

# Chicago Area Waterway System (CAWS) Dredged Material Management Plan (DMMP) – Calumet River Sediment Human Health Risk Assessment

## Quick Facts:

- The existing Chicago Area CDF has operated for over 30 years without causing significant adverse environmental impacts.
- The parameters and levels of contamination in the Calumet River and Calumet-Sag channel are generally similar.
- Particulate emissions (dust) from sediment is mainly comprised of naturally occurring materials, such as sand and clays, with relatively small amounts of contaminants adsorbed to the dust particles.
- The DMDF will hold sediment and dewater it. The water will be treated and/or sent to a local sanitary sewer for treatment.



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*Dredged material from the Calumet Harbor and River navigation project has been placed in the existing Chicago Area Confined Disposal Facility (CDF) since 1984. Numerous water quality monitoring samples collected over time indicate that the CDF is effective and has not caused any long-term, significant adverse impacts to the surrounding environment.*

## Contaminants of Concern

Potential human health risks posed by contaminants of concern (CoCs) in the Calumet River sediment were compared to levels used by the Illinois Environmental Protection Agency to evaluate human health risks listed in the Tiered Approach to Corrective Action Objectives (TACO). A table comparing sediment samples to the maximum allowable concentrations (MAC) in uncontaminated soils used as fill material are provided in a separate fact sheet. (MAC values were derived from the TACO regulations to ensure uncontaminated soils used as fill material would be protective of human health.) The main CoCs in the sediment include arsenic, various heavy metals, such as chromium, copper, lead, and mercury, and organic compounds such as PAHs and PCBs.

## Air Quality Assessment

The Clean Air Act (CAA) includes a general conformity rule to ensure that Federal activities do not contribute to air quality problems within non-attainment areas. In order to determine whether emissions from proposed construction and placement activities at the Dredged Material Disposal Facility (DMDF) would meet these requirements, the proposed plan was compared to similar area projects.

The proposed construction activities were compared with the Upper Des Plaines River and Tributaries project. Modeling of this large-scale project that includes constructing two reservoirs and several miles of levee indicated that construction-related equipment and vehicles, known as mobile source emissions, would not be a problem. Ongoing placement activities were compared with those modeled for the Grand Calumet River feasibility study, which included dredging a larger volume of more highly contaminated sediments. Volatile emissions were less than regulatory thresholds<sup>1</sup>, but particulate emissions could be a concern if unmanaged. As a result, controls, such as wetting the sediment, silt fences, or vegetation, may be needed to address particulate emissions.

The risk to human health depends on the type of contaminant, the level or dose of the contaminant, and the exposure route, such as through ingestion or inhalation of particles, or ingestion of ground water.

Although the levels of most of the CoCs in the sediment exceed background levels, and the levels of several CoCs exceed the TACO levels, the DMDF will be designed to confine the contaminated dredged material and minimize exposure to the contaminants. Once the facility is complete, a final cover will be placed on the site, it will be turned over to the non-Federal sponsor, and the site could be developed for another use that is consistent with site restrictions.

## Human Health Risk

Prior to constructing the Indiana Harbor and Canal (IHC) CDF, the U.S. Environmental Protection Agency (USEPA) conducted an extensive study to evaluate human health risks, including a Supplemental Risk Assessment (SRA) that was finalized in 2006. The USEPA employed weather and sediment data and computer models to estimate the type of pollution that could be released, the amount of pollution to which people could be exposed, and the likelihood that exposed people could get sick. Cancer risks were found to be within USEPA's established safety levels and residents were determined to be relatively safe from getting non-cancer illnesses, such as respiratory, nerve and organ damage, and reproductive problems.

The table on the reverse shows that in comparison to average concentrations in the IHC sediment, the average concentrations in the Calumet River sediment are considerably lower. As a consequence, the risks from Calumet River sediment would also be lower.

### Quick Facts:

- The DMDF will include a clay liner along bottom and berms to prevent release of contaminants to ground water.
- The DMDF will include controls, such as wetting the sediment, silt fences, and/or vegetation to minimize exposure to dust.
- Access to the facility during its life will be restricted to ensure safety and minimize exposure to sediment and/or water.
- After the DMDF is filled, a final cover will be placed to contain the sediment and prevent future exposure.



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### Comparison of Indiana Harbor and Canal (IHC) and Calumet River Sediment

Parameters	IHC - Arithmetic Mean [mg/kg]	Calumet River - Arithmetic Mean [mg/kg]	% Less Than IHC (IHC - Calumet River)/IHC
<b>Metals</b>			
Arsenic	75.4	36.8	51.2%
Barium	159	48.2	69.7%
Cadmium	13.6	1.71	87.4%
Chromium (total)	705	52.4	92.6%
Copper	336	104	69.1%
Lead	1,022	178	82.6%
Manganese	3,374	1,515	55.1%
Mercury (total)	1.06	0.149	85.9%
Nickel	165	40.5	75.5%
Zinc	6,973	942	86.5%
<b>PAHs</b>			
Acenaphthene	21.6	0.49	97.7%
Acenaphthylene	54.9	0.14	99.7%
Anthracene	35.0	0.49	98.6%
Benzo[a]anthracene	44.1	1.05	97.6%
Benzo[a]pyrene	35.3	0.97	97.2%
Benzo[b]fluoranthene	35.4	1.28	96.4%
Benzo[k]fluoranthene	18.5	0.47	97.4%
Benzo[g,h,i]perylene	25.3	0.59	97.7%
Chrysene	60.7	1.42	97.7%
Dibenz[a,h]anthracene	10.6	0.22	98.0%
Fluoranthene	88.1	2.14	97.6%
Fluorene	42.7	0.49	98.8%
Indeno[1,2,3-cd]pyrene	94.6	0.63	99.3%
Naphthalene	478	6.66	98.6%
Phenanthrene	171	2.40	98.6%
Pyrene	93.4	2.18	97.7%
<b>PCBs</b>			
Total PCBs	35.6	1.70	95.2%

Note:

<sup>1</sup> Details are in the U.S. Army Corps of Engineers (USACE), Chicago District's Grand Calumet River Feasibility Study in Lake County, Indiana General Conformity Determination, dated January 2009. Total estimated volatile emissions for both the dredging operation and disposal facility was 11.53 tons per year, which assumes the Indiana Harbor and Canal (IHC) and Grand Calumet River are being dredged simultaneously. This estimate was much less than the *de minimus* pollutant level of 100 tons per year for VOCs in a nonattainment area outside an ozone transport area. In addition, the IHC CDF operates under a "registration" status with the Indiana Department of Environmental Management (IDEM) that sets the maximum volatile emissions per year at 25 tons. VOCs are not considered to be one of the contaminants of concern for the Calumet River sediment.