Below are Dr. Anderson’s statements *(in italics)* and A. Patil’s response to your statements *(in bold)*:

*Although I did not participate in the earlier balloting on this subject I am impressed with the Task Group responses to reviewer comments. The standard is looking pretty good.*

**My comments:**

(1) *Section 7.2.2.2.1, Table 9, p. 1:* Can it be explained why the nitrate effluent concentration is specified as 10 mg/L ± 20% (high end is therefore 12 mg/L). It would seem to me that nitrate should be removed in the test resins (and that’s why it is included in this protocol as it competes with perchlorate removal). It is anticipated that it will bleed off (desorb) later in the test? Why not specify an effluent concentration that results in no sample exceeding 10 mg/L (the regulated drinking water level)? I realize that this relates to testing for perchlorate removal at challenging conditions, as it should, but I’m not sure I understand what the justification for this particular effluent nitrate concentration (and std dev) is. If it expected or observed that nitrate will desorb when the resins are approaching the end of their operational lives, a warning should be provided. Analytical Experts in the TG felt that ideally there should be no change in the concentration of nitrate from influent to effluent. That would be the ideal anion exchange media for this application. The only reason higher variance was allowed for the effluent was because there are higher analytical and experimental errors in the effluent sample than the production of influent samples where weighing of chemicals can be much more precise. During the validation if we find that this is not the case, then we will have the same variance on influent and effluent solutions.

(2) *Section 7.2.2.2.5d:* This is more of a general comment but I agree with Rob Herman who indicated that it may be difficult to hold the pH or other conditions in the test RO/DI water. I didn’t check but is there a protocol for checking test water characteristics at the end of a test? We will find out during the validation if maintaining the pH of the Test Water is a problem. Section J requires influent challenge to test both at the start and finish of the Test.

(3) *Section 7.2.2.2.10.2, figure 1, (p. 7):* In section 7.2.2.2.11.3.1 it indicates that a device may be operated in the upflow or down flow modes. This does not seem to have been taken into account in the discussion of Figure 1, especially in Note 3. Is the wording clear with respect to how freeboard will be adjusted appropriately in an upflow mode; is it even relevant? Without seeing the two set-ups it is difficult for me to anticipate how this wording relates to the operation of the pilot column in the two flow modes. Perhaps someone more familiar with the system can think about this.

To my way of thinking freeboard is not relevant to upflow or downflow. In either case excessive freeboard may be undesirable from the point of steady state flow conditions and variance from the full scale unit.

(4) *Section 7.2.2.2.10.3.1, p. 7/8:* In the “Example” at the top of page 7 why not just use hydraulic loading rate (HLR)? This is the way flows are typically standardized in the scientific literature. Instead of L/min or gpm, use L/h / m² / m³ (which = L/m). Typical HLRs for full scale drinking water filters range from about 5-15 m/h and for slow sand filters they range from about 0.1 to 0.4 m/h. This makes it easy to compare and standardize test conditions.

This is an excellent suggestion. We will go back to the Task Group with your suggestion and if everybody agrees, then we will use HFR in the protocol.

(5) *Section 7.2.2.2.10.4.4, p. 9:* The capacity calculation should be provided in metric as this is the international scientific standard (and that the US is one of only three countries in the world not using the metric system-recalling that NSF is trying to work out relationships with other standardizing agencies in Europe and elsewhere).

We will go back to the Task Group for their guidance in this matter.

**Minor comments:**

(1) *Section 7.2.2.2.8, p. 4:* Consider changing the word ‘sampled’ to ‘collected’ (in sentence beginning with “One bed volume shall be sampled...”).
Will do.

Typos:

(1) Section 7.2.2.2.5d, p. 3: HCL should be HCl
Will do.

(2) Section 7.2.2.10.3.1, p. 8: If you choose not to use hydraulic loading rates as discussed above change Lpm to
the more conventional scientific form which is L/min or L/min-1.
Will do.

(3) Section 7.2.2.10.4.1, p. 8 (near end of first paragraph): Change ml/min to mL/min (to be metrically complaint
and to match the convention used when you indicate mg/L in the same paragraph.
Will do.

(4) Section 7.2.2.10.4.2, p. 9: change hr to h (If after 400 h (16hr/day...)
Will do.

Explanatory comments added (below) per email. WA/pd

Section 7.2.2.10.3.1: In my comments I suggest using hydraulic loading rate (HLR) to standardize testing between labs (as opposed to flow). HLR is the flow rate through the filter divided by the surface area of the filter bed. It has units of volumetric flux (reported as m/h in SI units, and gpm/ft2 in US units) and is also referred to as superficial velocity as it is equal to the velocity the water would have if it were to move through the empty filter bed. The actual velocity is higher because filter media occupies some of the volume. In my response I incorrectly typed in the\HLR units as L/m; the units should be m/h. A sample of how to convert HLR to flow in L/min is below:

Calculate the flowrate at an HLR of 6.0 m/h assuming, for example, that your filter is 15.2 cm in internal diameter.

First determine the cross-sectional area:

Column internal diameter = 15.2 cm (/ 100 cm/m = 0.152 m)
Column radius = 0.152 m (/ 2 = 0.076 m)
Therefore column cross-sectional area = pr2 = p(0.076 m)2 = p(0.005776 m2) = 0.018146 m2
Then calculate required flowrate for an HLR of 6 m/h:

HLR (superficial velocity) = influent flow/column cross-sectional area
Therefore rearranging equation: influent flow = superficial velocity x cross-sectional area
Influent flow = 6.0 m/h x 0.018146 m2 = 0.1089 m3/h
0.1089 m3/h x 1000 L/m3 = 109 L/h / 60 min/h = 1.8 L/min

The advantage of this is that anyone, anywhere, knowing the HLR can reproduce an experiment without having any other knowledge of the column dimensions, flow rates, or media characteristics.