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COMMENTS ON THE PROPOSED REMEDIAL ACTION PLAN FOR HARBOR AT HASTINGS OPERABLE UNIT NUMBER 2

These comments on the Proposed Remedial Action Plan for Operable Unit Number 2 (OU#2 PRAP) are submitted by the Louis Berger Group, Inc. (Berger) on behalf of the Village of Hastings-on-Hudson (the Village). The comments are based primarily upon a review of the OU#2 PRAP as well as the Feasibility Study (FS) Report for OU#2, both of which were prepared by Earth Tech, Inc. on behalf of the New York State Department of Environmental Conservation (NYSDEC). Furthermore, and consistent with the overall regulatory objectives for remedial action to address the sediment contamination that comprises OU#2, our comments focus upon developing and implementing a remedial action that achieves the maximum reasonable protection of both human health and the environment for the Village and its current and future citizens.

It is apparent from our review of the work that has been executed on behalf of NYSDEC that extensive work has been undertaken to study the sediment contamination situation and to develop a range of remedial alternatives to be considered prior to proposing the proposed remedy: removal of PCB contamination > 1 ppm and metals contamination exceeding site-specific cleanup goals within approximately 100 feet of the shoreline regardless of its depth, with the remainder left in place (based on the belief that it is not feasible to safely remove sediment contamination farther than approximately 100 feet from the shoreline). Despite this substantial level of effort, the Village respectfully requests that NYSDEC and the Responsible Party (ARCO) consider the following:

1. Available hydrodynamic modeling and river scour depth prediction methods can and should be utilized to better assess, and tie the remedial action plan to, the actual risks posed by the contaminated sediments (i.e., the likelihood of release into the water column where humans can be directly exposed and/or into the food-chain where it can bio-accumulate in edible marine life); and,

2. An optimized alternative that combines the removal of the highest and most likely to be released sediment contamination with capping is feasible and is more protective and cost-efficient overall when compared to the currently proposed alternative.

A further detailed explanation of the basis of these two principal comments follows, as well as a further comment on the need to perform appropriate hydrodynamic modeling regardless of which alternative is ultimately selected.

I. The Importance and Utility of Hydrodynamic Modeling and Scour Depth Prediction

Increased flow velocities that occur within a river during large storms disturb and “scour” (at least temporarily) loose sediments that exist at the bottom of the river and move them to new locations. The smaller the particles that make up these sediments, the more susceptible they are to scouring and, accordingly, the lower the storm flow velocities that are necessary to disturb and move them. The “smudging” of the contamination contour pattern that can be observed if the contours for shallow sediments (zero to 6 inch depth) are compared to the contours for sediments deeper than 6 inches provides direct evidence of this well-established phenomenon (i.e., the deeper contamination contours indicate more localized areas of higher concentrations, whereas the shallow contamination contours indicate wider contamination spread but at generally lower concentrations). The primary risk pathway that has been identified by NYSDEC for OU#2 is related to the availability of the contaminated sediments to the food chain and the river at large. Based on these two factors, we believe it is imperative to quantitatively assess this scour potential in order to properly understand the fate and transport of the contamination - and thus to develop the most appropriate remediation plan.

Although scour depth is directly relevant to both the risk assessment and remedy selection components of the proposed remediation, it appears that a quantitative scour assessment has not been performed to date. Likewise, there is no mention in the reports that were reviewed of any hydrodynamic modeling to quantify the potential for upward migration of contaminants (primarily the PCBs) as groundwater below the river bed moves up and into the river and possibly carries contamination with it through advection or dispersion. Therefore, it is requested that a hydrodynamic assessment be completed and integrated into the decision-making process. For example, if it is determined using hydrodynamic modeling techniques that upward advection/dispersion is negligible and that riverbed scour depths do not exceed 3 feet under even the worst-case "design storm" condition, then both the risk assessment and the remedy could focus on the sediments within this zero to 3 foot stratum as opposed to just evaluating contamination levels without regard to depth (and therefore the likely stability) of the contaminated materials. Likewise, if hydrodynamic modeling indicates that particles larger than gravel sized stones will remain stable and in place during design storm conditions, a better evaluation of the effectiveness and impacts of capping alternatives could be completed. More specifically, hydrodynamic modeling could provide the following types of useful and relevant information (most of which would ultimately be required for the design phase of the remediation process regardless):

- Evaluation of river current magnitude and flow direction in the vicinity of the site and the delineated contaminated zones.
- Evaluation of design storm (including wind) events on dispersing contamination upstream and downstream of the site.
- Quantification of the potential role played by upward groundwater gradients in carrying contamination up through the riverbed.
- Identification of the proper stone size, cap thickness, and/or geosynthetic barrier type to ensure that a cap could effectively protect from contaminant migration and remain stable and in place.

- Evaluation of the impact that a cap might have on the riverbed and ecosystem both upstream and downstream of OU#2.

The Village also respectfully requests that the results of the above listed evaluations be shared with all interested parties as part of a second review period prior to the final selection of the proposed remedy for OU#2, or, if a ROD is adopted without these studies, that the information be made available for public review and comment during the remedial design stage. Given the long-term impacts of the currently proposed remedy and the relatively short time it would take to perform these additional evaluations, we believe that this request is reasonable and appropriate.[1]

II. An Optimized, Feasible, and More Cost-Efficient Remedial Alternative Can Be Developed that Combines Sediment Capping with Removal Of the Highest and Most Likely to be Released Sediment Contamination

The OU#2 PRAP concludes that the preferred remedy is to remove contamination within approximately 100 feet of the shoreline regardless of its depth, but leave the remainder in place in an uncapped condition. The primary basis of this selection appears to be the belief that it is not feasible to safely install and maintain sheeting or any other temporary enclosures to remove contamination in a controlled manner farther than 100 feet from the shoreline. This conclusion is not backed up in the documentation itself with a detailed engineering analysis. Moreover, it is inconsistent with the fact that controlled excavations are safely performed in river conditions with greater depths and higher velocities than the subject location on a regular basis (e.g., for pier foundations when constructing river crossings such as the Tappan Zee and George Washington Bridges).

