Responsiveness Summary

For

Public Comments Received

On the

New York State
Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources

DRAFT Technical Guidance Document

Entitled:

Screening and Assessment of Contaminated Sediment
DRAFT version 4.0
Dated January 24, 2013

November 6, 2013

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Background: In January 1999, the Division of Fish, Wildlife and Marine Resources (DFWMR) published *Technical Guidance for Screening Contaminated Sediment*. This document identified the concentration of various contaminants in sediment that if exceeded, were potentially harmful to aquatic organisms, explained the derivation of those values, and described how the values could be used to assess the risks associated with sediment contamination. The 1999 document was a reprint with minor updates of the original edition which was first published in November 1993.

The 2013 *Screening and Assessment of Contaminated Sediment* is comprehensive revision of the 1993/1999 Technical Guidance. This revision is a highly technical document that incorporates numerous scientific advances in sediment toxicology, as well as new methods and procedures for sediment quality assessment that have been developed in the intervening years. It focuses solely on assessment of sediment quality and does not discuss sediment management, mitigation, or remediation. *Screening and Assessment of Contaminated Sediment* identifies concentrations of contaminants in sediment that can be used to identify and classify sediment samples as unlikely to be harmful to aquatic life or sediments with a high probability of being harmful to aquatic life. When contaminant concentrations fall between those two categories, the document describes a hierarchy of methods for additional assessments to determine the potential for harm. *Screening and Assessment of Contaminated Sediment* prescribes the procedures that will be used by the Division of Fish, Wildlife and Marine Resources for assessing risks to aquatic life from contaminants in sediment.

Introduction: The New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources (DFWMR), prepared this responsiveness summary to address the comments that were received on the Draft guidance document entitled Screening and Assessment of Contaminated Sediment.

Draft version 4.0 of Screening and Assessment of Contaminated Sediment, dated January 24, 2013 was published for public review and comment in the Environmental Notice Bulletin (ENB) on February 27, 2013. The Department provided a 45 day comment period that ended on April 12, 2013. A list of the parties that commented on the draft document is included on page 2.

The comments received were carefully reviewed and analyzed. In the following summary, comments have been grouped by topic, and where possible, the location in the January 24, 2013 draft to which the comment refers is specified. Paraphrased comments are listed below followed by the response. The source of each comment is identified in parentheses following the comment.

The responsiveness summary generally addresses all comments received, with the exception of comments dealing with editorial or formatting changes. The comments have been arranged by topic and organized to generally follow the format of the draft document, with general comments addressed at the beginning of the responsiveness summary.

List of Commenters

AECOM
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Syracuse, New York 13202 (CE)

ENVIRONMENTAL ENERGY ALLIANCE OF NEW YORK
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660 Woodward Ave.
2290 First National Building
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Thomas Warth
Hiscock Barclay
2000 HSBC Plaza
100 Chestnut Street, Rochester, NY 14604 (Warth)

GENERAL

Comment 1 (whole document): Delete use of the word "criteria." (SMWG)
Response: The document was carefully reviewed and the word "criteria" was deleted wherever its meaning might have been misconstrued.

Comment 2 (whole document): Use of empirically-derived, co-occurrence-based SGVs should be avoided due to significant issues with their derivation and lack of predictive ability. (SMWG)
Response: While there are legitimate concerns regarding derivation of empirical SGVs, they are appropriate for initial screening, particularly for identifying sediments presenting little risk, and for metals, where there is no reasonable alternative for initial screening.

Comment 3 (whole document): Empirically-derived, co-occurrence-based values do not reflect causal relationships and their potential relationships to toxicity are confounded by correlations among chemical and other stressors. Higher concentrations of any chemical are likely associated with a higher probability of toxicity from other chemicals, even when the concentration of the chemical in question is not high enough to contribute significantly to toxicity. (SMWG)
Response: While empirical SGVs do not reflect causation, there is generally good evidence that they are useful for identifying contaminant concentrations that are rarely associated with adverse effects and contaminant concentrations that are frequently associated with adverse effects. Given no other data than the concentration of a contaminant in sediment, empirical SGVs are an appropriate tool for initial screening.

Comment 4 (page 13): *Chironomus tentans* was reclassified as *Chironomus dilutus* and should be referred to as such. (EEANY)
Response: A footnote was added pointing out the change in species name. When cited from a literature source, the original name was used as it was in the source document, but otherwise, the new name was used whenever the species was discussed.

Comment 5 (Section 9): Section 9 should discuss estuaries and whether freshwater or saltwater SGVs should apply. (SMWG)
Response: The Department has no clear, consistent policy for identifying the difference between saltwater and freshwater habitats for all possible applications; that is, no single value of salinity has been established to segregate the two. There is also a considerable overlap in species tolerance for salinity, particularly in estuaries. It is up to the user to determine whether fresh- or saltwater SGV values should be applied on a project-specific basis.

PURPOSE

Comment 6 (Page 1, para 3): The word "criteria" should be changed to "sediment screening values." (SMWG)
Response: The word "criteria" was dropped and the paragraph significantly revised.

Comment 7 (Page 1, para 4): "Reasonable" is inappropriate and should be changed to "screening level." (SMWG)
Response: Given the context in which it is used, reasonable is the appropriate word, however, this section was significantly revised. The theme of this paragraph is now addressed in a new section that provides an expanded discussion of the screening, classification, and assessment process.

BACKGROUND

Comment 8 (general): The Guidance should discuss the issue of background contaminants, particularly in urban waterways. Site-specific background data should be considered in screening assessments. (AECOM)

Comment 9 (Section 8.C): An understanding of local and regional reference conditions should be considered as a critical line of evidence. (CE)

Response (8-9): The concepts of background are discussed more extensively in a new section (4. Chemical Contaminants in Sediment). However, site-specific, local, or regional background has no role in making an assessment whether or not sediments at a given site are toxic or not. Consideration of background is a topic for sediment management, which this guidance does not discuss.

CLASSIFICATION

Comment 10 (general): Inappropriate management decisions might result from the use of sediment classifications. (AECOM)
Response: A new section has been added (Section 5. Screening, Classification, and Assessment Process) to clarify that the focus of this guidance is purely on sediment assessment and not sediment management.

