

NEW YORK ORAL COMMENTS TO SAB, 11/4/2010

We appreciate this opportunity to address the Committee.

My name is Dr. Raymond Vaughan. I am an Environmental Scientist with the New York State Attorney General's Office, and a member of New York's ballast water management team which is coordinated by the Department of Environmental Conservation.

We have two main comments that are intended to be constructive:

First, it looks like the Committee is not consistently posing the right statistical questions, meaning you're not yet being precise or succinct enough in framing the relevant questions and applying the appropriate statistical methods. In the SAB's draft response to its charge question 4, for example, the material on pp. 8-12 appears largely inconsistent with the material on pp. 30-39. There's also a lot of material that's illustrative of statistical concepts in general but appears to be tangential to the questions at hand.

As a starting point, the idealized Poisson requirements for sample volume are very straightforward. Lee et al. describe these requirements well. Granted, you can't just assume an idealized Poisson model, but the Committee needs to parse out and quantify the *quality control issues*, the *effects of volume concentration procedures*, and the *effects of aggregation or clustering*. Each of these can and should be distinguished from the Poisson volume requirements. In particular, you can't just assume overwhelming human and equipment error; you need data to identify the bounds on such error. You can't just assume overwhelming effects from aggregation or clustering; you need data to identify the bounds on such effects.

Our second comment is an apparently new and important one. It involves the following question:

In looking at aggregation and clustering, is the purpose to assess *ballast water treatment system performance* or *tank performance*? In other words, are we more interested in whether organisms are clustered in a ballast water discharge stream due to a momentary malfunction or hiccup of the treatment system, or due to clustering that occurs afterward in the ballast tank? These are separate issues. Assuming that we're all more interested in ballast water treatment system performance, the *uncertainties about aggregation and clustering can be largely eliminated by filling a tank with the required Poisson volume* – for example, 30 m³ – of water from the outlet of the ballast water treatment system, *and testing 100% of that volume*. Such a test procedure would directly measure treatment system performance and would keep such performance distinct from any subsequent complication of clustering in the ballast tank. Questions of clustering in tanks can't be ignored but need to be assessed separately. Any clustering that occurs in tanks is not necessarily related to treatment-system performance. More importantly, any clustering that occurs in a ballast tank – whether related to treatment-system performance or not – does not affect the measurement of treatment-system performance if 100% of the tank volume is tested.

Thank you.