UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

August 27, 2010

Stephen Garon, PhD
SRA International, Inc.
3434 Washington Boulevard
Arlington, VA 22201

Re: **EPA Response to Draft Hudson River EPS Peer Review Report**

Dear Dr. Garon:

EPA recognizes and very much appreciates the extraordinary work done by the Peer Review Panel. The draft report is well thought out and well written. That all seven members of the Panel concurred in the report adds further weight to the recommendations it contains.

The Panel has developed numerous insightful and valuable recommendations concerning the Engineering Performance Standards (EPS) and other aspects of the Hudson River dredging project that we expect will significantly improve Phase 2.

EPA has the following observations and comments to share with the Panel as it proceeds to finalize the Report:

1. Modeling: The draft Report recommends that a new model be developed to better estimate the impacts of various dredging scenarios as compared to Monitored Natural Attenuation (MNA). The Panel states that such a model must be peer reviewed, and that it should be used as one part of an adaptive management strategy as Phase 2 proceeds.

   EPA agrees that a new model with strong predictive capabilities will be a useful tool, along with extensive monitoring, field observations, etc., in adaptively managing the project to a successful conclusion.

   The draft Report notes that GE's new model may be a useful foundation for this effort. Over this summer GE has been sharing information about the model with EPA, including the actual model code and computer software that will enable EPA to evaluate and run the model. GE has also made its modeling consultants available to work closely with EPA and its consultants so that they can become familiar with the new model as quickly as possible. EPA has committed to complete a detailed, thorough evaluation of the

model; we anticipate this analysis will take 6-9 months.[1] If EPA determines that the model is a good predictive tool, we will use it to help inform relevant decisions that will have to be made during Phase 2.

In the meantime, we note that GE's new model predicts that within just a few years after dredging is completed, average fish tissue concentrations in the Upper Hudson will be significantly lower than if dredging had not occurred (i.e., the MNA scenario), and will continue to improve over the rest of the 50-year period for which modeled predictions were provided. This prediction is applicable for all the resuspension scenarios that GE presented to EPA.

2. DoC Determination: EPA agrees with the Panel's observation that a key obstacle to achieving the EPS during Phase 1 was "incomplete, inaccurate, and imprecise DoC characterization combined with disagreement on how to interpret and attain target levels." (Executive Summary, p. iii.) As the Panel notes, development of a more accurate, reliable DoC requires further sampling in the River. We are pleased to report that GE and EPA have been discussing such a new sampling program, and GE has advised that it expects to be in the field starting that effort very soon, possibly as early as the week of August 30, 2010. EPA endorses the Panel's recommendations that recoring be carried out for all low confidence cores, and all areas with missing data; and that confirmatory coring be done for 20% of the high confidence cores.

3. DoC Design: The Panel suggests that the DoC be designed "based on the 1 ppm Tri+ PCBs cleanup level...." (pg vi) and that the "Design Dredge Elevation should initially be set to below the level where Tri+PCBs are <1 ppm ..." (pg. 56). It appears that the Panel understood this to be the cleanup target set in the ROD (see bottom of pg. 49). We respectfully note that this characterization of the cleanup objective is not fully consistent with the ROD, which calls for removal of *all* PCB-contaminated sediments within areas targeted for remediation, with an anticipated residual of approximately 1 ppm Tri+ PCBs prior to backfilling (ROD, pp. iii and 95). In the Phase 1 Dredge Area Delineation Report and the Consent Decree, EPA and GE agreed to define DoC as the bottom of the deepest core section that had concentrations equal to or greater than 1 mg/kg *Total* PCBs (*i.e.*, all samples below that depth had concentrations less than 1 mg/kg Total PCBs; DAD §2.4.1). At the time, data indicated that core sections below this section would have non-detect or very low concentrations. In Phase 1, where the DoC was defined based on 1 mg/kg Total PCB, some 48% of the residual cores from GE-identified "high confidence" areas nevertheless yielded concentrations greater than 3 mg/kg Tri+PCBs after the first dredging pass. To define DoC based on 1 ppm *Tri*+PCBs would yield a shallower DoC that would be unlikely to achieve the anticipated residual of 1 ppm Tri+PCB called for by the ROD.