Comment 11 (Section 8.A): A presumption that [all] sediments [at a site] are toxic based on a single Class C exceedance is overly conservative. Statements imply that [management] decisions are/can be made following application of the guidance. (AECOM)
Response: This presumption has been dropped. The overall classification of the sediments at a given station is assigned based on best professional judgment, taking into account both the number of the individual contaminants and the magnitude of their concentration at the same station. A sediment classification is not assigned to an overall site.

Comment 12 (Section 9, 4th bullet): The conclusion that if the concentration of one or more contaminants exceeds the Class C threshold, then all of the sediments are highly contaminated is not rational. Classifications should indicate the potential level of risk and not be qualitative assessments of toxicity. (CE)
Response: This conclusion as been dropped. See response to comment 11, above.

Comment 13 (pages 7-8): For PAH-impacted sediments adjacent to MGP sites, neither EqP-modeled approaches nor SGVs provide sufficient specificity to correctly classify the Class A, B, or C thresholds as described. (EEANY)
Response: EqP and empirical SGVs are intended for initial screening when the only information available is the bulk sediment concentrations of contaminants. The initial screening procedures would not be applied to MGP sites, particularly ones where considerable sampling and testing has already been accomplished. Those sites have, for the most part, passed beyond sediment assessment and are a topic for sediment management.

Comment 14 (page 34): Defining Class C sediments on the basis of ERL-ERM sediments does not imply that the contaminant is present in large enough concentration that acute toxicity is definitely occurring, at least from PAHs at MGP sites. Wording should be changed to indicate that toxicity may be occurring, but is not definitely occurring. (EEANY)
Response: The wording has been changed.

Comment 15 (Section 3.A; 8.C): Sediment classification should only be done following the collection of multiple lines of evidence. Draft guidance currently classifies sediment only on the basis of SGV exceedances. The guidance calls for the whole site being classified based on the worst case classification. The guidance is unclear as to how classification system would be used, but it seems clear that final classification should be based on more than one line of evidence. The draft guidance can be improved by describing how likely lines of evidence would be interpreted in regards to determination of sediment classification. Include in the Table on page 36 how NYSDEC would classify sediments with the various combinations of SQT results. (SMWG)
Response: A new section has been added to better explain the screening, classification, and assessment process. Classification is described as an iterative process. When additional information is added, sediments are reclassified. DFMWR would generally interpret the table on page 36 in the same manner as recommended by the author, unless additional information was presented that suggested a different interpretation. The concept that the whole site should be classified on the worst-case classification has been dropped. A classification is not assigned to a whole site, only individual stations within the site.

SCREENING

Comment 16 (General): The guidance needs to state that site-specific risk assessment should be used to make cleanup decisions and that the use of default screening values a cleanup criteria is generally not appropriate. (AECOM)
Response: This document only addresses sediment assessment and does not discuss sediment management or cleanup.

RISK ASSESSMENT

Comment 17 (Section 8): NYSDEC should consider probabilistic methods in the tiered risk assessment process, particularly in reference to Class B sediments. (CE)
Response: The probabilistic methods that the commenter proposes are more germane to sediment management as opposed to the more limited topic of determining if contaminants present at a particular site pose a risk of direct toxicity to benthic organisms. Probabilistic methods are appropriate for follow-on evaluations for determining if the exceedance of a BSGV poses a risk or not.

EMPIRICAL SGVs

Comment 18 (Section 3): Provide a more robust comparative evaluation of empirically derived SGVs and EqP-derived SGVs to derive a more defensible basis for selecting one over the other. (CE)
Response: Empirical SGVs for organic compounds were replaced with equilibrium partitioning-based SGVs. Empirical SGVs are only used for metals because there is no alternative for initial screening.

Comment 19 (page 7): Neither empirical nor equilibrium partitioning SGVs "work" for assessing risks from PAHs at MGP sites. (EEANY)

Comment 20 (page 11): Long and Morgan values don't "work" for PAHs at MGP sites. (EEANY)

Comment 21 (page 14): The same comments regarding problems with using empirically-derived SGVs to PAHs from MGP sites in freshwater apply to saltwater as well. (EEANY)

Response (19-21): EqP and empirical SGVs are intended for initial screening when the only information available is the bulk sediment concentrations of contaminants. The initial screening procedures would not be applied to MGP sites, particularly ones where considerable sampling and testing has already been accomplished. Those sites have, for the most part, passed beyond sediment assessment and are a topic for sediment management.

Comment 22 (page 5): The statement that: "no single contaminant concentration in sediment can accurately represent a threshold of toxicity" is inconsistent with the stated preference for empirically-derived SGVs. (SMWG)
Response: Empirical SGVs for organic compounds were replaced with equilibrium partitioning-based SGVs. Empirical SGVs are only used for metals because there is no alternative for initial screening. Even before shifting to equilibrium partitioning SGVs for organics, the statement was not inconsistent with the overall context of the document, which is that the SGVs as published in tables 5 and 6 were intended primarily for initial screening when no other data was available, and are modified as additional information is introduced.

Comment 23 (general): Unmeasured chemicals and physical habitat variables can effect toxicity and confound the reliability of empirical SGVs. (SMWG)
Response: The comment is noted, and the document discusses this issue in detail. That is why SGVs published in tables 5 and 6 were intended primarily for initial screening when no other data was available, and are modified as additional information is introduced.

Comment 24 (Section 3): Empirically-derived, co-occurrence-based SGVs simply reflect background conditions, not toxicity. ERLs and TECs are within the range of naturally-occurring background concentrations for metals. Proposed values are background or less than background in urban settings. (SMWG)
Response: Empirically derived SGVs represent various percentiles of the contaminant concentrations associated with adverse biological effects. For the eight metals for which background values in freshwater sediments are reported by Rice (1999), all of the median background values are lower than the Class A SGVs except for nickel, which are nearly the same (21 ppm vs 27 ppm), and the 75th percentile background values reported are, on average, six times lower than the Class C SGVs. The Department does not accept that heightened concentrations of contaminants in sediment in urban areas that are of anthropogenic origin can be described as background.

Comment 25 (Section 3): Empirical-derived, co-occurrence-based SGVs do not predict toxicity and statements in the draft guidance regarding interpretation of exceedances of these values should be revised to reflect uncertainty. Many examples are provided of cases were SGVs, primarily ERLs and ERMs, did not reliably predict toxicity. (SMWG)
Response: It is agreed that empirically-derived, co-occurrence SGVs do not predict toxicity, but represent contaminant concentrations at which adverse effects are observed at a lesser or greater frequency, depending on the narrative intent. The language has been revised to reflect that the SGVs are not predicting the occurrence of toxicity but are reflecting the likelihood that adverse effects could be observed.

