



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

Fax (804) 698-4500 TDD (804) 698-4021

www.deq.virginia.gov

L. Preston Bryant, Jr.  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

## AD HOC ADVISORY COMMITTEE MEETING SUMMARY

### Triennial Review WQS

February 21, 2007

### Welcome and Introductions

#### Advisory Committee Members and Alternates Present:

*Chesapeake Bay Foundation: Mike Gerel*

*City of Richmond: Robert Steidel*

*Dominion Power: Judson White*

*Department of Navy: Dave Cotnoir*

*James River Association: Chuck Frederickson*

*U.S. Fish and Wildlife Service: Cindy Kane*

*VA Association of Municipal Wastewater Agencies (VAMWA): Jim Pletl*

*Virginia Coal Association: Tommy Hudson*

*VA Department of Conservation and Recreation: Charles Lunsford*

*VA Department of Health (VDH): Michele Monti (Epidemiology), Khizar Wasti (Toxicology), Bob Croonenberghs (Shellfish Sanitation); Steve Pellei (Drinking Water)*

*VA Department of Game and Inland Fisheries: Andrew Zadnik*

*VA Manufacturers Association: Tom Botkins*

#### DEQ Staff Present:

*Alan Pollock (Facilitator), Jean Gregory, Elleanore Daub, Alex Barron, David Whitehurst, Charles Martin, Jutta Schneider, Darryl Glover, Harry Augustine, Roger Stewart, Don Smith, Allan Brockenbrough*

#### Others Present:

*Ed Cronin (Greeley and Hanson for City of Richmond)*

*Lisa Ochsenhirt (City of Richmond City Attorney's Office)*

*Jamie Mitchell (Hampton Roads Sanitation District)*

### Draft amendments for conventional pollutants 10.5% assessment rule:

Review: The draft amendments include the assessment rules for allowable excursions used to determine impairments. EPA stated that we must include this in the water quality standards (WQS) in order to continue to do the assessment in this manner. The rules allow one

violation in data sets with < 10 data points and less than 10.5% violations in stations with > 10 data points. The amendments do not allow an excursion allowance for the daily average dissolved oxygen criteria. This was done to allay concerns that the minimum dissolved oxygen data collected could still fall under the 10.5% rules but the data might actually represent several days of low dissolved oxygen. If the daily average is met 100% of the time then this should not happen.

In order to show the group the effect of the 10.5% rule, a mock assessment was conducted with monitoring data comparing the number of stations that would be considered 'impaired' with no rules vs. the number of stations that would be considered impaired under the 10.5% and 2-hit rule. As expected, the assessment conducted using the rules resulted in fewer station impairments. For dissolved oxygen and pH the number of impaired stations using the rules decreased by approximately 50%. For pH, the number of stations using the rules decreased by approximately 67%.

Discussion: Staff clarified that the new amendments will not apply as an excursion allowance to permit limits or discharge monitoring reports. Permitting for conventional pollutants will remain unchanged by the new amendments.

DEQ should clarify the sampling location and depth for dissolved oxygen to ensure it is representative of stream conditions.

There was concern that monitoring and assessment information should not go in the water quality standards. This information should be in guidance. Staff agrees it has not been expected in the past but because of litigation in Florida where it was decided that the state could not assess their waters using these rules unless the WQS specify that certain exceedences be allowed.

There are still concerns; particularly in sensitive (e.g. endangered and threatened species) waters, that many miles of stream could be impaired that these rules would overlook. For example, in a large data set with 30 samples, three samples could be below the minimum D.O. criterion and that would be considered acceptable under the rules but would clearly have an impact on the aquatic life in that stream. Even in smaller data sets (<10) where 1 violation would be allowed, you just don't know if that one measured D.O. actually occurred for days, which would cause impairments. Meeting the daily average 100% of the time does not alleviate the concern because DEQ does not routinely collect daily averages.

Staff clarified that these rules were currently in use. It is not a change in practice and we are attempting to codify existing assessment rules. The aquatic life use impairments in sensitive waters would still exist under these rules.

There remain concerns for endangered and threatened species that cannot withstand long-lived excursions like other organisms. One suggestion was to increase biological monitoring in sensitive waters.