4. One Pass: We agree that a single pass that achieves the remedial objectives of PCB mass removal is the best and most desirable outcome. We have some concern that the inherent variability of the sediment conditions may make it difficult to develop a DoC that enables

[1] This estimated time for review of the model does not include any time that would be required for it to be peer reviewed, as the Panel has recommended.

that objective to be met consistently at all locations. If it is found that in certain areas very high levels of PCBs are being left behind after the first pass, even though the targeted DoC elevation is achieved, the ability of a cap to contain the PCBs may be compromised. We recommend that the Panel consider whether, in such situations (which we hope would be few), the option of a prompt second pass should be considered.

5. Compositing of Samples, and Determination of Whether to Cap or Backfill: The Panel recommends that residual cores taken after the first pass be composited across 1-acre sub-units for the purpose of determining whether to cap or backfill. It is possible that in some cases, this will result in an entire acre being capped when, in fact, there is only a much smaller area that has remaining elevated PCB levels. The percent of acreage capped compared to the percent of acreage backfilled is likely to become an important metric in evaluating the success of the One Pass approach. Thus, we are concerned that significant acreage may be capped unnecessarily as a consequence of compositing the samples. An alternate approach would be to analyze each of the post-dredging cores for a sub-unit, but retain flexibility to determine whether the averaging of the results should govern the cap/backfill decision for the entire sub-unit, or to determine that some further sub-division of the sub-unit is appropriate. For example, if it is reasonably clear from the individual core samples that capping is needed over, say, only a quarter or a half of the one acre sub-unit, while the remainder of the sub-unit can be backfilled, that outcome would be preferable to capping the entire acre.

   We note, as well, that the Hudson River sediments in this area are very poorly sorted, with wide variations in grain size in individual samples as well as among nearby samples. Constructing a representative composite out of disparate sample types is problematic.

   The Panel recommends that the requirement to cap, rather than to backfill, be triggered if post-dredging sampling shows greater than 3 ppm Tri+PCBs or higher in a sub-unit (pg. 60). The Panel's rationale is that this would not retard natural recovery if the backfill were to erode. This protocol would result in certain areas being backfilled which under the Phase 1 EPS would likely have been capped. EPA's view is that after Year 1 of Phase 2, some sampling of the backfill – particularly in areas where the post-dredging sampling showed between 1 and 3 ppm Tri+PCBs – should be performed to assess this approach (*e.g.*, whether the 95% reduction of surface concentrations predicted by GE (referenced by the Panel at pg. 47) is in fact being realized.)

6. Depth of Post-Dredging Cores: The Panel comments that there is little reason for post-dredging sampling to extend deeper than 6" (pp. 59 & 62); but the Panel does recommend a limited confirmation monitoring program to "verify the effectiveness of the updated DoC delineation approach" (pg. 63). EPA agrees with the need for a limited confirmation monitoring program. Specifically, it may be appropriate to take complete cores[2] after dredging in order to evaluate the mass removal efficiency of the One Pass approach. (Where capping is required, the installation of the cap under the One Pass approach would not need to await the results of the analysis of the remainder of the core.

---

2 *I.e.*, to Lake Albany clay or bedrock.

Therefore this approach would not delay closing the sub-unit, but would provide important information about PCB mass and the accuracy of the DoC delineation.)

7. Tri+ vs. Total PCBs: EPA agrees with the Panel's position that Tri+, rather than Total PCBs, is the consequential measurement, although Total PCBs should continue to be reported. (GE has agreed to provide EPA with Tri+PCB output data from its new model.)

8. Redeposition: We agree with the Panel that better quantification of redeposition will be helpful. We have had preliminary discussion with GE on this issue. It is EPA's intention that surface sediments will be sampled in each of the three River Sections prior to Phase 2 to develop a baseline of surface sediment conditions to help accurately assess this issue, and that post-dredging studies be carried out to quantify the extent of redeposition within the system.[3]

9. Data Interpretation: The Panel noted that disagreements on how to interpret sampling data was an obstacle during Phase 1 (pp. iii and 84). EPA agrees. It is important that there be a clear and consistent understanding about how data will be used and interpreted for various purposes such as DoC design and calculations of mass removal and mass load.