Comment 26 (Section 3): Equilibrium partitioning values should be used instead of empirically-derived, co-occurrence-based SGVs. (SMWG)
Response: Equilibrium-partitioning SGVs have replaced empirical SGVs for organic contaminants.

Comment 27 (Section 3, page 7, para 4): Consider the use of different classifying terms, so that, e.g., Class A sediment is not confused with the Class A water classification. (SMWG)
Response: It is unlikely that confusion would result from the use of similar terms by these two different programs.

Comment 28 (Section 3, page 10, para 3): The PECs of MacDonald, et al. 2000 and their underlying SQGs have serious technical flaws that make them inappropriate for assessing freshwater sediment toxicity in NY State. The PCB benchmark overestimates potential risk. (SMWG)
Response: The Department disagrees with the overall characterization of the MacDonald, et al. (2000) PECs, particularly when used for initial screening for toxicity assessment. The PEC for PCBs from MacDonald, et al. (2000) is not used as the basis for SGVs.

Comment 29 (Section 3, page 11, para 1): The database used to derive METs and TETs was not confined to data from the St. Lawrence river. (SMWG)
Response: The reference to METs and TETs was deleted.

Comment 30 (Section 3, page 12): The use of the mercury SGV implicitly requires that the TEC for mercury should be able to predict effects due to mercury and every other chemical [present], measured or unmeasured, in the underlying data set. The mercury TEC is well within the range of background concentrations and is thus extremely conservative. (SMWG)
Response: The use of the mercury TEC from MacDonald, et al. (2000) reflects that it is a concentration that below which, adverse are not frequently observed. No interpretation is suggested for other contaminants that may or may not be present. Exceeding this value (i.e., Class B) is interpreted in the guidance to mean that the potential for toxicity cannot be determined from the concentration of mercury alone, and additional information is required to assess the potential for toxicity.

Comment 31 (Section 3, Table 1a): The freshwater SGV for TCDD equivalent is not appropriate. Benthic invertebrates lack the aryl hydrocarbon receptor that mediates dioxin-like toxicity and are insensitive to dioxin. (SMWG)
Response: A screening value for TCDD is difficult to arrive at, as it is toxic at lower concentrations to higher trophic level organisms through bioaccumulation than to benthic organisms directly exposed in sediment. Because it has a very high K_{ow}, it binds very strongly to organic carbon in sediment, which again reduces the exposure to benthic organisms exposed directly. Virtually any detection of 2,3,7,8-TCDD is of concern because of bioaccumulation, and should be evaluated. A decision was made to use the bioaccumulation SGV derived using the K_{ow} and water quality standard for the protection of piscivorous wildlife as the screening SGV. This is the only bioaccumulation SGV that will be used for screening.

EQUILIBRIUM PARTITIONING SGVs

Comment 32 (page 8): The guidance does not take into account the increased binding capacity of black (soot) carbon and reliance on literature-based K_{oc} values results in an overestimate of risk. (EEANY):
Response: The original draft document specifically stated that different kinds of organic carbon have different binding capacities, and also stated that one way in which an equilibrium partitioning-based SGV can be modified is by substituting a site-specific, measured K_{oc}. While soot carbon has a greater binding capacity than the K_{oc} predicted from the K_{ow} leading to an overestimate of risk, other forms of organic carbon that can be present in sediment have lower binding capacities than the K_{oc} predicted from the K_{ow} and would lead to an underestimate of risk. In the final edition, Section 9 has been expanded to include a larger discussion of the use of site-specific, measured K_{oc}s.

MIXTURES

Comment 33 (Section 4.): The idea that: "if any individual quotient exceeds 1.0 then the sediments as a whole are likely to be toxic" is overly conservative. "Clearly additive" needs to be better defined/described. The total SGV quotient concept is overly conservative. (AECOM)

Comment 34 (Section 4.): Calculating the average aquatic life SGV quotient is not useful if no individual quotient can exceed 1.0 (SMWG)

Comment 35 (Section 4.): No sense in deriving a SGV quotient if any individual quotient exceeds 1.0. (CE)

Comment 36 (Page 17): Mean quotient can't be > 1 if none of the individual quotients cannot be >1 (EEANY)

Response (33-36): Statements to the effect that if an individual SGV quotient exceeds 1.0 then the sediments are considered toxic have been deleted.

Comment 37 (Section 4, page 15, para 3): The statement that toxicity would be expected if the SQGQ is > 1 is overly simplistic. It is essential to calibrate SQGQs to site-specific conditions (SMWG)
Response: The idea that toxicity is expected if the SQGQ (i.e., SGV) quotient exceeds 1 is the theoretical basis for the approach as described in the literature, but as the commenter suggests, this is not consistently the case. The text has been modified to clearly state that the significance of the SGV quotient depends on several different factors including site-specific characteristics, and that the absolute value of the SGV quotient is not as important as the quotient's ability to differentiate between likely toxic and likely non-toxic conditions.

Comment 38 (page 16): NYSDEC should provide guidance as to which groups of contaminants are clearly additive. (EEANY)
Response: to the extent possible, that has been done. The document cites examples were contaminants were broken down into three presumably additive groups: PCBs, PAHs, and metals. The final edition suggests other groups of like compounds, including organophosphate pesticides, chlorinated benzenes, and BTEX compounds can be considered as additive.

Comment 39 (Section 4.): For the evaluation of chemical mixtures, it is important to distinguish between empirically-derived, co-occurrence-based SGVs and EqP SGVs. Appropriate to sum EqP SGVs but not empirical SGVs as the occurrence of toxicity is already based on the mixture of contaminants and not the presence of individual contaminants. SGVs in Tables should not be generally referred to as reliable. (SMGW)
Response: The comment is correct. Text has been added to integrate this into the guidance, along with an appropriate literature citation.

Comment 40 (Section 4.): The magnitude of SGV quotients cannot be used to identify causes of toxicity. Example on page 17 is not accurate. The example would only be true if all of the SGVs were equally conservative, which is not the case. (SMWG)
Response: The comment is correct and the example has been deleted.

