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Document	EPA Response to Comments from Matt McMahon, PhD., on Engineering Performance Standards – Public Review Copy Hudson River PCBs Superfund Site
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Reviewer	#	Comment	Topic	Response
Matt McMahon, PhD	1	I remain concerned about the amount of PCB's released upriver during dredging that may approach Poughkeepsie and threaten its water supplies. Various PCB resuspension rates ranging from 1.24 (EPA) to 10% (Fox River) have been reported in the literature. And getting accurate measurements of the release is understandably difficult. Since Fox River is a flowing system like the Hudson, I must believe that resuspension could be as high as 10% in the Hudson as well. But Poughkeepsie is many miles downstream of Ft. Edward and some of the PCBs undoubtedly become adsorbed to sediment and settle out. How much settles out and how far downstream are good questions that I have not seen seriously addressed. Have estimates been made of the probability of PCBs in the Hudson River at Poughkeepsie exceeding drinking water standards during dredging?	**Resuspension** Public water supplies, drinking water quality	No specific estimates have been made of the probability of Poughkeepsie exceeding drinking water standards during dredging. However, Poughkeepsie has lower PCB baseline concentrations and settling is expected between Waterford and Poughkeepsie. Dredging operations, which comply with the action levels and result in protective water column concentrations at Waterford will also be protective for Poughkeepsie. In addition, as stated in Attachment G, the frequency of sampling in the Lower Hudson will be increased in response to greater loads and concentrations in the Upper Hudson, specifically, when Troy is expected to exceed 350 ng/L in order to measure the concentration entering the public water intakes. USEPA does not agree that it is appropriate to assume 10% resuspension. The monitoring performed at Fox River did not accurately represent the export rate due to the proximity of the sampling locations. This is discussed in detail in the Responsiveness Summary (Part 3 of

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				USEPA's 2002 ROD) in White Paper – Resuspension of PCBs During Dredging. Various resuspension rates have been examined with regard to impacts of the Lower Hudson. In Attachment D the near-field transport model (TSS-Chem) was used to evaluate the residual effects from an accidental spill, as well as the average source strength that is estimated based on the silt within the sediments. The analyses with the average source strength showed that most of the coarse grained material settles out within 30 meters from the dredge. The silts remain in the water column much longer. At one mile all the coarse material has settled. Since the silt fraction remaining is dependent on the flow and other factors, the fraction remaining at one mile varies. As shown in Attachment D, Table 10 for the average strength scenarios at 4000 cfs, approximately 60% of the silts resuspended remain in the water-column at one-mile. After the silts have traveled one mile they are not expected to settle appreciatively. For the action level modeling shown in Attachment D Table 31, approximately 30% of the solids and 24% of the PCBs remained in the water column after one mile. The far-field transport model (HUDTOX) does not have the resolution that TSS-Chem does and can only be used to predict the fluxes at the far-field monitoring stations.

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				HUDTOX generally had 25% loss of PCBs through these stretches of the river.
Matt McMahon, PhD	2	It seems that removal of the main PCB bearing silt layer will expose a bottom surface that still contains significant PCB levels. How long will this surface be exposed to the river flow before it can be capped with Aqua Bloc and bentonite.	**Residuals** High level PCB exposure after removal	The ROD calls for removal of all PCB-contaminated sediments in areas targeted for dredging, and anticipates a residual of approximately 1 mg/kg Tri+ PCBs. Therefore, the dredge cutlines to be submitted by General Electric Company (and which are subject to USEPA approval) should result in an exposed bottom surface after dredging that does not contain high levels of PCBs. Nonetheless, the Residuals Standard sets forth the requirements for testing each certification unit dredged (and backfilled, where appropriate) prior to the removal of the remediation equipment and any resuspension control equipment. In this manner, resuspension of disturbed sediment can be minimized. In the instances where sediments do not attain the residual standard criteria, the expected sequence of dredging testing and capping will also occur prior to the removal of any resuspension control equipment (such as silt barriers). At the very minimum, the productivity performance standard requires that all areas dredged in a single year be completed by the end of that season. Thus no area would be left partially disturbed for more than a

