

ERDC Findings Regarding Ohio EPA Technical Comments on Buffalo District's Evaluation of Cleveland Harbor Sediments

15 December 2014

Meeting Parameters: A meeting was held at the U.S. Army Engineer Research and Development Center's (ERDC) Environmental Laboratory on 25 November 2014 at the request of Ohio EPA (OEPA). The purpose of the meeting was for OEPA to present the technical basis for their concerns regarding open-lake placement of dredged material from Cleveland Harbor. Meeting participants were from USACE (ERDC; Great Lakes and Rivers Division, LRD; Buffalo District, LRB), USEPA, and OEPA, specifically: Mr. David Dale (LRD), Mr. Scott Pickard (LRB), Dr. Beth Fleming (ERDC), Dr. Todd Bridges (ERDC), Dr. Paul Schroeder (ERDC), Mr. Chris Korleski (USEPA), Mr. David Cowgill (USEPA), Dr. Marc Tuchman (USEPA), Mr. John Dorkin (USEPA), Mr. Kurt Princic (OEPA), Mr. Gary Klase (OEPA), Mr. Richard Blasick (OEPA), and Dr. Vanessa Steigerwald-Dick (OEPA). Formal discussions occurred between approximately 0830 and 1200. OEPA used a PowerPoint briefing to present their concerns. After discussions concluded, ERDC staff provided a tour of laboratory facilities used for conducting research on sediment toxicology and bioaccumulation, sediment management and engineering, and analytical chemistry.

Overall Finding: Based on the available evidence, the undersigned conclude that the Cleveland Harbor sediments present an acceptably low risk to Lake Erie, consistent with LRB's overall conclusions that open-lake placement of Cleveland Harbor sediment is not expected to result in significant adverse effects relative to the Clean Water Act Section 404(b)(1) guidelines. OEPA's comments on the Environmental Assessment (EA) prepared in accordance with the National Environmental Policy Act highlight opportunities for LRB to strengthen the evaluation and communication of results. We also believe that there are additional operational and engineering controls that could be considered for minimizing the environmental risks associated with the project, consistent with the direction in 40 CFR 230.11(d) to take "appropriate and practicable steps... which will minimize potential adverse impacts of the discharge on the aquatic ecosystem." Incorporating such additional engineering and operational measures into the project could provide the basis for a win-win outcome to the current impasse.

Major Findings: OEPA presented 5 primary arguments for their position that the sediments currently scheduled to be dredged from Cleveland Harbor should not be placed in Lake Erie.

1. The Port of Cleveland has a plan to provide 35+ years of Confined Disposal Facility (CDF) capacity. The financial viability of this plan is dependent on USACE placing dredged material from Cleveland Harbor in the CDF and providing the associated tipping fees. OEPA made reference on multiple occasions to the fact that parties are having to make long-term "business decisions" about management of dredged material from Cleveland Harbor and that uncertainty regarding how dredged material would be managed (whether through open-lake placement or management in the CDF) was complicating these decisions.
2. LRB went beyond the procedures defined in the Great Lakes Testing Manual (GLTM) in reaching its determination that the material was suitable for open-lake placement. If the GLTM procedures were followed, then the material would be considered unsuitable for open-lake placement.
3. The reference sediment used by LRB to compare the level of PCB bioaccumulation in Cleveland Harbor sediment to Lake Erie sediments was inappropriate because the lake reference sediments had been impacted by past disposal operations and consequently the PCB concentrations at the reference site are higher than lake background concentrations.

4. Bioaccumulation tests performed on Cleveland Harbor sediments indicate that PCBs in the sediment are expected to increase PCB bioaccumulation into the tissues of animals in the lake if the dredged material is placed in the lake. Since Lake Erie is currently impaired due to elevated levels of PCBs in water and sediments, as reflected by the current fish consumption advisory for PCBs, placement of sediments from Cleveland Harbor in Lake Erie is unacceptable.
5. LRB did not consider all of the relevant lines-of-evidence (LOE) in reaching its determination that Cleveland Harbor sediment was suitable for open-lake placement. These LOE include information related to the nature of PCB impairment in Lake Erie. In addition, LRB did not sufficiently coordinate and communicate with OEPA on the procedures it used in testing, evaluating, and concluding that the Cleveland Harbor sediments were suitable for open-lake placement.

The findings of the undersigned regarding each of the 5 primary arguments presented by OEPA are presented below.