Comment 41 (Section 4, page 15, para 2): A critical review of quotient method is missing (Long, et al. 2006) that is more comprehensive than articles cited, and should be included. (SMGW)
Response: Long, et al. (2006) had been reviewed and included in the formulation of the guidance, but not cited. It was re-reviewed, citations added, and some new material was added and cited as well.

MIXTURES - PAHs

Comment 42 (Section 4.A): Commenter concurs with the recommendation to require analyses for all 34 PAHs. Additional text is provided to clarify the discussion on the topic. (EEANY)

Comment 43 (Section 4.A): The commenter disagrees with the requirement to measure for all 34 PAHs, and requests that it be dropped. Which PAHs to measure for should be a site-specific determination. (SMWG)

Comment 44 (Section 4.A): The adjustment factors for evaluating samples with less than 34 PAHs are overly conservative and should be dropped. They are 95th percentiles and as such, represent the upper bound of uncertainty. (SMWG)

Response (42-44): The sediment guidance has adopted the method described in U.S. EPA (2003) for use in screening sediments contaminated with PAH mixtures in New York. That method includes both the requirement for analyzing sediment for 34 PAHs and adjustment factors. That methodology has been modified slightly, only by allowing for the use in linear interpolation of adjustment factors when the numbers of PAHs analyzed for falls between 13 and 23. The EPA method is used in a second of later stage of the screening, classification, and assessment process. For initial screening, the sum of total PAHs, defined as at least the 16 PAHs identified as priority pollutant in U.S. EPA (2009), can be compared to the empirical SGVs listed in Tables 5-6 (the total PAH SGV is the only empirical SGV for organic compounds). The EPA method or other alternatives (such as porewater analysis) are employed for sediments from stations that are classified B or C for PAHs, but those require analysis for the 34 individual or classes of PAHs listed in U.S. EPA (2003). The presence of unmeasured PAHs can be a significant cause of toxicity, particularly since alkylated forms can be more toxic than some parent forms.

Comment 45 (Section 4.A; 7.F): Given the ubiquitous nature of PAHs, it is highly unlikely that the requirement for a reference area (TEC less than 0.1) would be met for any site investigation when the standard parameter list of 13 PAHs is used. The appropriate reference site should be identified on a site-specific basis. (SMWG)
Response: The Department concurs with the comment that the appropriate reference site should be identified on a site-specific basis. The guidance never defined a requirement for a reference area as an area where the TEC quotient was less than 0.1. The guidance cites an *example* from the literature where a reference site was defined as a site where the PEC quotient ≤ 0.1 (Ingersoll, et al. 2009). That is the appropriate value. If a TEC quotient were to be used as the basis for a reference site, then the recommendation would be to select a site where the TEC Quotient ≤ 1.0.

MIXTURES - METALs

Comment 46 (Section 4.B): The mixtures of metals guidance should include *foc* normalization: consistency with EPA guidance. (AECOM):

Comment 47 (Section 4.B): AVS/SEM: Use difference approach rather than the ratio approach. (CE)

Comment 48 (Section 4.B): The AVS:SEM discussion should include TOC normalization. Comments focus on the use of the AVS difference method instead of the AVS ratio method. (SMWG)

Response (46-48): Both the difference method and total organic carbon (TOC, f_{oc}) normalization have been integrated into the revised guidance.

Comment 49 (Section 4.B): Allow greater flexibility in the use of AVS/SEM – technical discussion included. AVS/SEM more robust than metals SGVs (CE)
Response: The guidance does not oppose the use of AVS/SEM. However, predictions of the presence or absence of toxicity made by an evaluation of AVS/SEM should be confirmed with toxicity testing, particularly if other, non-metallic contaminants are, or are likely, to be present. Once the utility of the AVS/SEM predictions have been validated at several stations within the site, the AVS/SEM method might be used more broadly throughout the site without additional toxicity testing. The revised guidance provides examples of limited circumstances where the sole use of AVS/SEM was deemed appropriate for assigning a sediment classification of A.

Comment 50 (Section 4.B): Consideration of AVS:SEM should be allowed at sites where sediments are likely to be disturbed, if it can be demonstrated that metals releases due to sediment resuspension will not be at unacceptable levels. (SMWG)
Response: The guidance has been changed to indicate that AVS and SEM methods can be considered in areas subject to disturbance, but the potential for an alteration of toxicity as a result of disturbances must be taken into consideration as well.

Comment 51 (Section 4.B): For metals, if EqP-based values are not available, rather than using empirically-derived, co-occurrence-based SGVs, consider using background values for initial screening. Consider developing and adopting New York-specific sediment reference values. (SMWG)
Response: The Department does not agree that "background" concentrations have any value for screening.

BSGVs

Comment 52 (Section 5.): Clear guidance needs to be provided to end users relative to the proposed use of BSGVs, particularly in urban waterways. Use LOELs instead of NOELs. (AECOM)

Comment 53 (Section 5, 6.C.): The limitations of BSGVs should be explicitly recognized and used only in initial screening. (SMWG)

Comment 54 (Section 5.): The section should clearly state that BSGVs are not used for classification. (Warth)

Response (52-54): The guidance has been clarified to better emphasize the original intent, that BSGVs are only intended to identify a potential concern that a bioaccumulation problem might exist and needs to be evaluated. The guidance clearly states that BSGVs are not used for classifying sediments, with the one exception of the SGV for 2,3,7,8-TCDD. The procedures for follow on bioaccumulation studies should be determined at the time such a study is undertaken.

Comment 55 (Section 5, 6.C): The discussion of bioaccumulation/biomagnification should include further discussion on the relative weight of this evidence when predictions from BAFs and other methods are inconsistent with these findings. (CE)
Response: Exceeding a BSGV is not considered as a line of evidence that a toxicity problem exists. It is a flag used to identify that a bioaccumulation concern might be present and needs to be evaluated, however, the procedures for a bioaccumulation study are beyond the scope of this document.

Comment 56 (Section 5, 6.C): The derivation of bioaccumulation-based SGVS (BSGVS) is overly conservative and their use may be inappropriate. (SMWG)
Response: The BSGVs are intended only to raise a flag to identity that a bioaccumulation concern might be present and needs to be evaluated, however, the procedures for a bioaccumulation study are beyond the scope of this document. In that context, the derivation is not overly conservative.