10. Adaptive Management: EPA will continue to gather and evaluate data over the coming years. Our purpose will be to further improve our understanding of the river system and the effects of the dredging program, and to evaluate the adequacy of the revised DoC determinations and Engineering Performance Standards. Of course, fish will continue to be monitored in each river section, as well as in the Lower Hudson, over the duration of the project (and beyond). We will use these data to make any appropriate improvements to the operating protocols for the project. We also expect to engage with the wider community of stakeholders in periodic assessments of the data.[4]

11. Cumulative Load: The draft Report contains some discussion of the role of cumulative load to the Lower Hudson as a metric for evaluating the project. The draft Report correctly recognizes that cumulative load is only one metric, and that other metrics should be considered and may be more meaningful. Nevertheless, the draft Report includes what may be a misunderstanding about how the cumulative load metric was used by EPA in the ROD and the development of the original Engineering Performance Standards. The draft Report states, at page 34:

> "An adequate standard is one which achieves the goal articulated in the 2004 EPS, that is, the maximum allowable load must result in a net reduction of transport to surface sediments in the upper and lower Hudson compared to MNR **within a timeframe that corresponds with the ROD (i.e., 20-25 years)**" (emphasis added).

---

[3] Other monitoring efforts may also be helpful.

[4] While we do not anticipate using a formal peer review process, we will welcome the input of knowledgeable experts, including any of the current Panel members.

There is no doubt that annual loads to both the Upper and Lower Hudson will be significantly lower almost immediately after dredging than under MNA. (GE's new model also makes this prediction.) However, the Panel's use of the phrase "net reduction" suggests that the Panel was thinking of cumulative load over time – *i.e.*, the running cumulative total load which is calculated by adding each year's new load to the total of all the previous years' loads. The cumulative load over time predicted for dredging can be compared to that predicted for MNA. When graphed, these two predicted curves may or may not cross; and if they do cross, they may do so sooner or later.

The ROD did not state that the cumulative load under the remedial scenario ought to fall below the predicted cumulative load under the MNA scenario in a 20-25 year time frame. The 2004 EPS included a graph forecasting that under one of the resuspension scenarios, the cumulative Total PCB load would be less than that under MNA in about 20 years after the completion of dredging (see bottom diagram of Figure 2-4 of Volume 2 of the 2004 EPS), but the 2004 EPS did not use 20 years -- or any other specific time period -- as a dividing line between what would be an acceptable versus an unacceptable amount of time to wait before the cumulative load under a dredging/resuspension scenario falls below the cumulative load that would occur under MNA.

EPA will, of course, be pleased if the actual cumulative load curve crosses the theoretical MNA forecast curve within 20-25 years after dredging. It is EPA's position, however, that a longer period to the cross-over point is not a reason to abandon or fundamentally change the project, nor is it inconsistent with the ROD. On the contrary, if the curves were predicted to cross in, *e.g.*, 30, 40 or even 50 years or more, EPA considers that the project would still be of great long-term value. The PCB contamination of the Hudson River started over six decades ago; the possibility that the cumulative load curves might not cross until after three to five or more decades is not at all objectionable *when, in the meanwhile, fish tissue levels and associated human and ecological exposures would be substantially reduced very soon after dredging is completed, both in absolute terms and relative to MNA*. This outcome is what was predicted at the time of the ROD, and it is what GE's new model predicts today.

As a metric, cumulative load is of limited relevance when considering the primary goal of the remediation, which is to reduce PCB concentrations in fish. The Panel correctly recognizes that fish tissue concentrations -- and ecosystem impacts in general -- are driven by water column and sediment concentrations and not by load. GE's model predicts that Upper Hudson fish tissue concentrations will increase during dredging, and then quickly decrease after dredging as they respond to the decreased PCB concentrations in the river.[5] Indeed, fish collected in the Upper Hudson immediately after the 2009 dredging season did show – as always has been predicted – an increase in PCB

---

[5] Importantly, the predicted decrease will quickly bring the fish tissue concentrations after dredging to levels significantly below where they are predicted to be under the MNA scenario. EPA has always recognized that short term increases in fish tissue levels are inevitable, but these are substantially outweighed by the long term benefits of dredging.

concentrations compared to recent pre-dredging years. But Upper Hudson fish collected during the spring of 2010 show *no* appreciable change from recent pre-dredging years. And for fish in the Lower Hudson, there was essentially no signature at all from the 2009 dredging work. Based on this Phase 1 experience there is no reason to expect any significant fish tissue increases in the Lower Hudson during the remaining years of the dredging project.

