instream Water Quality Monitoring

❖ Ground Water Gradient Control Systems

❖ Real-time Volatile Emission Monitoring

❖ Total VOCs at the dredge site

❖ 4 Air Monitoring Stations at the CDF

❖ Naphthalene

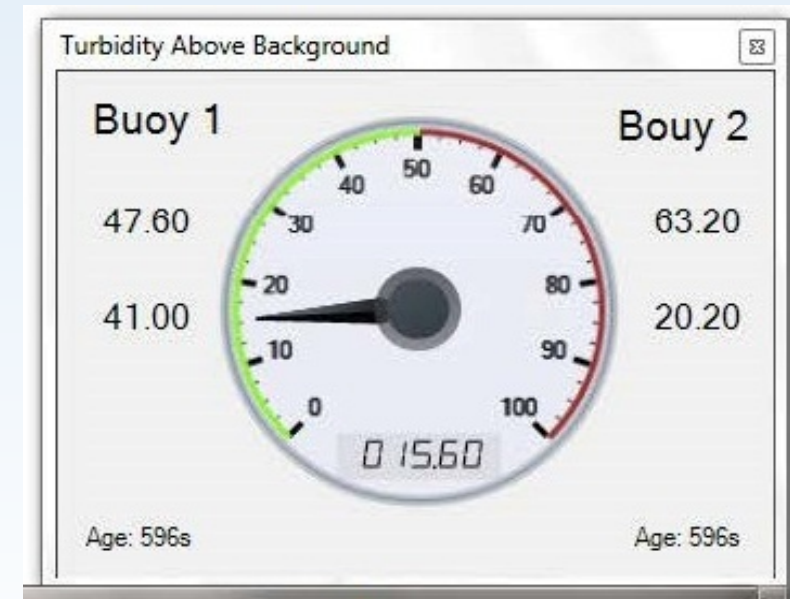
❖ Airborne particulate



Instream Water Quality Monitoring



- ❖ Two environmental monitoring buoys:
 - ❖ Data Loggers
 - ❖ Two turbidity YSI sondes



Groundwater Gradient Control



❖ Lift Stations and Wells direct ground water back into the CDF



❖ An inward gradient is maintained to prevent ground water contamination of the surrounding community

Sealing the CDF

- ❖ Two feet of sediment designed to seal the CDF
- ❖ Sealing required as much sediment to be placed in the CDF as quickly as possible
- ❖ ~150,000 CY in each cell were required to seal the CDF
 - ❖ As of 2014, the CDF has stabilized and the groundwater wells are maintaining an inward gradient around the site.



Real-time Volatile Emission Monitoring



- ❖ Purpose: Protect Community, Environment and Workers
 - ❖ Short-term (1-hr) and long-term (24-hr)
 - ❖ Meet USEPA and IDEM regulations
- ❖ Program Data Requirements (short-term)
 - ❖ Immediately available (real-time)
 - ❖ Dredge Site - Total VOCs; daily
 - ❖ CDF - Naphthalene and particulate; 24/7
 - ❖ Comparison to short-term action levels (STALs)
 - ❖ Posted to public website

Daily Real-time Measurements

- ❖ Photo-ionization detectors (PID) used to measure VOC's
- ❖ Monitoring takes place at the dredge and at the offloading operations
- ❖ Concentration of VOC's determine the need for respirators



Continuous Real-time Monitoring



- ❖ Target Contaminants – 24/7
 - ❖ VOCs (naphthalene)
 - ❖ Airborne particulate (PM₁₀)
- ❖ Centralized Automated Data Collection
 - ❖ Real-time; background corrected
 - ❖ Integrated surface wind data
- ❖ Real-time to Air Monitoring Website
<http://www.indianaharbordredge.com/AirQuality.aspx>
 - ❖ Automated alarms

Log

Indiana Harbor and Canal Dredging and Disposal Project

[PM Log In]