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				single dredging season.
Matt McMahon, PhD	3	What is the estimated amount of PCBs that will be released in the interval between the dredging and capping operations? What is the estimate of the amount of PCBs that will be released during the capping operation?	**Resuspension** Quantities of PCBs release	The amount of PCBs that are released between dredging and capping will be dependent on several factors including the time that the area is exposed, the water velocity, the degree of containment, the concentration of the residuals, the area requiring capping, etc. The remedial design and implementation will have to consider the potential impact on water column concentrations, contamination of downstream areas, and minimizing releases.
Matt McMahon, PhD	4	Another concern is my lack of certainty about the mode of transport of PCBs down the river during dredging. An EPA Hudson River Reassessment report – Phase 2 [Data Evaluation and Interpretation Report] concludes on the basis of experimental measurements "Water column PCB transport occurs largely in the dissolved phase, in the upper Hudson representing 80% of the water column inventory during the 11-12 months of the year". Is this statement accurate pertaining to silt released during dredging? It certainly needs clarification because dissolved PCBs won't settle out and will be transported downstream indefinitely – to Poughkeepsie and the ocean. Please advise me if conventional filtration systems and technology such as those employed at the	**Resuspension** PCB transport rate, filtration capabilities	Compliance with the Resuspension Standard will ensure that water users are protected since the concentration at far-field locations will be below the maximum contaminant level (MCL) for Total PCBs, which is 500 ng./L, as required by the Safe Drinking Water Act. As noted in the Responsiveness Summary (Part III of the 2002 ROD) (p. 9-21) "Generally the treatment train at drinking water supply facilities such as Waterford, which utilizes a surface water source for water, involves filtration. Even in the early 1990s when total PCB levels in the Upper Hudson River were five to 10 times greater

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		Poughkeepsie and Rhinebeck water treatment plants are capable of removing dissolved PCBs from the Hudson River feed? If they cannot, will carbon filters remove them? And if they prove necessary, will EPA and/or GE bear their added cost?		than current levels, the filtration process was able to remove the PCBs effectively. Evidence for this comes from the fact that during this period (1991-1993) there were no violations with regard to total PCB levels in drinking water. As mentioned previously, the impacts to the water quality are anticipated to be minor and total PCB levels will not approach the historically high levels. Since the treatment train at the water supply facility has been shown to be able to deal with PCBs in general and has been shown to effectively remove them in the past despite significantly higher levels at the time, no adverse effects on drinking water due to dredging are expected." Since Poughkeepsie has lower PCB baseline concentrations and settling is expected between Waterford and Poughkeepsie, the action levels that are protective of the water intake supplies at Waterford will be also protective for Poughkeepsie drinking water supplies. In addition, as stated in Attachment G of the Resuspension Standard, the frequency of sampling in the Lower Hudson will be increased as necessary to confirm compliance with the standard. This will be done in response to greater loads and concentrations in the Upper Hudson, specifically when Troy is expected to exceed 350 ng/L. Monitoring of water supplies will be

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				performed as stated in the ROD (p. 99): "EPA will increase monitoring of water supply intakes during each project construction phase to identify and address possible impacts on water supplies drawn for drinking water. The locations, frequency and other aspects of monitoring of the water supplies in the Upper and Lower Hudson will be developed with public input and in consultation with New York State during remedial design." Further issues related to the design of the water supply monitoring program will be discussed in the Community Health and Safety Plan. The Phase 2 report cited pertains to the undisturbed Hudson River system. The large dissolved fraction is an integration of releases from the sediments and is caused by biological processes that are different from dredging releases. With this biological mechanism, the PCBs are introduced into the water-column in the dissolved phase. The mode of PCB introduction into the water column from dredging is expected to be in the suspended solid phase. GE will address the use of additional filters and the cost as part of the contingencies developed for the Remedial Design.