In fact, as a metric, cumulative load over time actually obscures the fact that annual loads post-dredging will be significantly lower than under the MNA scenario, and that the benefit from this improvement will extend far into the future.

EPA will be reviewing the GE model predictions for Tri+ PCB loads associated with MNA and various dredging scenarios to help ensure that Remedial Action Objectives are being met. But it is not EPA's position that the cumulative load curves must cross within 20-25 years in order for the project to be considered successful.

12. "Hard Cap": The Panel "does not support placing an absolute limit on the mass of PCBs to be dredged, as proposed by GE, because the mass of PCBs to be removed is unknown and constraining the remedy to such a limit appears to be contrary to the ROD" (pg. 81). EPA agrees.

On June 28, 2010 GE submitted an extensive document package of about 500 pages, proposing that 920 kg be set as the "Allowable Load Above Baseline" (*i.e.*, the "hard cap"), and describing how it arrived at that figure. In addition to providing this document package to EPA, GE requested that the package be forwarded to the Peer Review Panel. EPA declined on several grounds,[6] but EPA did immediately initiate a detailed review of GE's submission, and has engaged in numerous and ongoing discussions with GE on this subject.

Because EPA anticipates that GE will bring to the Panel's attention its proposed 920 kg hard cap figure, EPA feels it is appropriate to note for the Panel several significant disagreements we have already identified during our initial review of GE's submission. These disagreements do not involve questions about the actual performance of the model itself -- we are not yet in a position to determine whether or not the model is a good predictive tool. Rather, our current disagreements involve questions about the manner in which GE used (or chose not to use) the outputs from the model to generate its 920 kg proposal.

GE's calculation of the 920 kg figure assumes a Gross Load at the end of the dredging period of 2,700 kg. From this figure is subtracted 160 kg (the predicted 2010 Load,

---

[6] In reaching this decision, EPA considered, among other things, the provisions of the Consent Decree; the late date of the GE submission; the fact that it would take many months for EPA to analyze the model (let alone have it peer reviewed); the fact that even a preliminary response by EPA would take many weeks; and the fact that other stakeholders would also need to have an opportunity to review and comment, and react to EPA's comments. Based on these and related concerns, EPA determined that it was not appropriate to impose on the Panel the burden of such an extensive new submission and the certainty of such an extended delay. This decision, initially made at the Regional level, was reviewed and endorsed by senior leadership at Agency Headquarters.

based on the modeled MNA result for 2010), and a further 1,620 kg (the "Baseline Load" for the 6-year assumed dredging project), yielding the 920 kg figure. EPA has identified the following significant areas of disagreement with respect to this arithmetic:

a. The 2,700 kg Gross Load assumed by GE comes from its modeling of cumulative load. GE asserts that this figure is the maximum cumulative load to the Lower Hudson that can be generated during the dredging period and still have the cumulative load curve on the graph cross the MNA curve no later than 20 years after the end of dredging. As discussed in Point # 11, above, this reflects a misunderstanding of how cumulative load was considered in the ROD and the establishment of the EPS – there is in fact no requirement that the cumulative load curves cross within 20 years.

   If GE were to base its calculation on a crossover period longer than 20 years, the 920 kg figure would increase accordingly. For example, if a 40-year crossover point were selected, the 920 kg figure would increase to about 1,700 kg -- even if no other corrections or adjustments are made to the way in which GE calculates this value.[7]

b. Unlike the 160 kg load assumed for 2010, the 1,620 kg Baseline Load that GE assigns to the dredging years is *not* the MNA-based load which GE's model predicts for those years. In fact, GE has informed EPA that its modeled MNA results for these years total 1,160 kg. EPA strongly disagrees with GE's stated reason for using the higher value of 1,620 kg.