The daily average definition for dissolved oxygen (i.e. 'at the same depth') does not coordinate with average calculations in the Bay waters that calculated via interpolation at various depths.

DEQ staff will attempt to get specifics about impairments in sensitive waters to try to get a better perspective about the impact of these rules to those waters (show the effect of the rules using maps, for example).

### **Draft amendments for bacteria criteria to protect recreational uses**

Review: The first draft amendment to bacteria is the deletion of the exception to shellfish waters in the recreation criteria section since this will clarify that the recreation criteria also apply in shellfish waters. DEQ also recommends the deletion of the fecal coliform criterion because it expires in 2008. In addition, a revised geometric mean and single sample maximum for E. coli in freshwater is recommended. This is based on EPA guidance and is considered protective of primary contact recreation. A minimum of four samples is required to calculate the geometric mean. The deletion of the site-specific single sample maximum calculation is recommended because it is not used routinely. The addition of the 10.5% rule for bacteria to match the allowable excursion rate for the conventional pollutants is included. The deletion of the disinfection policies (permit requirements) for recreation criteria and possibly in shellfish waters is considered. Finally, a site-specific criterion for the CSO impacted waters on the James River so that the City may move forward with a Long-Term Control Plan that meets water quality standards.

Discussion: A four-sample geometric mean requirement was included primarily to match the beach monitoring program that collects samples weekly. This normally results in four but sometimes five samples per month. This does not match EPA's recommendation of a five-sample minimum but it is much better than the existing 2-sample geometric mean.

At the previous meeting we discussed whether a seasonal mean would be more appropriate as this would dispense with the problems associated with a single sample criterion and monthly 'grab' oriented monitoring program because several months of data could be combined to calculate a geometric mean which is considered the more relevant value for protecting and improving water quality. DEQ staff found no obvious differences between a seasonal mean vs. a monthly mean (impaired months = impaired seasons) and it left open a question of what to do with the non-swimming months data. DEQ decided to find a way to use and apply the single sample maximum more appropriately month by month all year long than to move to a seasonal concept.

The City of Richmond presented another option for statewide application based on the statistics used in the EPA 1986 bacteria criteria calculation. The current single sample maximum is based on the 75<sup>th</sup> percentile of the data distribution associated with the geometric mean. By applying this percentile as a maximum value, this pushes the geometric mean below 126. Applying the 10.5% rule to this data distribution partially accommodates for this but to assure the geometric mean is at (but not below) the criterion, the maximum should be the 90<sup>th</sup> percentile of the data distribution (about 670 CFU/100ml using a geometric mean of 206). Data from the James River model with all CSO controls in place (alternative E) shows that while the geometric mean of 206 is met throughout the river segment, the single sample maximum of 385 is exceeded most of the time. In order to meet the single sample maximum of 385, a geometric mean of 61 (with an illness risk of .5%) would have to be met. This is not the intent of the bacteria criteria. The Beach Act (2004) states that the single sample

maximum was not intended as an acute criterion; rather, developed as a statistical tool to allow decision makers to make informed decisions to open or close beaches based on small data sets. The Beach Act also provides that states may use the single sample maximum to make water body assessments when limited data is available. The maximum was not designed to provide reductions in the illness levels provided by the geometric mean.

There was agreement and disagreement to this argument. The use of the 90<sup>th</sup> percentile would help us meet goals especially in agricultural areas where watersheds with best management practices (cattle removed, fencing installed) installed still cannot meet the existing criteria. The use of the 90<sup>th</sup> percentile is not appropriate in beach areas as it aligns with infrequently used primary contact recreational waters. The James River in Richmond and the beaches do not meet that use and the state has already decided to protect all waters at the designated beach area level. There was disagreement that the use of the EPA data distribution using the 75<sup>th</sup> percentile and the 10.5% rule should 'add up' to 100%. The two are unrelated and should be treated separately.