OEPA Argument 1: Sufficient capacity can be provided in the Cleveland Harbor CDF. This argument is not germane to technical considerations covered in 40 CFR 230 as to whether and to what degree dredged material from Cleveland Harbor would have an “unacceptable adverse impact” on Lake Erie. The “Federal Standard” is established as the least costly, environmentally acceptable, practicable alternative. The Port of Cleveland CDF plan is just one of several alternatives that would be considered in establishing the “Federal Standard”.

OEPA Argument 2: The GLTM was not followed. The GLTM was jointly published by USEPA Region 5 and USACE (Great Lakes and Ohio River Division) in 1998. The intent of the GLTM was that it be “consistent with the national guidance presented in *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual* (USEPA/USACE, 1998), also known as the “Inland Testing Manual.”” Further, the GLTM states that “This regional testing and evaluation manual should be used to supplement the national testing and evaluation guidance in accordance with the 404(b)(1) Guidelines (40 CFR 230). **The user of this regional guidance should have read and be familiar with the "Inland Testing Manual" (USEPA/USACE 1998) and the 404(b)(1) Guidelines in their entirety.**” The undersigned find that the evaluation conducted by LRB is consistent with the GLTM, the national guidance contained in the Inland Testing Manual (ITM), and the requirements under 40 CFR 230. Furthermore, the environmental testing and evaluation conducted by LRB represents the most extensive and detailed effort to evaluate an individual dredging project in the history of Great Lakes dredging. The additional analysis that LRB undertook to evaluate the bioaccumulation potential of PCBs is similar to and consistent with the types of analyses that have been conducted at other dredging projects across the country when uncertainty regarding bioaccumulation has prompted additional study and analysis. The analyses undertaken by LRB to reach the conclusion that the dredged material from Cleveland Harbor is suitable for open-lake placement are consistent with the GLTM, the ITM, and 40 CFR 230.

OEPA Argument 3: LRB used an inappropriate reference to compare bioaccumulation levels from Cleveland Harbor sediments. PCB concentrations in water and sediment vary both spatially and temporally. This is evident from data collected from Lake Erie as well as other waterbodies around the country that contain PCBs. USACE and USEPA use reference sediments to compare the relative differences in toxicity and bioaccumulation between the proposed dredged material and sediments in the area where dredged material will be placed (absent the influence of previous dredged material disposal activities). If less toxicity and bioaccumulation are observed in the dredged material compared to the reference, then a finding of no “unacceptable adverse effects” can be easily made. Therefore, the

selection of a reference area is important to determining potential impacts of dredged material placement. Reference areas should contain sediments with similar physical characteristics as the dredged material. For dispersive placement sites, the reference area should be located near the placement site but be outside the dominant path of sediment transport from the placement site and be representative of area-wide contamination. Reference site CLA-4 provides a representative reference area that is outside the influence of past dredged material placement activities at CLA-1. The most recent placement operations at CLA-1 occurred more than 40 years ago; subsequent sedimentation, dispersion and natural recovery processes at the site have produced surface sediment conditions representative of the regional background. The GLTM allows use of reference sites within a placement site. Additionally, the ITM also allows use of past placement sites for comparative risk purposes, particularly when placement activities occurred decades ago. Therefore, CLA-1 can also be used as a reference area. Additionally, OEPA does not have a standard to guide the selection of reference sediment, but simply evaluates the information USACE provides. Given the available information, the undersigned find that the reference sediments used in the evaluation are consistent with established practice and are sufficiently representative of sediments in Lake Erie to serve this purpose.