   If the 1,160 kg value from the GE model is used for the dredging years -- with no other corrections or adjustments -- GE's proposed 920 kg "hard cap" would climb to 1,380 kg.[8]

   If the Baseline Load is corrected to 1,160 kg, *and* a 40-year crossover point is assumed -- but with no other corrections or adjustments -- the proposed "hard cap" would increase to about 2,180 kg.[9] This figure exceeds the 2,000 kg that EPA has estimated might be associated with the dredging project.[10]

c. GE uses modeled predictions of Total PCBs, rather than Tri+, for its calculation of the 920 kg proposed hard cap value. If the modeled outputs for Tri+ were used, EPA anticipates that the cumulative load curves for the Lower Hudson would cross considerably earlier than for Total PCBs. This is because dredging-

---

[7] According to GE's documentation, the Gross Load for the dredging period that is associated with a cumulative load crossover at 40 years would be about 3500 kg. Making no other adjustments to GE's calculations, the subtraction of the 160 kg 2010 Load and the 1,620 Baseline Load leaves 1,720 kg as what GE characterizes as the "Allowable Load Above Baseline" attributable to the dredging project – *i.e.*, the proposed "hard cap."

[8] 2,700 kg Gross Load minus 160 kg 2010 Load minus 1,160 kg Baseline Load = 1,380 kg.

[9] ~3,500 kg Gross Load minus 160 kg 2010 Load minus 1,160 kg Baseline Load = ~2,180 kg.

[10] On page 29 of the draft Report this figure is reported as 2,800 kg, which we assume to be a typographical error. As the Panel is aware, EPA's 2,000 kg estimate derives from our estimate of 1% resuspension as measured at Waterford.

related PCB releases contain a lower percentage of the Tri+ PCB than is observed during baseline conditions. As a result, the overall percentage increase in Total PCB transport due to dredging is greater than the percentage increase in Tri+ PCB transport, leading to a shorter time to the Tri+ PCB crossover point. Thus, substituting Tri+ for Total PCBs into the GE calculation would very likely also yield a substantially higher value for the proposed "hard cap." EPA has requested and GE has agreed to provide the model outputs for Tri+PCB.

We emphasize again our agreement with the Panel that a "hard cap" is inappropriate. Our point here is merely to show that GE's method of calculating its proposed hard cap includes several significant errors which, if corrected, would generate a much higher figure than the 920 kg it has proposed.

13. Engineering Controls on Resuspension: The Panel does not recommend the use of silt curtains or other physical barriers to control resuspension given the time requirements and logistical complexities associated with their use, and what the Panel considers to be their limited effectiveness (Report at page 32). As a general matter EPA does not disagree, but we note that there are a small number of areas of the River where engineering controls can be quite effective and should be considered. An example was the rock dike used at the top of the east side of Rogers Island, which worked very well. The Three Sisters Islands and the channel west of Griffin Island are areas where such controls may also be valuable.

14. Productivity: EPA agrees with the Panel's view that the project will very likely require more than five more dredging seasons, and may require more than 7 seasons. EPA places great value, however, in continuing to seek improvements to productivity rates during the life of the project, and EPA is cautiously optimistic that rates greater than 350,000 cubic yards per year can be achieved.[11]

Attached is a table setting out several additional factual review comments for the Panel's consideration.

We thank the Panel once again for its remarkable efforts, and for the opportunity to provide these final comments.

Sincerely,

Walter Mugdan
Director, Emergency & Remedial Response Division

[11] In this connection, EPA notes that the Report includes one or two statements suggesting that Year 1 of Phase 2 might involve only the completion of those CUs that were originally to be completed during Phase 1. We agree, of course, that completion of those CUs must be the primary objective for Year 1 of Phase 2; but obviously the work during the 2011 dredging season should proceed beyond those CUs if possible. In particular, the dredging behind Three Sisters Islands should be completed in 2011 to avoid delays in 2012 due to concerns about cross-contamination in the main channel of the river.

