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Cc: Tom Schadt[tschadt@anchorqea.com]; Stuart Messur[smessur@anchorqea.com]; David Haury[dhaury@anchorqea.com]; Linda Logan[llogan@anchorqea.com]
From: Vaughn, Stephanie
Sent: Fri 2/17/2017 9:46:49 PM
Subject: RE: BERA Dispute Status

Hi Jim,

Below is additional information related to some of the BERA dispute items that the NCG still considers under discussion, as noted in your 2/15/2017 email. The comments address technical memos you forwarded on 2/2/17 (Benthic Invertebrate Risk Assessment Summary) and on 2/8/17 (Tissue Screening Levels). We can discuss this information during our 2/21/2017 dispute wrap-up call.

Thank you,

Stephanie

Issue 1: Tissue Screening Levels

The Draft Baseline Ecological Risk Assessment written by Anchor QEA for the Newtown Creek site was submitted to EPA in February 2016. EPA reviewed the document, and issued comments on 6/11/16. The NCG responded to the comments on 11/4/16, and EPA replied to NCG on December 6, 2016. The NCG then submitted a Notice of Dispute Resolution regarding the BERA on 12/22/16. A Dispute Resolution meeting was held on 1/11/17, and among the technical issues that could potentially be resolved through additional information was a request from EPA for more information and explanation on the derivation of toxicity reference values (TRVs) used in the Draft BERA. Anchor QEA submitted a memorandum, "Newtown Creek Baseline Ecological Risk Assessment: Selection of Wildlife Toxicity and Reference Values and Tissue Effect Thresholds" on 1/20/17. A second Dispute Resolution meeting was held in New York City on 1/26/17, prior to which the TRV memo had only been partially reviewed. EPA provided comments to the 1/20/17 memorandum, requesting additional information on the derivation of benthic invertebrate and fish tissue screening levels. Below are EPA's comments on the Tissue Screening Levels memo:

1. General Comment: The Screening Level memo was well written, and clearly detailed the derivation of the invertebrate and fish tissue screening levels utilized in the BERA. Such

clarity makes the BERA much easier to review. For the most part, the screening levels were derived and utilized in an acceptable manner.

2. The fish tissue screening levels for Total PCBs were based only on Aroclor 1254, and were significantly higher than the tissue levels EPA has accepted at other sites. To be consistent with EPA's requirements for similar sediment sites, EPA requires the use of fish tissue whole body residue values that have already been established for a number of COPECs for the nearby Passaic River site. The Record of Decision (ROD) for the Lower 8.3 Miles of the Lower Passaic River was published March 3, 2016. The acceptable values were listed in the *Lower Eight Miles of the Lower Passaic River Focused Feasibility Study Report* (FFS; The Louis Berger Group, 2014). The FFS lists fish tissue critical body residue thresholds as both NOAEL and LOAEL in Table 4-13:

COPEC	**NOAEL (ug/g wet wt)**	**LOAEL (ug/g wet wt)**
Copper	0.32	1.5
Lead	0.4	4.0
Mercury	0.052	0.26
LMW PAHs	0.26	2.6
HMW PAHs	0.21	2.1
Total PCBs	0.17	0.53
Dieldrin	0.008	0.04
Total DDx	0.078	0.39
2,3,7,8-TCDD	8.9E-07	1.8E-06

3. The invertebrate tissue screening levels were based on the USACE ERED, as described. However, to be consistent with EPA's requirements for similar sediment sites, EPA requires the use of invertebrate tissue whole body residue values that have already been established for a number of COPECs for the nearby Passaic River site. The acceptable values were listed in the FFS (The Louis Berger Group, 2014). The FFS lists macroinvertebrate tissue critical body residue thresholds as both NOAEL and LOAEL in Table 4-13:

COPEC	**NOAEL (ug/g wet wt)**	**LOAEL (ug/g wet wt)**
Copper	5	12
Lead	0.52	2.6
Mercury	0.048	0.095
LMW PAHs	0.078	0.78
HMW PAHs	0.022	0.22
Total PCBs	0.008	0.026