Comment 57 (Section 5, 6.C): A different example should be used in the Appendix B calculation because the PCB data used is out-dated. The published BSGV in table 3 is not the same as is used in the example in App B. (SMWG)
Response: The example has been changed.

Comment 58 (Section 5, 6.C): The specific inputs for the calculation of BSGVs should be documented. (SMWG)
Response: A table with the inputs used for the derivation of BSGVs has been added to Appendix C. A section on site-specific BSGVs has been added which reflects how input values can be changed to recalculate BSGVs.

Comment 59 (Appendix B): The values from Newell, et al should be updated. Also, users should have flexibility to update underlying assumptions. (SMGV)
Response: Updating Newell, et al. (1987) is beyond the scope of this project; however, BSGVs derived by the Newell, et al. method are not used to classify sediment; only to identify potential bioaccumulation problems. The revised guidance provides additional flexibility by including the table of input values and procedures for calculating site-specific BSGVs.

Comment 60 (Section 5): Commenter recommends that site-specific K_{oc}s are needed to accurately measure bioaccumulation potential. (EEANY)
Response: Concur; text has been added to discuss methods for measuring site-specific K_{oc} values.

SITE SPECIFIC SGVs

Comment 61 (Section 6): Alternative summary statistics should be considered instead of the 75/25 standard. For example, consider the context of spatial scale of representativeness, or arithmetic mean or the use of an upper percentile to allow some minimum fraction to exceed the SGV. An approach that infers adverse effect from a single exceedance would not be consistent with the tiered process that is proposed. The concentration used for classifying sediments should be based on either the mean value or a more protective probability percentile (e.g. 90% percentile). (CE)
Response: In essence, the determination of site-specific SGVs is using toxicity data from some stations to extrapolate risk to other stations about which contaminant concentrations are known but toxicity is not. There are, obviously, many methods of establishing thresholds for sediment classes, which is why there are so many different sets of SQGs available in the literature (PEC/TECs; PELs/TELs; SELs/LELs; ERM/ERLs, AET, logistic regression curves, etc.), and there are advantages and disadvantages for every approach. After reviewing many different sets of SQGs and methods, the 75/25 approach was selected as a reasonable method for differentiating sediments in which toxicity does not appear to occur frequently from those in which it does. It is not as restrictive as using NOELs/LOELs, and does allow for the occurrence of some false positives and false negatives. At the point of deriving site-specific SGVs, both bulk sediment chemistry and toxicity testing will have been already conducted. Site specific SGVs are derived in an attempt to understand and interpret toxicity test and bulk sediment chemistry results. The results of a derivation of site-specific SGVs could be used either to assess risk from individual contaminants or for developing site-specific SGV quotients. Other methods, such as those mentioned above, can be considered as well, particularly if the results of the 75/25 analysis are unsatisfactory. Project managers will have to decide if the site-specific SGVs are useful for sediment management decisions or if other methods should be considered for

interpreting results as well. For that reason, the derivation of other SGVs besides the 75/25 values are illustrated in Appendix E of the revised guidance.

Comment 62 (Section 6): Commenter believes generic SGVs are unsuitable for screening contaminants from MGP sites and advocates the use of site-specific SGVs. (EEANY)
Response: See responses for comments 13, and 19-21.

Comment 63 (Appendix D): It is not necessary to develop site-specific TEC/PECs or ERL/ERMs; just identify concentrations that are 75% predictive of effects or 25% predictive of no effects. (SMWG)
Response: Concur. The Appendix has been revised to focus primarily on derivation of the 75/25 values. The derivation of other SQG values is retained, however, for purposes of illustration. A project manager might want to derive other SQG values to compare to values derived from other datasets, or to use if the 75/25 approach does not produce usable values.

Comment 64 (Appendix D): The use of hit/no hit information is an oversimplified explanation and ignores potential valuable information. Lack of relationships between concentration and response might indicate a different, co-varying chemical is causing problems. Check MacDonald, et al. 2009 for concentration-response relationships. (SMWG)
Response: The 75/25, hit/no-hit method *is* a simplified approach. If the results are unsatisfactory, then other methods and additional information must be integrated to understand the relationship between the concentrations and effects observed.

Comment 65 (Section 6): The commenter discussed limitations associated with probability ranking, and recommends the use of logistic regression model instead. (EEANY)
Response: There are advantages and disadvantages to every approach for deriving empirical, site-specific SGVs. Logistic regression has the advantage of basing an SGV on an inflection point of the concentration-effect curve. The 75/25 approach has the advantage of establishing a pre-determined acceptability level for false positives and false negatives. The usefulness of either approach is dependent upon the distribution of concentration and effects data for the site. Logistic regression is a method that can be applied if the results of the 75/25 approach are unsatisfactory.

Comment 66 (Section 6): The draft guidance should provide flexibility in the methods used to derive site-specific SGVs. (SMWG)
Response: The 75/25 approach is the method selected for deriving the first draft site-specific SGVs, however, other methods can be considered if the results from the 75/25 approach are unsatisfactory.

Comment 67 (Section 6, Appendix C): The commenter agrees that measured K_{oc} values provide more site-specific results, and proposed additional language for explaining how site-specific K_{oc}s should be measured/determined. (EEANY)
Response: Measured K_{oc} values are a better basis for site-specific equilibrium partitioning-based SGVs than K_{oc}s derived from K_{ow} values. Some of the proposed language was adopted.

Comment 68 (Appendix C): The source of all of the values used in App C should be explicitly noted. (EEANY)
Response: Text has been added to identify the sources of the values listed.

TOXICITY TESTING

Comment 69: (Section 7): Control-normalized results and minimum significant differences should be used in the analysis of sediment toxicity test results and these concepts should be added to the guidance.
Response: The guidance neither precludes nor requires the use of these or other procedures. The test for toxicity is a statistically significant difference between the test population and the control/reference population. The specific analytical methodologies employed to make that determination should be discussed and agreed to when toxicity tests are undertaken.

Comment 70 (Section 7.B): Statistical power. Greater flexibility is required in the number of samples required at any site; minimum of 20 is too high.

Comment 71 (Section 7.B): The commenter stated that the requirement for a minimum of 20 samples in order to observe differences as low as 5-10% is overly stringent and not practical. Literature supporting position was provided, as well as a detailed analysis.