Impacted parties under the TMDL program see the current criteria as too stringent, unattainable or addressing a non-existent risk or problem. There is also a perception issue when a TMDL results in loading reductions from wildlife sources. This leads to resistance in implementation and promotes challenges of the criteria rather than water quality improvements. To see the impact of less stringent criteria or excursion allowance on TMDL loading requirements, DEQ presented modeling information that showed how loadings varied among sources (straight pipes, livestock, run-off and wildlife) under different criteria scenarios. A useful scenario (criterion plus excursion allowance) would not result in the need to eliminate wildlife as a source of bacteria in the TMDL. In addition, a useful scenario would reduce the loadings required from other nonpoint sources (livestock and run-off) in the TMDL to allow flexibility to choose the most appropriate nonpoint reduction source at individual sites. All scenarios presented protect primary contact recreational uses. The scenarios varied the allowable illness rate of the geometric mean between .8% and 1.0%, the single sample maximum for designated beach areas and moderate full body contact recreation and the allowable excursion frequency of the geometric mean and the single sample maximum between 100% and 90%. The results showed no consistent significant change in reductions resulting from the single sample maximum change only but that a change was needed to the geometric mean (illness rate .8% to 1.0%) to result in more meaningful and workable reductions. The draft geometric mean criterion at the 1.0% risk level with its corresponding single sample max at 90% (based on existing assessment procedures) that was chosen for the draft amendments did help to reduce or eliminate wildlife and run-off requirements. It will also help move the TMDL program forward with more attainable loading requirements that would maintain primary contact uses at all sites.

Some of the group did not believe the scenarios presented would be as successful in an urban area or an area subject to sewage discharges with disinfection. An appropriate criterion should be based on the 90<sup>th</sup> percentile of the geometric mean (670 CFU/100 ml). Two of the creeks presented (Northeast Creek and Pigg River) can not meet these criteria without installing storm water retention ponds on agricultural lands, which is not feasible. Three watersheds in Virginia have expended 5 million dollars on improvements and still have not

yet attained the existing 235 single sample maximum. If the value was much higher (e.g. 1000 fecal coliform) we would be looking at a de-listing today.

Two groups did not agree that footnote '2' (the allowance to calculate a site-specific single sample maximum using a site-specific standard deviation) should be deleted just yet. Its usefulness will become more apparent as more data is collected.

The James River draft site-specific standard amendment for the CSO impacted waters was discussed. This standard is written so that the geometric mean applies when sufficient data exists to calculate the mean (4 or more samples per month). Otherwise, the single sample maximum must apply. Since DEQ does not routinely collect enough samples to calculate a geometric mean, this special standard would promote the collection of additional samples from the City in order to implement the approved Long Term Control Plan. The amendment also adds that the single sample maximum be used at all times for beach monitoring and notification (currently notification at the James River recreational areas is based on rainfall events not on instream monitoring). Several members of the group thought this type of standard was more widely applicable (e.g. to Lynchburg, to all CSO impacted waters, to all urban waters and statewide). It was thought that applying it statewide would promote more permittee monitoring to ensure adequate data existed to calculate geometric means near their discharge.

DEQ recommended deleting the disinfection requirements for permits in this section of the regulation (sewage discharges disinfected to meet the recreation bacteria criteria). DEQ believes that prohibiting mixing zones for E. coli and enterococci will result in the same requirements; however, several groups provided comment that did not support the concept of mixing zone prohibition for these parameters. These comments emphasized that this action will not eliminate human risk to virus exposure or support higher designated uses to certain waters but will cost more money. Several members agreed that effluent requirements should not be in the water quality standards.

DEQ recommended deleting the disinfection waiver allowance. This waiver allows for reduced or no disinfection in waters where recreation is not occurring. This type of waiver more appropriately falls under the variance provisions or a use attainability analysis. This deletion will not prevent permittees from demonstrating that they can adequately disinfect to the bacteria criteria limit and then substitute a chlorine residual limit for an E. coli or enterococci limit.

### **Draft amendments for disinfection requirements to shellfish waters**

Review: Existing shellfish criterion matches the National Shellfish Sanitation Program (NSSP) requirements for instream water quality. There are no disinfection requirements for shellfish waters. Currently, permits contain a limit of 200 CFU/100 ml. This matches the recreation based fecal criterion (which is one of draft amendments recommended for deletion). The Food and Drug Administration has told us that permits to shellfish waters must have a fecal coliform limit (enterococci not acceptable for shellfish protection). Condemnation zones below sewage discharges will always be required under the NSSP program to allow interstate commerce and probably will not result in smaller condemnations

based on a more restrictive permit limit. The viruses are the main concern for shellfish use protection. The current permit limit of 200/100 milliliters for fecal coliform has not resulted in known outbreaks of illness and disinfection of a discharge does not necessarily kill all viruses, even at 14/100. Existing fecal limits of 200 resulted in a de-facto mixing zone. Many other east coast states require 14/100 ml fecal coliform be met end of pipe in shellfish waters. However, most of VA permits were not meeting that limit.