Dieldrin	0.0016	0.008
Total DDx	0.06	0.13
2,3,7,8-TCDD	1.5E-07	1.3E-06

4. The fish and macroinvertebrate tissue screening values for other COPECs were calculated as described by NCG, and appear to be acceptable.-

Issue 2: Benthic Macroinvertebrates and Confounding Factors

EPA appreciates the additional supporting documentation to help explain the evaluation conducted for the benthic macroinvertebrate risk assessment. EPA has provided comments on the supplemental material, with references to original EPA comments that need to be addressed. Assuming that the comments are adequately addressed, and that the nine sample locations suggested to be associated with the confounding factors are further clarified as: 1) being toxic; and 2) include a robust discussion about other possible reasons for the toxicity (including but not limited to, bulk sediment comparisons, concentrations of individual compounds and DNAPL), the discussion and figures that were identified as needing to be deleted can remain in the document. It would be helpful for the revised section to be submitted to EPA prior to submission of the entire Revised BERA to ensure that it meets the Agency's expectations.

The 1/11/17 dispute meeting yielded that another technical issue that could potentially be resolved through additional information was a request from EPA for more information and explanation on confounding factors and benthic macroinvertebrate toxicity test results described in the Draft BERA. Anchor QEA submitted a memorandum, "Newtown Creek Baseline Ecological Risk Assessment Benthic Macroinvertebrate Risk Assessment Summary" on 2/2/17. Below are EPA's comments on the memo:

1. 1st page, Part 1, Overall Approach, 3rd sentence: "The use of AVS and SEM and porewater chemistry to evaluate bioavailability rather than rely on bulk sediment chemistry is consistent with the state-of-the-science to assess risks tot benthic organisms." While AVS/SEM is a valuable line of evidence, the inherent variability of the method means it is not as definitive as inferred by NCG. EPA's comments on the BERA (comment ID No. 9, 16, 91, 97, 138) stated that bulk chemistry was also a necessary line of evidence.

The EPA method (2005) allows a variety of extraction methods (gravimetry, colorimetry,

gas chromatographic photoionization, and ion-specific electrochemistry). Variability may also be introduced through sample heterogeneity, and through oxidation of reduced sulfur species between the times of collection and analysis.

Hammerschmidt and Burton (2010) found that measured concentrations of both AVS and SEM were highly variable. They sent four different sediment samples to each of seven different independent labs, and found that measured AVS in the four samples varied between laboratories by factors of 70 to 3,500-fold. Measurement of SEM in the four samples varied between labs by factors of 17 to 60-fold. As a result, the calculation of AVS/SEM ratios is highly uncertain.

A follow-up interlaboratory comparison was conducted by Brumbaugh *et al.* (2011) where AVS and SEM nickel concentrations were measured by five labs that were aware of the interlaboratory comparison and were provided specific guidance for conducting sample preparation, analysis, and QC measurements (to eliminate the multiple methods). The study showed that AVS/SEM can be reproducible when the methods have been standardized to allow consistent performance. However, even if performed by a single lab, using the same method every time, these two studies indicate that the research behind the AVS/SEM toxicity method needs to be reevaluated to be method-specific.

Overall, while AVS/SEM is a potentially useful tool for assessing bioavailability and associated toxicity of sediment metals, it should not be used as a stand-alone line of evidence for evaluating risk until laboratory methods have been standardized enough to allow consistent inter-laboratory reproducibility (NJDEP, 2015). Bulk chemistry is an important line of evidence, and should not be discounted as simply a screening method in favor of AVS/SEM (as was done by NCG), particularly when the AVS/SEM results do not show strong correlation with observed toxicity.

2. 2nd page, 1st incomplete paragraph: The document states that the benthic community responds most strongly to dissolved oxygen in the water column than on the SQT. This has not been satisfactorily demonstrated in the Draft BERA. EPA's comment ID No. 112 states that the text and figures presented in the BERA do not support that conclusion. NCG responded that the text and figures would be revised to clarify the line of evidence, but as yet, EPA has not seen the revisions and does not agree that the benthic community responds more strongly to water column DO than to SQT (including bulk sediment chemistry).

