Reviewer’s report

Title: Wrangling Environmental Exposure Data: Guidance for Getting the Best Information from your Laboratory Measurements

Version: 1 Date: 17 Sep 2019

Reviewer: Kathleen Attfield

Reviewer's report:

Thanks to the authors for the changes that much improve the flow and comprehensibility of the manuscript. There is such useful material here that it serves the reader well to be able to move more cleanly from one section to the next. I greatly appreciate the authors’ efforts in creating this summary of methods of QA/QC review as I can see it be immensely helpful to many researchers new to working with outside laboratories.

The large quantity of new material and re-organization, however brought up some additional issues for me as listed below. If these are addressed, I see this manuscript as being acceptable for publication though still tricky to navigate at times. Numbers refer to the track changes version of the document.

Please review the document for the use of the term "qualify" as it is still used in a rather technical sense at times. For the more novice reader, it may not be understood as a way of looking at or flagging values between the LOQ and LOD and many may not be used to seeing values provided for this situation. For example, lines 243-5 could read as "flagging" instead of "qualifying". There are quite a few mentions of this before the scenario is explored in 301-315. Line 320 is a little hard to follow (a detect vs. a true detect).

In general, please check over the document for possible confusions between laboratory measurement problems and overall method measurement problems. The authors refer to this in line 234 but do not explicitly address the difference.

Comment 2.5: Authors have reorganized and added information to present the batching issues related to QA/QC review more cleanly. However do they state that researchers should work with labs to develop a batching plan? They also don't address whether they would request a lab to review and compare different batch results before releasing data back to the researchers.

Line 288: I think it's more correct to say the MRL is lowest level that some labs will report or report without flagging/qualifying as estimated. Again, since a lab may not be providing values below the LOQ.

Line 309: Does the term "non-detect" need to been defined (as meaning below the LOD)? Remember that some groups may only have received an MRL cutoff.
Lines 366+: What LCS do the authors' suggest for blood? Bovine serum brings a different suite of measurement issues, including potential background levels of some analytes of interest.

Line 76: I think the authors mean measure invalidity; not that the measurements are invalid. The tests may be fine, but the conclusions drawn are incorrect.

Line 180: Matrix choice does not fit cleanly into a "chemical identity" section. Matrix choice is also an issue beyond biological matrices and plays a role in environmental sampling as well.

Line 183: Is this paragraph meant to fall under the "chemical identity" sub-section? Might it more be "method performance"?

Lines 196-7: The method of choice for the researcher is based on the levels of concern to the researcher, not necessarily that they can enumerate all the anticipated concentrations.

Line 340: The 20% recommendation is not terribly clear - 20 field QC vs 80 field samples, 20 field QC samples vs 100 field samples, 20 field QC vs 80 other QC?

Lines 362 and 370: Please keep introduced terminology consistent: include "standard". Line 370 should be LCS not "spiked sample". Likewise, lines 366-369 could use the term "spiked" so as to clue the reader to the adherence to the paragraph header. Please check that paragraph beginning at 571 also has consistent terminology.

Lines 396-406: It is possible that readers may be more confused by the difference between surrogate recovery standards and internal standards (since both are added to every sample) than with matrix spikes (which could be more easily contrasted by starting each section saying one addresses overall recovery and the other individual sample recovery).

Lines 428-431: This addition about blood sample field blanks is difficult to follow. I assume the authors mean to state what methods can be used in lieu of blood sample blanks, though they may be inadequate.

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