Attachments

cc: Alison Wolfe, SRA
Ann Klee, Esq., GE
John Haggard, GE
Sheri Moreno, Esq., GE

Comment No.	Page No.	Section No.	Paragraph No.	Factual Review Comment	Topic
1	2	1.1.1	2	The Report refers to the remedy selected in the ROD as "the proposed remedy." We respectfully note that the ROD sets forth EPA's selected, rather than proposed, remedy for the Upper Hudson River.	Text fix
2	9	3	2	Word Missing. "In a riverine system with currents as high as present in the Hudson River during higher flow periods, much of the generated residuals will be lost if the residuals are ***not*** covered."	Text fix
3	10	3, Finding Rsp.1	Table 1	The Table indicates that the Resuspension Standard of 500 ng/l TPCB was exceeded at Waterford on 3 to 10 occasions. The Standard was actually exceeded at Thompson Island, not at Waterford (see EPA Phase 1 Report Figures 1-3-4b and 4c).	Drinking water MCL
4	11	3, Table 2		PSCP footnote 4: Control level "adjusted" values appear inconsistent with table. Control level criteria adjusted to 49kg Tri+PCB, should be 39kg Tri+PCB.	Resuspension control level
5	11	3, Finding Rsp.1-1	1	The Panel states that the PCB concentration standard and control level were exceeded at all 3 far field monitoring stations. The EPA report Figures I-3-4b and 4c show that these levels were only exceeded at TID and Lock 5, but not at Waterford.	Control level
6	23	3	Paragraph after bullets	"The incomplete analysis done for the 2004 EPS does not consider near-field and far-field PCB deposition rates on the sediment bed surface;" For clarification purposes, EPA did simulate near field suspended matter transport and settling in its near-field modeling analysis. The HUDTOX model runs did not reflect the near-field settled solids but did incorporate an estimate of dredging-related suspended solids transport 1000m downstream of the dredge. This analysis was the basis for the EPA forecasts of dredging-related resuspension.	EPA's HUDTOX model processes
7	24	3	Last, 3rd sentence	"20 percent to 35 percent Tri+PCB" It should be noted that the project site has some unusual interactions. Some locations have Tri+ percentages as high as 50% and some very low concentrations may be as high as 66% Tri+. The 35% level is a good typical average but not the upper end of the range of this percentage.	Tri+ to TPCB ratio
8	29	3, Finding Rsp.3-2.2	5	As shown in the Panel's report Table 3, EPA's proposed total load limit is 670 kg Tri+PCB. The Panel report states that EPA proposes 2,800 kg of (presumably) TPCB. We expect that this is a typo as 2000 kg is used later on in the report. EPA did propose a Total PCB load of 1% or approximately 2,000 kg.	TPCB and Tri+PCB Load limit

Comment No.	Page No.	Section No.	Paragraph No.	Factual Review Comment	Topic
9	34 and 35	4, Finding Rsp. 3-8 and 4-1	Fourth full paragraph (p. 34) and third paragraph, last sentence (p. 35)	"...maximum allowable load must result in a net reduction of transport to surface sediments in the upper and lower Hudson compared to MNR within a timeframe that corresponds with the ROD (i.e., 20-25 years)." And: "...should include a combined assessment of dredged and undredged areas over a 25-year period." The ROD does not specify a particular time frame to assess the success of the remedy and thus this statement represents a criterion that is not presented in the ROD. In the EPS, the cross over point was used to differentiate a remedy where a cross over occurred from one that did not. The EPS did not require recovery by a specific date. For further discussion of this issue, see Point 11. in EPA's Comment Letter.	Recovery period
10	39	Finding Rdl. 1-2.1	2nd bullet	*"As applied in the decision flowchart, the Residuals EPS defines residuals as inventory whenever the surface-sediment average concentration measured greater than 6 ppm Tri+PCBs after dredging; however, the reasoning for this distinction was not clearly grounded in science or risk management."* For clarification purposes, the 6 ppm Tri+ PCB was identified as the 99% UCL for a mean of 1 ppm in residual sediments based on the statistics of the case studies examined for the EPS. The 99% UCL was intended to measure the comparability of the measured residuals to a true arithmetic average of 1 ppm Tri+ PCB, as indicated in the EPS. From EPS, Vol. 3, Section 3.4.1, p. 39. "The values currently representing the UCLs and PLs were derived from statistical evaluation of the case study datasets, as discussed in subsection 2.1.3, and applied proportionally to the criterion in the ROD (assuming that an average residual of 1 mg/kg Tri+ PCBs is the desired central tendency of the residual sediments). The action levels(the UCL and PL values) are intended to measure the comparability of the true mean (arithmetic average) of the sediment sample population's Tri+ PCB concentrations to the 1 mg/kg Tri+ PCBs residuals concentration stated in the ROD." Thus any population of residual samples whose mean exceeds this value has less than a 1 percent chance of actually having a mean of 1 ppm Tri+ and therefore requires further sampling to define the areas where residual contamination or inventory remain.	PCB inventory

