### Appendix 4: Steps in Performing a Critical Manuscript Review

Developed by Dr. N.G. Love

1. **What is the motivation behind the work?** Is this motivation valid; i.e., does it justify the work performed?

2. **What is(are) the objective(s) of the work?** Identify hypotheses, if given, and clarify if experimental approach is inductive or deductive. Also, comment on whether or not the authors provide adequate basis for their hypothesis.

3. **Evaluate the experimental approach.** Do the authors conduct the correct experiments (including all the necessary controls and statistical redundancy) to adequately address their objectives? The materials and methods should be written to a level of detail that will allow another person to repeat exactly what was done. If the experiments are inadequate, suggest modifications to the experimental plan or additional experiments that would be appropriate for addressing the objectives/hypotheses proposed.

4. **Analyze the results.** This is best done by looking at graphs and figures BEFORE reading the authors’ rendition of what they think the data mean. This allows you to look at the data before being influenced by the authors’ interpretation. Then, read the authors’ rendition of the results. Are the data adequately interpreted? Do the interpretations correspond with the data shown?

5. **The discussion should relate the results to other literature and convey the importance of the results.** Does the discussion accomplish this? If not, why not? If so, why?

6. **Do the conclusions flow from the data presented, or do the authors over-interpret their data (i.e., do they use too much conjecture)?** If you think the authors’ conclusions are inadequate, provide your own conclusions based on your interpretation of the work.

7. **Do the conclusions address the objectives originally outlined by the authors (i.e., do the authors achieve what they set out to do)?** If deductive in nature, do the results support the hypothesis? If inductive, do the data support the hypothesis as developed?

8. **Does the abstract convey the key conclusions from the work correctly and sufficiently?** Does it convey the implications of the work? The abstract should not be vague (vague = “the chemical concentration changed”; more clear = “the chemical concentration decreased by 40% in 5 hours”). I find it best to critically evaluate the abstract after reading the paper, making sure that it conveys the key points so that anyone reading only the abstract will understand the major conclusions of the work and their significance.

9. **Is the title appropriate for the work completed?** Many times, titles are not well stated and lead people to read papers that do not achieve what the title implies is achieved.

10. **Finally, it is appropriate to comment on how well the paper is written in terms of grammar and logical flow of information.**

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*Note: this was provided by Dr. Soupir. It is just one suggestion on how to do a peer review in ABE.*