There were three options presented to the group. Option one was to specify that fecal limits to sewage discharges with condemnation zones would remain at 200 CFU/100ml. All new or increased discharges would be disinfected to 14/100ml to protect water quality. Option 2 would be to require all sewage discharges to meet a geometric mean of 14/100ml. The third option would be to remain silent and allow permits to determine the appropriate permit limits based on the standards (14/100 as a mean and 49/100 ml as a 90<sup>th</sup> percentile). Several members agreed that effluent requirements should not be in the water quality standards (option 3).

Section 270 of the regulation (Shellfish buffer zones; public hearing) also contains requirements for shellfish waters, including a public hearing requirement for proposals to shellfish waters. Staff was unsure at this time whether amendments were expected in this section. NOTE: Staff has learned since the 2/21 meeting that amendments to this section are not recommended at this time.

### **Introduction of Numerical Criteria - Aquatic Life**

Review: EPA has published three new aquatic life criteria (nonylphenol, diazinon, TBT). DEQ will likely propose all three. TBT will appear as a revision in the regulation since VA already has adopted a TBT criterion. The revision will result in a less stringent TBT criterion that may result in a de-listing of the Elizabeth River for TBT. Three other criteria may be revised to match recent EPA revisions (cadmium, selenium, silver). These three revisions will result in more stringent criteria than existing. Finally, recent published scientific literature regarding ammonia and copper toxicity to mussels shows that the existing copper and ammonia criteria may not be protective of mussels.

No changes to the duration and return frequency of the toxics criteria are expected.

Discussion: Newer scientific publications are due later this year for copper and ammonia. Some questions were raised as to whether any revised criteria based on the new information would apply to all water or just waters contain endangered and threatened species of mussels. If the criteria were to apply to specific waters, the standards would need to provide a specific citation or must list the waters. A regulation cannot reference a 'moving target' for example, a database that changes. Currently, the listings of endangered and threatened species waters are generally the same as the critical habitat in the Endangered Species Act. The only special requirement currently that applies to these waters is the halogen ban. Several years ago, there was an agency decision to keep that requirement of the ban fixed on just those waters. The halogen ban was adopted to protect these species from chlorine spills. Since then, no chlorine spills have occurred in Virginia. Over the years, DEQ has questioned whether the ban is still necessary since the chlorine criterion is protective of endangered mussels. Others still agree

the ban is useful and protective of sensitive organisms and that a complete listing of sensitive waters would be useful in the regulation. This may or may not result in a new class or aquatic life use of waters. DEQ will work with DGIF to determine the extent of sensitive waters and the potential impact of more stringent criteria.

## **Human Health**

Review: EPA has published a new methodology for calculating human health criteria. Factors involved in the calculation are: body weight of an average person, average fish ingestion rate; average water consumption rate, risk level for carcinogens, toxicity values, bioconcentration factors and the relative source contribution. Key differences between the new methodology and the old methodology include an increase of the fish ingestion rate from 0.0065 kg/day to 0.0175 kg/day and the addition of the relative source contribution that allocates 20% of the exposure from fish and assumes 80% exposure comes from other sources. Both of these changes result in a more stringent human health criterion. Several options exist and include: revising the criteria using the old methodology but update the toxicity values and bioconcentration factors (least likely to be approved by EPA), revise all human health criteria using the new methodology (with or without the relative source contribution), revise only the 15 criteria that were published individually by EPA (these include the relative source contribution), revise using the old methodology but match the fish ingestion rate used by the Virginia Department of Health for fish consumption advisories (two 8oz meals per month or approximately .015 kg/day) or some combination of the above. Many of the states in the east are beginning to adopt the new methodology.