Comment No.	Page No.	Section No.	Paragraph No.	Factual Review Comment	Topic
11	40	4	1	"According to EPA, only in CU4 did the average Tri+PCB concentration consistently decline with each dredge pass." For clarification purposes, EPA showed that the concentration in the areas to be redredged did not decline but the overall average concentrations declined in most CUs. (see attached Table 1). We take this difference to infer that most redredging had to address inventory (hence the concentrations being removed did not decrease) whereas the average overall concentrations steadily declined in 8 out of 10 CUs as individual nodes went from inventory to compliant.	Post dredging surface concentrations
12	40	4, Table 8	Second to Last Paragraph	The Panel states that re-dredging is required if individual Tri+PCB sample concentrations are greater than 15 or 27 ppm. Re-dredging was based on the average Tri+PCB concentrations in the CU as well as the individual concentrations. Also, the count of cores listed in Table 8 is not correct. A revised table generated by EPA is attached (see attached Table 2). An additional column depicting the number of residual nodes requiring re-dredging per dredge pass is attached as an indication of the total number of nodes requiring re-dredging, as opposed to those done in response to levels higher than 15 ppm.	Number of dredging passes and residual nodes
13	62	Finding Rdl.4	Last paragraph	The statistics reported from GE regarding high confidence areas are not consistent with EPA calculations and may have been used in the Panel's recommendation for backfilling below 3 ppm Tri+ PCB. In Phase 1, where the DoC was defined based on 1 mg/kg Total PCB, some 48% of the residual cores from GE-identified "high confidence" areas nevertheless yielded concentrations greater than 3 mg/kg Tri+PCBs after the first dredging pass; and the DoC in 'high confidence' areas was consistently underestimated by greater than 6 inches. See attached Table 3 for a tally of the post-dredging cores exceeding 3 ppm Tri+PCBs in high confidence zones by CU.	Residuals – 'High Confidence' areas
14	49	Finding Rdl.3-1	Last paragraph	The Panel's reference to 1 mg/kg Tri+ in the ROD as the basis for depth of dredging is not fully consistent with the ROD, which states: *"Removal of all PCB-contaminated sediments within areas targeted for remediation, with an anticipated residual of approximately 1 mg/kg Tri+ PCBs (prior to backfilling);"*	Residuals (Basis for DoC)

Comment No.	Page No.	Section No.	Paragraph No.	Factual Review Comment	Topic
14 (con't.)				The Tri+ concentration refers to allowable residuals concentration, and does not define the DoC (as implied by the Panel's text). The ROD calls for all PCB contaminated sediment to be removed, though it anticipates a residual of about 1 ppm Tri+PCBs. Negotiations between GE and the EPA over the Dredge Area Delineation Report resulted in a definition of DoC as 1 mg/kg *Total* PCB (section 2.4.1 of the DAD, GE 2/2005). See further discussion in Point 3. of EPA's Comment letter.	
15	64	5; Charge Question 1	1	There appear to be typos in the statement of Charge Question 1 or an error in the document formatting – the letter "y" at the end of "individually" and "simultaneously" is truncated or was mistyped as a "v."	Text fix
16	68	Table	NA	The table is mis-labeled as Table 13. Its title should read "Table 14. Phase 1 Monthly Output Summary."	Text fix
17	69	Table	NA	The table is mis-labeled as Table 14. Its title should read "Table 15. Peak Phase 1 Monthly Output Rates."	Text fix
18	69	Footnote 5	NA	The text of the footnote is missing references to the table that should be labeled as "Table 14. Phase 1 monthly output summary" in the Peer Review Report, and instead displays "Error! Reference source not found."	Text fix
19	70	Table	NA	The table is mis-labeled as Table 15. Its title should read "Table 16. Summary of EPA's Proposed Modifications….."	Text fix
20	71	Table	NA	The table is mis-labeled as Table 16. Its title should read "Table 17. Summary of GE's Proposed Modifications….."	Text fix
21	75	Table	NA	The table is mis-labeled as Table 17. Its title should read "Table 18. Summary of Recommended Changes to the Productivity EPS."	Text fix

Comment No.	Page No.	Section No.	Paragraph No.	Factual Review Comment	Topic
22	76	5; Finding P.3-2.1	First paragraph under Phase Peak Monthly Output	First sentence should read, "As presented in Table 14, the peak monthly removal output…."	Text fix
23	77	5; Findings P.3-2.2 and P.3-2.3		Each section should begin, "As presented in Table 15…"	Text fix
24	66, 67	5; Finding P.1-1, 1-3	Footnote 3, 1st after bullets	Total removed and processed should be 371,299 tons, not 371,550 tons (GE Phase 1 Report Table E-5).	Text fix