Comment 72 (Section 7.B): It is not clear how the minimum requirement for 20 samples for adequate statistical power was generated. (SMWG)

Comment 73 (Section 7.B): The number of test organisms per test chamber are specified in standardized test protocols. (SMWG)

Response (70-73): The concept in mind behind Section 7.B was improperly expressed and has been deleted.

Comment 74 (Section 7.C): It is not necessary that the samples should be evenly spaced over the contaminant gradient. The key concern is that a sufficient number of stations be positioned within the response range or the test organisms.
Response: The samples should be distributed as evenly as possible across the concentration gradient in order to establish the best possible concentration-effects gradient, at least with initial testing. The sensitivity of test organisms to the specific contaminant mix likely to be present at any station tested is unknown until testing is completed. If a satisfactory concentration-effects relationship cannot be established than additional testing with modified procedures or different species may be needed.

Comment 75 (Section 7.D): Multiple species. At some sites, sometimes, only one species is adequate. (AECOM)

Comment 76 (Section 7.D): The commenter cites literature that evaluated the ideal characteristics of test organisms for sediment bioassays. Very few other sediment organisms would meet those characteristics as well as Hyalella and Chironomus. Other species would add variability to results. Problems with applying Microtox testing to sediment assays were discussed. Literature cited. Better guidance needs to be provided on the use of surrogate (Microtox) tests. Hyalella already demonstrated to be highly sensitive to PAHs in sediment and is the ideal organism for testing sediments from MGP sites. (AECOM)

Comment 77 (Section 7.D): The recommendation to use nonstandard sediment toxicity tests instead of standardized *Hyalella* and *Chironomus* tests is short-sighted, because the ecological relevance would be questionable. (SMWG)

Response (75-77): The Department firmly believes that the use of only one or two species for sediment toxicity testing is inadequate. However, the use of only *Hyalella azteca* and *Chironomus spp*. (as well as several saltwater amphipod species) for sediment toxicity testing has become institutionalized. Standard procedures have not been developed for multispecies toxicity assessments in the same manner as they have for water quality assessments. Because sediment toxicity tests are lengthy and expensive, it is unlikely that test protocols for other species are being developed. As the commenter points out, using additional species would likely result in additional variability, which could cloud the interpretation of multiple species test results. The section on multiple species has been reluctantly dropped, but the discussion of the use of alternative (i.e., bacterial, luminescent, and enzymatic) toxicity tests has been retained and moved to the section on additional lines of evidence. Little additional guidance has been provided because The Department has relatively little direct experience in this area, but literature sources suggest that it could be a valuable tool for expanding the data regarding site-specific toxicity available without the costs of additional chronic tests, and should be considered/evaluated as an appropriate site-specific additional line of evidence.

Comment 78 (Section 7.E): Studies of MGP sites has shown no relationship between total PAHS and amphipod and chironomid growth. They do not object to the requirement for a 28 day test, but they believe that mortality/survival is the most sensitive endpoint. (AECOM)
Response: The sediment guidance is not limited to the assessment of PAHs from MGP sites. Mortality may be the most sensitive endpoint for PAHs, but not necessarily so for other contaminants.

Comment 79 (Section 7.E): The use of chronic toxicity testing should be a site-specific determination. Five literature references are provided to document that 10 day amphipod survival tests better reflected toxicity than 28 day growth endpoints. (SMWG)
Response: The requirement for chronic toxicity testing is retained. While some studies have shown better results with acute tests than chronic tests, literature such as Ingersoll, et al. (2000) and U.S. EPA (2002) indicate that the results of the long term tests are preferred to short term tests, and that longer term tests are more predictive of benthic community level impacts. Of the studies cited by the commenter, some acknowledge problems with results that showed greater toxicity with short term tests than long term tests. For example, McGee, et al. (2004) discusses

problems relating to feeding, and that review shows that test animals in 10 day studies were not fed, but test animals in the 28 day studies were fed, suggesting that the greater occurrence of adverse effects observed in short term tests might have been influenced by nutrition. Different feeding regimes in different long term tests also produced different results.

Comment 80 (Section 7.E): Guidance on the numbers and types of toxicity tests should be clarified. Guidance is vague and difficult to implement. Other freshwater species are less than ideal for testing, some are less sensitive; others are only seasonably available. (SMWG)

Response: The guidance has been clarified. Chronic toxicity testing with at least one, but preferably two species is required. If acute testing is conducted instead of chronic, then an acute to chronic ratio of 6 will be applied to the results. Alternative (i.e., bacterial, luminescent, or enzymatic) toxicity tests are an option that can be utilized as an additional line of evidence.

Comment 81 (Section 7.F): Controls and reference sites: The guidance should recognize that anthropogenic contaminants may be ubiquitous in urban waterways and should be taken into consideration when selecting reference sites – incremental risk. (AECOM)

Response: The presence of contaminants in urban waterways will certainly affect the selection of appropriate reference sites, and must be considered. However, the basic criteria for a reference site are unchanged. The reference site sediment must be as physically and chemically similar as possible to the sediment in the site being evaluated, contaminant concentrations must be as low as possible, and the sediments must be non-toxic.

Comment 82 (Section 7.F): Commenter generally agrees with requirement for both control and reference sites. They recommend that at least five reference samples be included. They also suggest that the guidance should propose what statistical measure should be used to compare test and reference samples. (EEANY)

Response: The Department agrees with the use of multiple reference sites, but the actual number should depend on site specific conditions. For a sediment sample to be considered toxic, then the effect being tested for (survival, growth, reproduction) should be statistically significantly different from the reference site. Statistical analysis is discussed in standard methods for toxicity tests.

Comment 83 (Section 7.F): Limiting the selection of an appropriate reference site by using a mean PEC quotient of <0.1 is overly restrictive. (SMWG)

Response: The guidance cites literature in which the mean PEC Quotient was used as the basis for selecting reference sites, but it neither requires nor limits the choice of reference sites to those that meet this criterion.

Comment 84 (Section 7.F): The guidance should explain the difference between a reference site and background. (SMWG)

Response: Background is discussed in greater detail in the revised guidance. The guidance states that: "The reference site must be as physically and chemically similar as possible to the sediment samples being tested, with the exception of contaminants." Certainly, a reference site can meet the definition of background, as provided in the revised guidance, but it doesn't have to, as long as whatever contaminants are present are demonstrably non-toxic.