3. 3rd page, Toxicity Section, 2nd paragraph, 3rd sentence: "The results of the toxicity tests and porewater chemistry were combined to develop porewater-based concentration-response

relationships for those COPECs with porewater TUs greater than 1 (see Figures 8-19a through 8-24a)." The figures show a relationship only when 11 sample locations (13% of the total number of locations) are removed from the assessment.

4. 4th page, Numbers 1 and 2 at the top of the page: The two numbered statements say that all but nine of the 28-day toxicity test sample locations (the two samples from Westchester Creek were run twice to total 11 samples) are consistent with porewater based relationships. The paragraph that follows the numbered statements relates the nine locations (MC005, MC017, NC065, DK037, DK040, EB006, EB036, WE012, and WE014) to CSOs, as displayed on Figure 8-13. However, the relationship is not supported. Figure 8-13 also shows that in Maspeth Creek, location MC023 is closer to the large CSO than locations MC005 and MC017, but MC023 was consistent with the porewater based relationship. In Newtown Creek, there are multiple CSOs near sample locations NC013, NC161, NC162, NC037, and NC165, yet all of those locations were considered to be consistent with the porewater-based relationship. Figure 8-13 shows that there were only two sample locations each in Dutch Kills and East Branch, so there is no comparison to other locations near the CSOs in those reaches. While Westchester Creek is not on the figures attached to this memo, there were multiple CSOs near five of the sample locations in Westchester Creek, and three of those locations were consistent with the porewater based relationship. There is no technical analysis or explanation as to why the nine locations were removed and the others in close proximity to CSOs were not. Removing these nine locations as being CSO-related simply because they weaken the correlation is not a "plausible explanation", and is not technically defensible.

The contingency tables (Table 8-9) only list comparisons for the sum of total SEM metals TU and SPME PAH TU from porewater. This does not allow for consideration of a single risk driver (or several individual drivers), as could potentially be identified through assessment of individual PAH compounds as noted in EPA's Draft BERA comment ID Nos. 15, 16, 132, 137, and 138. More importantly, it ignores the bulk sediment chemistry. The fact that strong correlations could not be made using a limited scope of contaminants/media is not a reason to exclude nine sample locations as CSO-related. Additionally, NCG could assess the individual locations against individual contaminants to derive correlations, and perhaps there are different primary drivers in different reaches of the Newtown Creek system. The current analysis is incomplete.

5. 4th page, 2nd paragraph: Evaluation of which toxicity test is a better predictor of toxicity using the same contingency table method is flawed from two perspectives: 1) the limited contaminant/media used in the contingency; and 2) toxicity testing is a direct measure of toxicity. Because the 10-day toxicity study did not match up to the contingency tables as well as the 28-day toxicity study indicates that the design of the contingency tables is not suitable for the Newtown Creek data.

The 10-day sediment toxicity study is just as valid as the 28-day study, and should be given equal weight in the risk assessment (EPA comment ID No. 11 and 139). The 10-day study is a standard method that has been successfully performed for many years. The 10-day study performed for the Newtown Creek project met all acceptability criteria,

all standard reference acceptability criteria, and the lab control and reference area samples were all exposed under the same conditions as the Study Area samples. There is no scientifically defensible reason to exclude the 10-day study.

6. 4th page, numbered bullets at the bottom of the page: Removing sample locations to improve "false positive" rates does not appear to be supported. While it certainly makes the analysis tighter, it requires removing 13% of sample locations to bring the "error" rate to 1%. Stating that the 10-day toxicity results are a poor predictor of the porewater-based concentration-response relationship means only that the porewater-based correlations were insufficient to capture the potential within-site variability, to address the variability of the AVS/SEM method, to address individual contaminants as risk drivers, or to address the toxicity associated with bulk sediment.

7. 5th page, 2nd bullet: sediment bioassay results are partially explained by porewater chemistry, but results will not be fully explained until correlations have been developed for individual contaminants, individual locations, porewater chemistry, and bulk sediment chemistry.