Table 1. Summary Statistics of Surface Sediment Residual Cores for Different Dredging Pass

CU	Residual Core Pass	Tri+ PCB (mg/kg) from GE Form 1	
		Mean	Median
1	1	5	5
1	2	NA*	NA*
1	3	8	6
1	4	14	12
1	5	30	26
2	1	29	18
2	2	22	12
2	3	13	3
2	4	1	2
3	1	20	5
3	2	6	2
3	3	1	1
4	1	28	11
4	2	16	3
4	3	6	1
5	1	8	6
5	2	5	3
5	3	4	2
6	1	9	6
6	2	6	2
6	3	5	2
7	1	26	12
7	2	16	8
7	3	6	1
7	4	5	1
8	1	12	3
8	2	8	2
8	3	15	2
8	4	4	1
17	1	21	1
17	2	4	0
17	3	1	0
18	1	21	3
18	2	3	1
18	3	2	1

Note:
* Statistics not calculated due to incomplete sampling

Table 2: Comparison of High Level Post Dredging Cores (Tri+ >=15 ppm) by CU with Total Nodes Dredged in Each Dredge Pass

CU	Number of Nodes Dredged in 1st Pass	Number of Nodes Dredged in 2nd Pass		Dredged in 3rd Pass		Number of Nodes Dredged in 4th Pass		Number of Nodes Dredged in 5th Pass	
		Tri+PCB ≥15ppm	Total	Tri+PCB ≥15ppm	Total	Tri+PCB ≥15ppm	Total	Tri+PCB ≥15ppm	Total
1	43	0	10	0	43	5	43	11	32
2	40	19	37	14	25	12	6		
3	47	13	26	7	10				
4	42	19	42	12	8				
5	28	3	15	3	7				
6	40	4	29	3	4				
7	41	18	40	12	37	3	2		
8	52	10	21	6	20	8	13		
17	40	11	11	1	5				
18	47	13	18	1	1				

Table 3. Number of Nodes with Average Tri+ PCB Concentration Greater than 3 ppm in GE Defined High Confidence Areas

CU	Sediment Residual Core Location											
	Tri+ PCB >3ppm				Total Number of Cores				Percentage of Cores with Tri+ PCB >3 ppm			
	After First Dredging Pass	After Second Dredging Pass	After Third Dredging Pass	After Fourth Dredging Pass	After First Dredging Pass	After Second Dredging Pass	After Third Dredging Pass	After Fourth Dredging Pass	After First Dredging Pass	After Second Dredging Pass	After Third Dredging Pass	After Fourth Dredging Pass
2	10	5	4	0	13	13	13	13	77%	38%	31%	0%
3	9	3	1	0	17	17	17	17	53%	18%	6%	0%
4	10	6	0	0	21	21	21	21	48%	29%	0%	0%
5	0	0	0	0	2	2	2	2	0%	0%	0%	0%
6	2	0	0	0	3	3	3	3	67%	0%	0%	0%
7	7	5	1	0	11	11	11	11	64%	45%	9%	0%
8	13	7	5	4	22	22	22	22	59%	32%	23%	18%
17	6	1	0	0	23	23	23	23	26%	4%	0%	0%
18	10	1	0	0	27	27	27	27	37%	4%	0%	0%
							Weighted Average		48%	20%	8%	3%

CU	Shoreline Core Location											
	Tri+ PCB >3ppm				Total Number of Cores				Percentage of Cores with Tri+ PCB >3 ppm			
	After First Dredging Pass	After Second Dredging Pass	After Third Dredging Pass	After Fourth Dredging Pass	After First Dredging Pass	After Second Dredging Pass	After Third Dredging Pass	After Fourth Dredging Pass	After First Dredging Pass	After Second Dredging Pass	After Third Dredging Pass	After Fourth Dredging Pass
2	3	0	1	0	3	3	3	3	100%	0%	33%	0%
4	1	0	0	0	2	2	2	2	50%	0%	0%	0%
8	5	2	1	1	8	8	8	8	63%	25%	13%	13%
							Weighted Average		69%	15%	15%	8%