Comment 85 (Section 7.F): The reference site should also be representative of the ambient contaminant conditions that may be affecting a study site. (SMWG)
Response: This is an implicit reference to background, and suggests that any toxicity attributable to contaminant concentrations similar to that in adjacent areas outside the specific site in question should somehow be integrated into the toxicity assessment for sediments within the site being evaluated. The Department strongly disagrees with that concept and distorted meaning of "background." The purpose of this guidance is to describe procedures and methods for determining if contaminants in the sediment from a particular site pose a risk to aquatic life; i.e., are they toxic or not. Reference sites are used to allow for the potential that physical and chemical characteristics of the sediment *other than* contaminant concentrations might influence the survival, growth, and reproduction of organisms present, and to achieve that goal, a reference site must be as physically and chemically similar as possible to the sediment samples being tested, with the exception of contaminants. Comparison of contaminant concentrations outside of the site of interest to those inside the boundaries of the site and the question of how those external contaminant concentration should or should not affect decisions and actions taken within the site is a sediment management responsibility and beyond the scope of toxicity assessment.

Comment 86 (Section 7.G): Provide more discussion or cross referencing to guidance on statistical sampling designs, consider incremental sampling methods: (CE):
Response: When the guidance was initially prepared, very little information was found on sampling design. After reviewing what was available, the Balduck method was selected as an appropriate model. Even the Balduck method only prescribes the number of samples that should be collected and not the distribution of sampling stations throughout the site. Sampling should be planned to ensure the area under investigation is adequately covered. Despite this recommendation, it is usually after sediment has been initially sampled and contaminants detected that this guidance comes into effect, so in all likelihood, the guidance will have little influence on initial sampling. The procedures and methods for subsequent sampling can be determined by project staff as the sediment assessment proceeds.

DECISIONMAKING

Comment 87 (Section 8): The statement that "if a number of samples are collected at a site, the whole site should be classified as the worst case" is questionable. A single site should not override information provided from other sites. (SMWG)
Response: The Department agrees. The revised guidance does not recommend classifications for whole sites. Instead, stations within each site are classified based on best professional judgment and taking into account both the number of the individual contaminants and the magnitude of their concentration at the same station.

Comment 88 (Section 8): The section on benthic community analyses is overly simplistic with respect to the difficulties frequently encountered in conducting and interpreting benthic community evaluations. (SMWG)
Response: The commenter is correct that the guidance does not go into a lot of detail in describing procedures for conducting a benthic community analysis. The guidance establishes that benthic community analysis is an appropriate line of evidence for evaluating sediment

toxicity, identifies several key metrics that should be considered for use, and identifies the general objective that if contaminants in the sediment at a particular site are not posing a risk to aquatic life, the ecological community present should not be substantially different from that present at a similar site lacking contaminants. The details for conducting and evaluating the benthic community assessment are likely to be site-specific and should be worked out at the time such analyses are being planned.

Comment 89 (Section 8): The use of the BLM should be restricted to evaluating sediment porewater. (SMWG)
Response: The Department agrees with the comment.

Comment 90 (Section 8): The discussion of bioaccumulation/biomagnification should be expanded to include strengths and limitations associated with the use of empirical benthic chemical residue data relative to a surrogate, such as the 28 day bioaccumulation test. (SMWG)
Response: Empirical benthic chemical residue data have no value or use beyond identifying that a potential bioaccumulation problem might exist. If contaminant concentrations fall below the BSGV values, then the contaminant is not considered to pose a bioaccumulative risk. If the contaminant concentration exceeds the BSGV, then additional study is needed to determine whether there is a risk or not. The 28 day bioaccumulation test is one method for determining whether or not exceeding the BSGV poses a significant risk.

BEYOND SCREENING

Comment 91 (Section 8.B): The commenter would like clarification if the section implies that once screening is complete, no additional characterization of site chemistry is required; rather, development of site-specific SGVs using toxicity testing is the next step to be taken. (EEANY)
Response: Once a station has been classified as A, no further assessment is needed for that station. The development of site-specific SGVs using toxicity testing is one possible step, but not necessarily the next step. Screening, classification, and assessment continues until as many stations as possible can be clearly classified as A or C.

Comment 92 (Section 8.C): Additional lines of evidence should be considered in determining if an impairment exists, not just in determining the type and extent of impairment. (CE)
Response: The Department agrees with the comment.

Comment 93 (Section 8.C): NYSDEC should incorporate a multi-criteria decision process that provides guidance for weighing various lines of evidence. (CE)

Comment 94 (Summary): Commenter recommended that a decision tree-type figure be added to clarify how the different approaches discussed in the document should be employed and sequenced. (EEANY)

Response (93-94): The Department agrees that a multiple-criteria decision making process is appropriate, but it is not appropriate to establish *a priori* how and in what order each additional line will be evaluated. Those details should be worked out as each site assessment project proceeds, and can vary from project to project. The selection of a particular line of evidence to pursue might depend on the evaluation of previous studies.

Comment 95 (Section 8.C): Benthic community structure alone is not a reliable measure of benthic impacts and all three legs of the SQT triad need to be evaluated at the same time. (EEANY)

Response: The Department agrees with this; however, depending on the nature of the specific project, it may not be practical to conduct all three analyses at the same time. For example, most projects begin with bulk sediment chemistry analysis, to determine what contaminants were present. After screening with SGVs, a decision is made as to which stations require toxicity testing. While toxicity testing and benthic community analysis can be conducted simultaneously, it might be prudent to await the outcome of toxicity testing to determine at which stations a benthic community analysis might be needed.

Comment 96 (Section 8.C, Porewater): The commenter provided additional detail regarding SPME pore water methodology, and provided a reference to recent EPA documents with additional information on other solid-phase methods. (EEANY)

Comment 97 (Section 8.C, Porewater): The porewater sampling and analysis discussion should be updated to reflect recent advances documented in U.S. EPA (2012). (SMWG)

Comment 98 (Section 8.C, Porewater): There are [other] passive samplers that can be tailored for specific chemical contaminants (e.g. mercury and methylmercury) in sediment. (SMWG)

Comment 99 (Section 8.C, Porewater): Guidance should utilize methods described in U.S. EPA 2012 regarding passive samplers. ((AECOM)

Comment 100 (Section 8.C, Porewater): Passive samplers should be deployed in the biologically active zone of the sediments to provide an accurate estimate of exposure. (SMWG)

Response (96-100): The Department was unfamiliar with U.S. EPA (2012) and appreciates commenters bringing it to our attention. That document has been reviewed and information regarding different solid-phase methods has been added to the revised guidance. It should be pointed out, though, that these methods are new, and not thoroughly vetted for all possible contaminants of interest. There is great value in their use as long as validation studies are conducted as needed and appropriate.

