

(Sent to Portland Water Bureau as an e-mail attachment from EPA Region 10 on 4/22/09)

Variance Monitoring Considerations Associated with Method 1623 DRAFT 4/22/09

OGWDW offers the following technical comments, largely focused on analytical method issues, to complement the perspective offered by the office regarding appropriate variance considerations/conditions. OGWDW anticipates that Region 10 will use the comments to support discussions with the petitioner regarding the design of an appropriate sampling plan and we look forward to reviewing that plan prior to its approval by Region 10.

Generally speaking, use of a modified version of Method 1623 for variance monitoring should involve a study design more extensive than a "Tier 1"-based evaluation (as described in Method 1623) that would be used to support LT2 compliance monitoring; statistical interpretation of the results of the study should be provided. Further recommendations follow:

(For reference purposes, Portland has replaced the bullets with numbers)

1. Statistically valid data should be provided to demonstrate the efficacy of the proposed method version before initiation of sampling.
2. The number of observations necessary for the experiments should be calculated using the variation in repeated matrix spike tests.
3. Matrix spike samples should be collected from a full suspension of specific source water in the complete volume proposed for sample collection (e.g. 200L) and spiked with 100 oocysts.
4. A letter of support should be provided from all manufacturers for any equipment and/or reagents used outside of manufacturer specifications and recommendations (e.g. 200L sample collected at 4L/min instead of manufacturer validation at 50L and 2L/min or quantity of reagents in less volume than recommended by manufacturer e.g. IMS antibodies).
5. Collection pressure and duration of sample collection should be specified in the study plan.
6. A comparison of recoveries for the proposed method version with recoveries from all previous method variations used to sample source water should be included in the study plan. Any pertinent time or pressure constraints should be identified.
7. If chemical additions, such as sodium hexametaphosphate, are incorporated into 1623, observations on the appearance and staining ability of FITC and DAPI on oocysts should be reported in study plan.
8. Corrective action plans for invalidated samples should be specified in the study plan.
9. High volume Ongoing Precision and Recovery (OPR) should be determined every week that samples are analyzed.
10. Provisions to address seasonal changes to the physical, chemical and biological characteristics of the source water should be included in the study plan.
11. Sample locations should include any known or suspected "hot spots" in the source to supplement samples taken from the intake.
12. Storm event sampling should be performed at an increased frequency, with the rationale for the approach based on citations from peer reviewed literature.
13. A process-based mathematical model should be used to better characterize *Cryptosporidium* concentration in the relevant source water, as well as oocyst loads generated within, and exported from, the source. A model based on Ferguson et al. 2007, supplemented with the Office of Research and Development adaptations to make this approach more readily applicable to U.S. conditions is recommended. (For further information, contact Nicholas Ashbolt 513-569-7318 or Gene Whelan 706-355-8305) Ref: Ferguson, CM BFW Croke PJ Beatson NJ Ashbolt and DA Deere. Development of a process-based model to predict pathogen budgets for the Sydney drinking water catchment. *Journal of Water and Health* 5.2:187-208, 2007.