8. 5th page, 3rd bullet: sediment bioassay results are not explained by proximity to CSO and MS4 discharge locations. There are numerous outfalls in the Newtown Creek system, and with the ebb and flow of the tides, there are numerous (at least double the number of stations excluded by NCG) sediment triad samples within proximity to one or more outfall. Additionally, what is currently being called "confounding factors" could be a function of the limited contaminant/media used in the correlation analyses.

9. 5th page, 4th bullet: While confounding factors are a concern, it does not appear that NCG has sufficiently assessed the physical/chemical/toxicological data collected at the triad sediment sample locations.

10. Benthic Flow Chart – Part 2: The first box, titled "Benthic Risk Assessment" only lists porewater-based concentration-based relationships, and it should include individual COPECs (as opposed to just TPAH and SEM metals TU), and bulk sediment. The boxes dealing with the removal of nine stations and the association with CSOs are not supported by the data, the explanation in the Draft BERA, nor the additional explanations in this technical memo. While the observed toxicity could not be explained by the narrow set of analyses performed, there was no attempt to link observed toxicity to CSOs other than by proximity (which does not appear to be supported by the figures attached to the memo).

11. 45th page, Polychaete/Sediment Regressions: This section relates to two of EPA's Draft BERA comments. Regarding comment ID No. 186, the response is acceptable. EPA required that the measured polychaete tissue data be used in wildlife exposure estimates, and NCG states that the measured tissue concentrations were used to develop BSAFs to predict tissue concentrations for areas where tissue data was not collected.

However, Comment ID No. 269 required that BSAFs be developed for each of the Study Area segments, rather than for the Study Area as a whole. The memo states that the

BSAF was developed for the entire Study Area. This was unacceptable in the comment matrix, and is still unacceptable. Empirical tissue data should be used to develop BSAFs for each of the Study Area segments, or an additional analysis should be included that supports using a creek-wide BSAF.

12. 45th page, Surface Water Screening Values: This paragraph refers to the NYSDEC comments on the use of surface water criteria for Aldrin/dieldrin and DDx. Ian Beilby provided clarification to NCG in an email dated 2/7/17, which was five days after NCG submitted the memo to EPA. As part of a 2/13/17 conference call between NCG and EPA, NCG requested clarification about how to proceed with NYSDEC's comments. EPA is working on clarification with NYSDEC, and will provide information to NCG during the dispute Negotiation Period.

References

Brumbaugh, WG, CR Hammerschmidt, L Zanella, E Rogevich, G Salata, and R Bolek. 2011. Interlaboratory Comparison of Measurements of Acid-Volatile Sulfide and Simultaneously Extracted Nickel in Spiked Sediments. *Environmental Toxicology and Chemistry*. Volume 30, number 6, pp 1306-1309.

EPA (United States Environmental Protection Agency). 2005. Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (cadmium, copper, lead, nickel, silver, zinc). EPA/600/R-02/011. Office of Research and Development, Washington, DC.

Hammerschmidt, CR and GA Burton Jr. 2010. Measurements of Acid Volatile Sulfide and Simultaneously Extracted Metals are Irreproducible Among Laboratories. *Environmental Technology and Chemistry*, Volume 29, number 7, pp 1453-1456.

NJDEP (New Jersey Department of Environmental Protection). 2015. Ecological Evaluation Technical Guidance, Version 1.3, February 2015. NJDEP Site Remediation Program.

The Louis Berger Group (in conjunction with: Battelle and HDR/Hydroqual). 2014. Lower Eight Miles of the Lower Passaic River Focused Feasibility Study Report. Submitted to the US EPA Region 2 and the US Army Corps of Engineers, Kansas City District.

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Subject: BERA Dispute Status

Stephanie,

As requested during the meeting on 2/13, the following presents the NCG's understanding on the status of Newtown Creek BERA items as documented in the 12/22/16 dispute resolution letter. Please forward this to others, as appropriate.

Note this information is subject to change depending on future discussions with EPA and in the event that more information becomes available.