Comment 101 (Section 8.C, Porewater): The draft guidance should not be so prescriptive in stating a preference for porewater collection methods when the field is rapidly evolving. (SMWG)

Response: The use of porewater as the basis for assessing sediment toxicity has long been plagued with problems regarding sampling methods. Numerous references support the methods

identified as preferred; that is, dialysis samplers and centrifugation/filtration. Other methods can be employed as long as validation studies are conducted to demonstrate that the other methods are at least as reliable as the established methods.

Comment 102 (Section 8.C, Porewater): In discussing the benchmarks for evaluating porewater results, focus should be placed on the dissolved phase of the porewater. An additional filtration step is required when the centrifugation method is employed. (SMWG)
Response: The Department agrees with this comment. Filtration following centrifugation is a necessary step and was not adequately discussed. The revised guidance includes filtration following centrifugation.

SUMMARY AND CONCLUSION

Comment 103 (Section 9, 2nd Bullet): Balduck method does not take into consideration site-specific data quality objectives or conceptual site models. Does not address sampling depth. (AECOM)

Comment 104 (Section 9, 2nd Bullet): Commenter supports the use of the Balduck method. (CE)

Comment 105 (Section 9, 2nd Bullet): Commenter requests reference material on Balduck method. (EEANY).

Comment 106 (Section 9, 2nd Bullet): Needs more discussion of the derivation. (SMWG)

Response (103-106): See also the response to Comment 86. It is acknowledged that the Balduck is a simplistic method for selecting the number of samples that should be collected when evaluating a sediment site of a given area. There are other factors that need to be taken into consideration when developing a sampling plan. Information on the Balduck method will be provided when the revised guidance is published.

Comment 106 (Section 9, 14th Bullet): This paragraph overstates the certainty with which alterations of benthic communities can be attributed to contaminants. (SMWG)
Response: The assertion that benthic community analyses can provide a clear indicator whether or not contaminants are causing adverse effects is well supported in the literature; however, it is acknowledged that it may not always be the case. That is why additional lines of evidence are needed.

Comment 107 (Tables): All tables should include a footnote that references site-specific, regional background or reference values and how they should be used in the context of the recommended SGVs. (SMWG)
Response: The SGV Values in Tables 5 and 6 are values used to make some initial evaluation about the potential risk to aquatic life from contaminants present. Background concentrations have no relevance to the use of these values for initial screening.

Comment 108 (Appendix C): Table only provides information for some compounds (PCBs missing). Guidance should direct user to on-line sources and on-line calculators in the absence of empirical data. (SMWG)

Response: A section has been added to the text explaining the derivation of the PCB SGVs. The derivation of SGVs is explained fully in the text of the guidance and is sufficient for use in deriving equilibrium partitioning-based SGVs. The recommended on-line source for log K_{ow} values is the same as was used in the development of the guidance; the Hazardous Substance Data Bank (HSDB). A footnote including the internet URL is included in the revised guidance, now Appendix D.

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ENB - Statewide Notices 2/27/2013

Public Notice

Notice of Proposed Rule Making to Amend 6 NYCRR Sections 2.20, 6.2 and 6.4

Pursuant to the Environmental Conservation Law sections 11-0901, 11-0903, 11-0905, 11-1101 and 11-1103, the New York State Department of Environmental Conservation (NYS DEC) hereby gives notice of the following:

Draft Sediment Quality Assessment Guidance Document Available for Comment

This notice announces the availability of the draft guidance document Screening and Assessment of Contaminated Sediment for public review. **Public comment on this document will be accepted for 45 days, through close of business Friday, April 12, 2013.**

Background: In January 1999, the New York State Department of Environmental Conservation (NYS DEC) - Division of Fish, Wildlife and Marine Resources published Technical Guidance for Screening Contaminated Sediment. This document identified the concentration of various contaminants in sediment that if exceeded, were potentially harmful to aquatic organisms, explained the derivation of those values, and described how the values could be used to assess the risks associated with sediment contamination. The 1999 document was a reprint with minor updates of the original edition which was first published in November 1993.&

The 2013 Screening and Assessment of Contaminated Sediment is comprehensive revision of the 1993/1999 Technical Guidance. This revision is a highly technical document that incorporates numerous scientific advances in sediment toxicology, as well as new methods and procedures for sediment quality assessment that have been developed in the intervening years. It focuses solely on assessment of sediment quality and does not discuss sediment management, mitigation, or remediation. Screening and Assessment of Contaminated Sediment identifies concentrations of contaminants in sediment that can be used to identify and classify sediment samples as unlikely to be harmful to aquatic life or sediments with a high probability of being harmful to aquatic life. When contaminant concentrations fall between those two categories, the document describes a hierarchy of methods for additional assessments to determine the potential for harm. When final, Screening and Assessment of Contaminated Sediment will prescribe the procedures that will be observed by the Division of Fish, Wildlife and Marine Resources for assessing risks to aquatic life from contaminants in sediment.

Information: The Draft Screening and Assessment of Contaminated Sediment (PDF, 1.05 MB) can be found on the NYS DEC website at:

http://www.dec.ny.gov/docs/fish_marine_pdf/contamsedimentrev.pdf or a copy can be obtained by contacting Timothy Sinnott at NYS DEC, Division of Fish, Wildlife and Marine Resources, Bureau of Habitat by mail at 625 Broadway, 5th Floor, Albany, NY 12233-4756, or by phone at (518) 402-8970, or via email at txsinnot@gw.dec.state.ny.us. The document is 72 pages in length and the PDF version is 1.074 MB. Comments on the Draft Screening and Assessment of Contaminated Sediment should be sent, written or email, to the same address. Comments received by the close of business April 12, 2013 will be considered for inclusion in the final version of the document.

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