Home Site News Health & Safety Project Information Contact Us Site Map

[Historical air monitoring data](#) can be found on the US Army Corps of Engineers - Chicago District web site.
[Monitoring Results](#)

Links to historical data (ACOE)

Chart Navigation

[View Advanced Chart](#) [View Data in Table Format](#) [View Air Monitor Locations](#) Chart Background Color: #D3D3D3

Date Options (Times are EST)

☐ Last 12 Hours ☐ Last 24 Hours ☒ Custom Date

Start Date: 03/03/2014 02:00 PM End Date: 03/10/2014 02:00 PM

[Go](#) [Clear All](#)

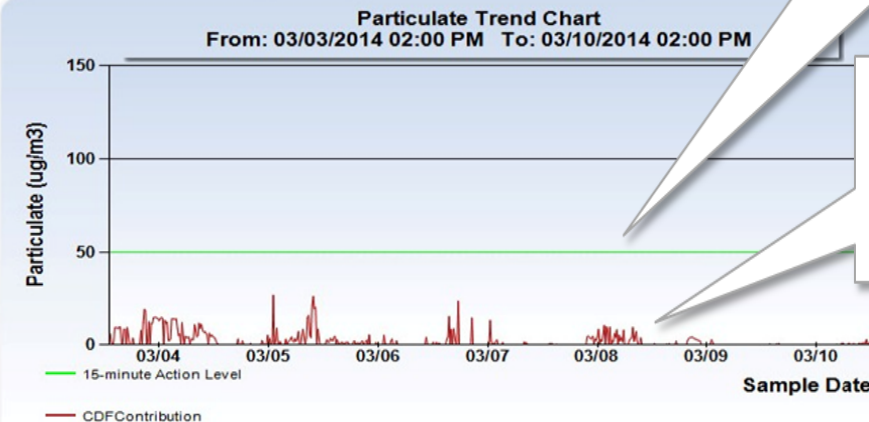
Particulates Naphthalene

☒ Particulates ☐ Naphthalene

Naphthalene Zoom

☒ Zoom Out ☐ Zoom In

Note: if a CDF Contribution point is higher than Action Level then that part of the line will



Air quality limits displayed

Real-time
+
Archived Data
(User selects)

IHC CDF Dredge Project : Air Monitoring Alarm Response Log

Air Monitoring Station: ☒ M1 ☒ M2 ☒ M3 ☒ M4 ☐ Dock

Air Monitoring Instrument:

☐ Cerex Unit (Naphthalene) ☒ Thermo Unit (Particles) ☐ PID Monitor

Date & Time of alarm: 7/16/2013 10:45 AM

Email sent to site Technician? (Yes or No)

Technician responded to the alarm; Scott Peterson

1. Was dredging occurring at the time of the alarm? (Yes or No)

2. Alarm caused by:

- ☐ Loss of Power
- ☐ Loss of Radio Communication
- ☐ Out of Calibration
- ☐ UV Alignment
- ☐ Blockage in Air Tube
- ☒ Air Quality
- ☒ Other: Site Maintenance-Mowing

Alarm Details

Cause

Actions Taken

3. Corrective Actions taken? (Yes or No)

4. Dredging suspended? (Yes or No)

5. Alarm logged in air monitoring action spreadsheet? (Yes or No)

Description of Action Taken:

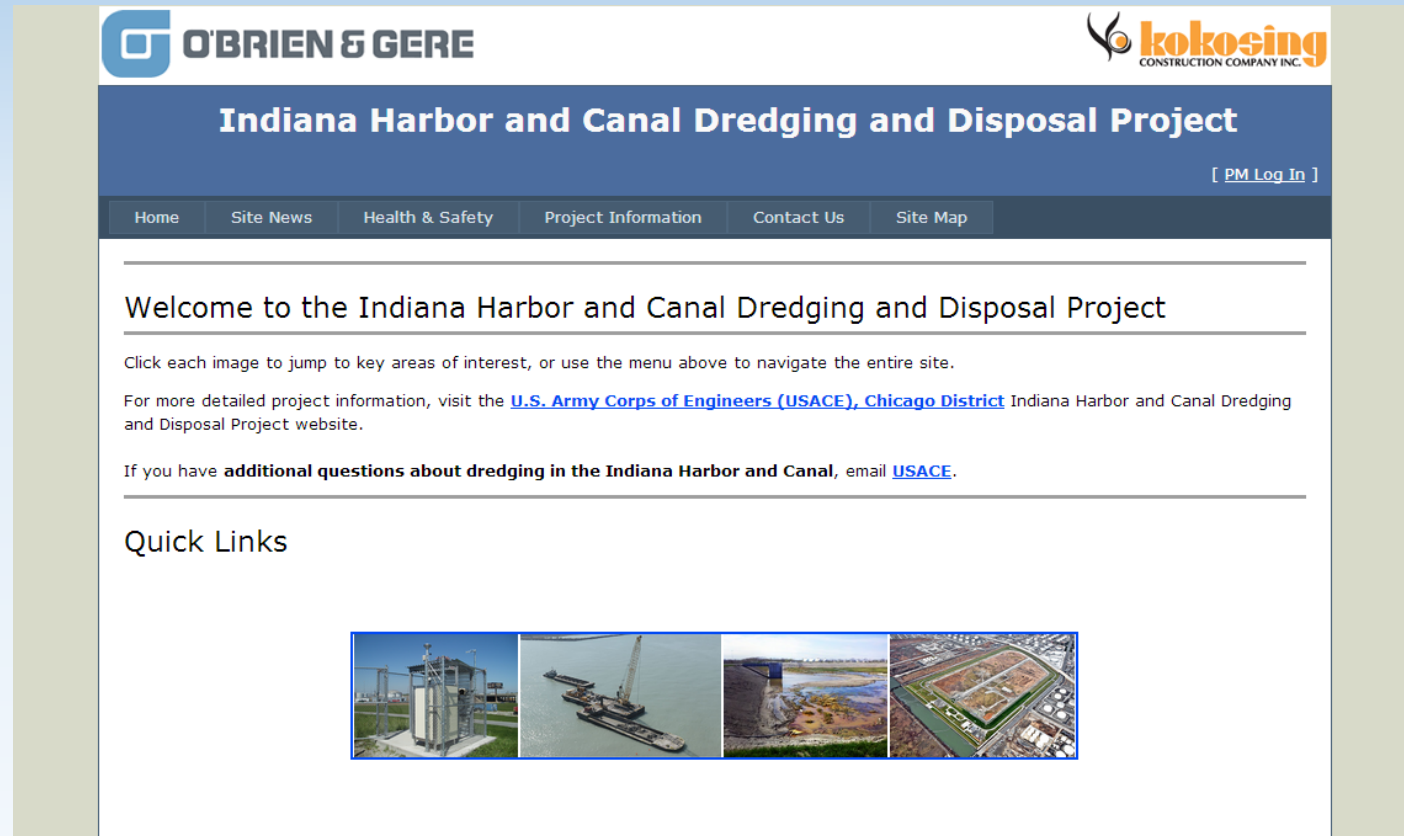
A) While USACE was performing site maintenance of mowing and trimming, along with dry site condition and high pollen count, the particulate readings were above normal for most of the day. The mowing tractor started working at 8:00 AM and finished around 2:30PM.



Real-time Monitoring Program Successes

- ❖ Demonstrated Continuous Protection - Community, Environment, and Workers
 - ❖ Dredging and off season
 - ❖ Air quality within USEPA and IDEM limits
- ❖ Successful Real-time Website
 - ❖ Immediate feedback to project team and ACOE
 - ❖ Addressed public's air quality concerns
- ❖ No air quality-related project delays

Indiana Harbor Dredging Website



<http://www.indianaharbordredge.com>

Questions? Comments?



Views expressed in this presentation are those of the Kokosing/ O'Brien & Gere JV and not those of the U.S. Government