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[1] The Village does not believe that the remedy proposed for consideration in these comments or any of the alternative remedies in the OU#2 PRAP should delay finalization of the Record of Decision for OU-1 or the undertaking of the remediation contemplated in the PRAP for OU-1. Thus, NYSDEC could issue a revised PRAP for public review and comment if deemed appropriate without jeopardizing the work on OU-1.

In contrast, the Village and its engineering consultant believe that an optimized alternative that combines sediment capping with the removal of the highest and most likely to be released sediment contamination is not only feasible, but is also much more protective overall when compared to the currently proposed alternative. Furthermore, we believe that such an alternative may also be optimized to be more cost-efficient than the proposed remedy in terms of total mass of migration-prone contaminants removed (not to mention the added benefit of controlling the remainder of the contamination).

As stated above, there are two primary components to this optimized alternative that is being proposed for consideration: (1) removal of the most-likely–to-migrate (based on hydrodynamic modeling results) and highest levels of contaminants (based on contour mapping) within cellular sheet-pile enclosures or "cells" that are elongated in the direction of river flow and designed to withstand the anticipated river velocities, ice jams, etc; and, (2) design and installation of a cap using hydrodynamic modeling results to select cap layer types and thickness and to ensure cap effectiveness and stability.

The use of temporary sheet-pile enclosures is the most protective means of isolating a localized area to be dredged as the interlocking steel sheets are driven into the sediments well below the level of dredging and also extend to above the water surface. The use of a fully enclosed oval or rectangular shaped sheet-pile cell rather than a large three-sided enclosure that extends from the shoreline is the means by which dredging, whether for remediation or for a bridge foundation excavation, is most frequently completed in greater water depths where it is required to maintain a controlled environment (i.e., an environment without release of sediments into the surrounding waters as a potential pollutant). Between the enclosed shape and the elongation of the oval/rectangle in the direction of flow, these cells have superior rigidity and resistance to the kinds of forces that can exist in a large river, including but not limited to high water velocities, ice jams, and high winds. Geosynthetic silt curtains are also used for isolating areas to be dredged but are not preferred because they are not anchored into the sediments, they only extend to the water surface (not above it), and they are subject to tearing; thus greatly increasing the likelihood of a release of contamination during dredging operations.

The proposed optimized approach has the advantage of identifying and removing that component of the contamination that gives rise to the greatest future risks while capping and permanently isolating the remainder. Based in large part upon the results of the hydrodynamic modeling discussed above, the "priority-removal" program that is included in this approach could be designed using a mathematical and risk-based approach to identify the sediment hot spots that could be removed (i.e., the most risky sediments) and to establish the removal depth as something greater than the potential scour depth at that location. Likewise, the hydrodynamic modeling results would also be used to properly design the cap materials to ensure that they will remain in place and effectively control the upward migration of contamination that is left in place. Combined, these two remedies will result in the removal of the highest and most likely to be released sediment contamination (the accessible hot spots) while leaving the lower levels of contamination in place but containing them using an engineered cap that will restrict future migration of the contaminants. Finally, it is noted that this proposal for an optimized alternative is intended to set forth a conceptual approach, and that there may be areas that would warrant certain additional considerations regarding the desirability of contaminant removal regardless of the results of the hydrodynamic modeling (e.g., the highly-contaminated, adjacent to the shoreline, debris-filled area off of the northwest corner of the site).

III. Hydrodynamic Modeling Should Be Performed Immediately Because The Modeling Is Needed to Properly Evaluate and Complete the Design of the Currently Proposed Alternative

The alternative that is proposed in the OU#2 PRAP includes the use of a very large sheet-pile enclosure at the northern (upstream) end of the site as well as a connected downstream enclosure using a silt curtain. In this manner, the proposed mechanical dredging (within the sheet-pile enclosure) and the proposed hydraulic dredging (inside the silt curtain) can be performed under controlled conditions. As noted above, the Village has serious reservations about the reliance on silt curtains to control effectively sediment released during dredging – even hydraulic dredging. The use of sheet pile enclosures would be far preferable to the reliance on silt curtains to minimize the potential for dispersion of contaminated sediments during dredging.

The PRAP currently sets the limit as 100 feet, subject to future refinement. Not surprisingly – given the apparent lack of hydrodynamic modeling performed to date – it is acknowledged in the PRAP that the feasible limits of sheet-pile enclosure and silt curtain as proposed cannot be definitively established at this time. Similarly, the details of any capping approach and its projected effectiveness cannot be definitively established without this modeling. Therefore, regardless of whether full consideration will be given to the optimized alternative that is proposed above (or any other alternative), a proper alternative evaluation and selection cannot be completed without the benefit of this modeling. For this reason, the Village urges NYSDEC to undertake (or have the Responsible Party undertake) a hydrodynamic modeling effort in connection with its finalization of the PRAP regardless of which alternative is pursued. If this is not to be done at this time, the Village requests a prompt explication of the quantitative basis of setting the 100 foot (from the shoreline) limit for the removal of sediment contamination.