<u>Primary Disputed Items</u>

Schedule

The schedule for submittal of the next draft BERA report is to be determined following completion of the dispute resolution period (currently through 2/23/17)

Reference Areas: Censor stations and Use Individual Reference Areas

EPA is directing that the reference area stations to be censored using a PEC-Q approach as provided to the NCG on 2/3. During the 2/13 meeting, the NCG expressed some concerns over the computation and application of the approach (use of individual metal PEC-Qs rather than an average metal PEC-Q; use of an overall average PEC-Q to evaluate individual stations; inclusion of non-triad stations; a need to re-calculate using updated datasets). EPA will consider NCG's comments and will provide additional information on the PEC-Q approach. EPA will also provide clarification on use of individual reference areas.

Based on the 2/13 discussion, this item is still under discussion.

Sediment Bioassays: Sediment-Porewater Relationship and Confounding Factors

The NCG sent a technical memorandum to EPA on 2/2 clarifying the BERA approach. During the 2/13 meeting, EPA stated they want the risk characterization step to also include a comparison of the bioassay results to bulk sediment concentrations. The NCG is of the strong opinion that the Phase 2 Work Plan decisions, which were reached after careful discussions with, and the approval of, the agency, recognized that porewater was the more relevant medium to evaluate potential impacts from COPECs. Hence, the Phase 2 program included broad porewater sampling throughout the Study Area.

In addition, EPA stated that a discussion of confounding factors may be appropriate to include in the risk characterization step if the discussion was broadened to include other potential confounding factors in addition to the ones included in the Draft BERA. EPA is finalizing its comments on the 2/2 memorandum and these comments may lead to additional discussions between the parties. The NCG believes a full discussion of confounding factors in the risk characterization is important in light of the strong evidence that toxicity observed at specific stations is not associated with COPECs in porewater.

Based on the 2/13 discussion, the NCG considers this item still under discussion.

10-day Sediment Toxicity Test

This was discussed with EPA during a meeting on 1/11/17. The NCG would like to provide

additional comments to EPA before the dispute resolution period ends.

At this time, the NCG considers this item to be under dispute.

Other Items for Dispute

Wildlife Exposure Modifying Factors

During the meeting with EPA on 1/11/17, EPA stated they would like the wildlife baseline risk analyses to include a range of exposure modifying factors (EMFs) in the risk characterization of the report; not confine these analyses to just the uncertainty section. The NCG had responded to EPA's original comments by agreeing to use a range of EMFs in the uncertainty section of the report.

At this time, the NCG considers this item to be under dispute.

Selection of Fish and Wildlife TRVs

The NCG sent a technical memorandum to EPA on 1/20 with additional information on selection of the wildlife and fish TRVs. EPA approved use of the wildlife TRVs in a 2/3 e-mail to the NCG, but requested more information on the tissue TRVs. Additional information on the tissue TRVs was sent to EPA on 2/8. During the 2/13 meeting, EPA indicated this information is still under review.

The NCG considers selection of the wildlife TRVs resolved; tissue TRVs are still under discussion.

White Perch

Use of white perch fillet data in the BERA risk analyses was discussed with EPA on 1/11. In a

1/20 follow-up email, EPA stated that white perch should be treated qualitatively in the BERA through comparison with striped bass fillet data. This was confirmed in a 1/26 meeting with EPA.

The NCG considers this issue resolved.

Additional Responses to be Discussed with EPA

Polychaete- Sediment Regressions

During a meeting with EPA on January 4, the NCG clarified use of the polychaete-sediment regressions in the BERA. The NCG provided this clarification in writing to EPA on 2/2. The NCG wants to determine whether EPA needs further clarification.

At this time, the NCG considers this issue to still be under discussion.

NYSDEC WQS

The use of additional NYSDEC surface water standards was discussed during the 1/11 meeting with EPA. In a follow-up e-mail on 2/7, NYSDEC indicated that NYSDEC water quality standards for the protection of wildlife and for human health based on fish consumption should be considered in the porewater evaluation of the BERA. During the 2/13 meeting, EPA agreed to discuss this further with NYSDEC.

At this time, the NCG is waiting for EPA to clarify NYSDEC comments.

Jim

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