OEPA Argument 4: Bioaccumulation is higher in Cleveland Harbor sediments and is therefore unacceptable for placement in Lake Erie. The concentration of PCBs in the sediments to be dredged from Cleveland Harbor averages about 100 parts per billion (ppb) while PCB concentration in the reference sediments used for the two potential placement sites (CLA-1 and CLA-4) average about 125 ppb; however, the sediments to be dredged had less total organic carbon, increasing bioavailability of PCBs. Relative differences in the bioavailability of the PCBs resulted in higher bioaccumulation of PCBs in worms exposed to the dredged material compared to worms exposed to reference sediments from CLA-1 and CLA-4 (between 1.03X and 4.3X). In cases where bioaccumulation is higher in the dredged material (compared to the reference) without a corresponding increase in toxicity, as found in the testing of the Cleveland Harbor sediments, accepted national practice allows for the use of additional lines-of-evidence to reach conclusions about the potential for “unacceptable adverse effects.” In order to determine whether higher bioaccumulation in sediment-dwelling organisms would result in an unacceptable impact on the environment following placement in Lake Erie, LRB conducted an evaluation to conservatively estimate benthic food-web exposures to fish. The approach LRB used to perform this analysis is comparable to approaches used in other dredging projects, nationally, to evaluate risks related to bioaccumulation. Based on the multiple lines-of-evidence developed through this evaluation, LRB concluded that the dredged material meets the 404(b)(1) guidelines for open-water placement in Lake Erie. When OEPA was asked during the meeting whether they expected placement of Cleveland Harbor sediments in Lake Erie to affect either local or lake-wide risks, they responded that they did not expect a consequential change in risk levels. When they were then asked what standard they were applying to reach the conclusion that the placement would be unacceptable, they responded that OEPA did not have a standard for making this judgment. From statements made by OEPA during the meeting, the basis for their opposition to placing Cleveland Harbor sediments in the lake appears to be related to the goal of reducing PCB loading to Lake Erie. Based on our review of the data and evaluations performed, the undersigned find that placement of the dredged sediments in Lake Erie, as proposed, presents a low but acceptable risk to the environment that is consistent with the 404(b)(1) guidelines as specified in 40 CFR 230. The potential increase in PCB bioaccumulation in fish would not affect the rate of Lake Erie recovery or the time to achieve risk reduction goals, would not impact wildlife populations, and would not alter the required fish consumption advisories.

OEPA Argument 5: LRB did not consider all the relevant lines-of-evidence in reaching its factual determination. The undersigned do not believe that the inclusion of the additional LOE raised by OEPA

would lead to a different factual determination regarding open-lake placement. However, we do believe that including a discussion of these LOE would strengthen the evaluation by considering environmental conditions in Lake Erie, with respect to PCBs. We did evaluate an additional LOE by comparing PCB concentrations in Cleveland Harbor sediments to levels USEPA and OEPA have determined in the long term to be protective of human health and the environment in more than 10 sediment projects in other regulatory contexts (e.g. Great Lakes Superfund projects, GLNPO sediment clean-up projects). In all of these cases, the concentrations of PCBs in Cleveland Harbor sediments are lower (in many cases substantially lower, e.g., 1/2 to 1/3 the concentration). In regard to the matter of coordination and communication, a brief review of the record indicates the LRB and OEPA have engaged in extensive communication regarding this project, including numerous teleconferences, face-to-face meetings, as well as email and letter correspondence. We recommend that LRB and OEPA work together to define a mutually agreeable framework for requesting and receiving timely water quality certification for future dredging projects, consistent with the intent of guidance in the GLTM concerning the need for close coordination.

Final Recommendations:

Short-term recommendation: LRB has proposed the use of an operational measure to minimize risk related to open-water placement, i.e., reducing the size of the area over which the dredged material would be placed in order to reduce exposure to PCBs. Other potential operational and engineering approaches that could be employed include capping disposed sediments with a layer of clean sediments, sequencing dredged material placement such that sediments with lower bioavailable PCB concentrations are placed on top of sediments with higher concentrations (thus reducing surface exposures), placing activated carbon within the surface layer of disposed sediments, in addition to other approaches. In regard to the use of activated carbon, 10 years of research at ERDC and many other organizations worldwide has shown that activated carbon has a very high affinity for PCBs in sediment and can be used to dramatically reduce PCB exposure and bioaccumulation (by as much as 90% with modest dosages). Such operational and engineering actions are the kinds of approaches referred to in 40 CFR 230.11(d) as “appropriate and practicable steps... which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.” One or a combination of such actions could be evaluated (including costs) as an approach for minimizing risks and addressing uncertainties in testing, evaluation, and operations.

Long-term recommendation: The key to preemptively avoiding potential impasses in the future regarding dredged material placement in Lake Erie and the other Great Lakes is to identify ways to achieve win-win outcomes. The most direct path to such transformation is to take steps to reconfigure dredged material management from an in-water “disposal operation” to an in-water “beneficial use” activity. In-water management of sediments is generally less costly than managing sediments in upland sites, such as CDFs. In addition, there are many economical beneficial uses for sediment in water that are consistent with *Engineering with Nature* principles and practices, including habitat creation, development of Natural and Nature-Based Features to support coastal resilience, use of dredged material to cap historically contaminated areas, etc. Expanding the dialogue within the region on the opportunities for in-water beneficial use is a key element of an overall strategy to reduce reliance on costly, and in many cases unnecessary, upland management of dredged material.

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