The State Water Control Board along with the Virginia Department of Health developed the dioxin criterion along with a great amount of public input and EPA approval in 1990 and it subsequently withstood a legal challenge. Staff will likely recommend that the dioxin criteria remain unchanged.

EPA published the mercury fish tissue criterion in 2001 and implementation guidance was expected in December 2006. Staff will likely recommend including this criterion and removing the human health water column criteria for mercury.

Other human health related parameters under consideration are radionuclides, temperature and fluoride.

Discussion: Fluoride has a secondary MCL and DEQ staff are not in favor of adopting additional secondary MCLs into the regulation.

Temperature is a concern for swimmers in thermal mixing zones, which normally occur below power plants. Thermal mixing zones are currently regulated under section 316(a) of the Clean Water Act but have always addressed aquatic life impacts, not human health. One particular mixing zone in the James River below the Chesterfield Power Station can have uncomfortably hot temperatures during the hottest month of the year and a sign warns swimmers to avoid that area. One suggestion was to ask the Virginia Department of Health what should be done and if a statewide criterion is appropriate.

For new or revised criteria, DEQ should be sensitive as to whether analytical methods for permits are published and whether analytical detection limits can quantify these new criteria.

Revisions to the ammonia or copper criteria should apply to all waters that contain mussels (not just endangered mussels). If it is not possible to apply revised criteria statewide, DGIF is willing to work with DEQ to determine a lesser area where mussels are located.

Revisions to any criteria should wait for EPA to publish 304(a) criteria. Once 304(a) criteria are published, there is little question whether they should be proposed (e.g., published human health 304(a) criteria should be proposed). EPA guidelines for calculating criteria allow for additions of new data to the criteria database or to lower criteria in order to protect commercially or recreationally important species. Permits should be adjusted individually when sensitive species exist below a discharge and not via a regulatory change.

The human health criteria calculations are very conservative. For example, the water ingestion is 2 liters every day over a 70-year duration (expected lifetime). Some new human health criteria might be more stringent than the corresponding MCL using the new methodology.

There are two types of human health criteria. The first is designed to protect human health via the water and fish ingestion route. This criterion applies in designated public water supplies. The other human health criterion is designed to protect human health via the fish ingestion route only. This applies in all other surface waters.

### **Total Dissolved Solids**

Review: TMDL studies have determined that it is the imbalance of cations and anions that cause the instream toxicity; therefore, TDS was identified as the parameter of interest. To date, TDS or specific conductivity has been identified as the stressor in six TMDLs. There are no numeric criteria for total dissolved solids (TDS) so whenever DEQ has a biological impairment due to TDS we use a reference watershed approach for each TMDL. The Academic Advisory Committee is reviewing various options for TDS criteria and the empirical approach is the most practical (e.g. use the 90<sup>th</sup> percentile water quality data from reference watersheds).

Discussion: Often an individual component causes the problem (e.g. bicarbonate) and not the total measure of dissolved solids. However, in the DEQ TMDL studies nothing specific emerged as the stressor just the ionic imbalance. Whole effluent toxicity testing should be relied upon. There can be community shifts to more tolerant species when TDS components are stressors. This type of criterion is very site-specific and cannot possibly be statewide. The geology differs from one watershed to another. It is uncertain how a reference stream can be chosen for an 'impaired' stream that contains sensitive endangered species. Industry has come to the conclusion it is the ion ratio that is important and will get this information to the Academic Advisory Committee (Carl Zipper).

**Handouts distributed at the February meeting:**



Agenda, Ad Hoc Committee, Triennial Review, February 21, 2007

Copies of Slides from Presentations

10.5% Rule Amendments for Conventional Pollutants and Amendments for Bacteria  
(including Impact of Bacteria Criteria on TMDL Reductions)

Numerical Criteria (Aquatic Life and Human Health)

TDS – A TMDL Stressor / Pollutant

Draft Amendments sections 50 (Conventional Pollutants), 160 (Bacteria Shellfish), 170  
(Bacteria Recreation) and 310 (Special Standards)

National Recommended Water Quality Criteria, EPA 2006

*Water Quality Guidance for Protection of Freshwater Mussels (Unionidae) from Ammonia  
Exposure*, 2003, Environmental Toxicology and Chemistry, Vol. 22, No. 11, pp. 2569-2575.

