

MEMORANDUM

STATE WATER CONTROL BOARD  
Office of Environmental Research and Standards  
4900 Cox Road Glen Allen, Virginia 23060

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SUBJECT: Interpretation of Fecal Coliform Bacteria and Mixing Zones

TO: Fred Holt, OWRM

FROM: Jean Gregory, OERS

DATE: April 20, 1993

COPIES: Alan Anthony, Elleanore Daub, OERS; Larry Lawson, Martin Ferguson, Dale Phillips, OWRM

This is in response to your February 17, 1993 request for interpretation of the fecal coliform standard and mixing zones.

Essentially, OWRM is questioning the use of mixing zones for bacterial standards and human health standards. The bacterial standards and the toxics human health standards should be considered separately. While these two standards are intended to protect human health, the time of exposure considered and the illnesses we are protecting against are different.

The bacterial standards in VR680-21-02.2.A were developed to protect the use of state waters for primary contact recreation. Meeting the standard meant that people could enjoy activities (such as swimming) in all waters without any harm from bacterial related illnesses resulting from swallowing water or direct body contact. The bacterial standards have a disinfection policy which describes implementation of the bacteria standards. That policy implements this standard as an effluent limit. There is no mention of mixing zones for bacterial standards in the disinfection policy or in the mixing zone policy. In addition, there is no dilution stream flow mentioned for the bacterial standards in VR 680-21-01.4. Therefore, our interpretation is that bacterial mixing zones are not allowed and all bacterial standards must be met in all areas of a stream (200 per 100 ml geometric mean or 1000 per 100 ml at any time). We are considering changing this section during the 1993 Triennial Review in order to clarify the use of the 1000 per 100 ml standard which was developed for interpretation of instream monitoring data and not as an effluent limit. Note in B.3 of the bacteria standard that sewage discharges "shall achieve a fecal coliform geometric mean value in the effluent equal to or less than 200 per 100 milliliters."

For the numerical human health toxics criteria, the intent at the time of adoption of these standards was that the human health standards would be permitted based on the entire stream

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flow (harmonic mean or 30Q5). That was the purpose of listing the stream flows for carcinogens and noncarcinogens in VR680-21-01.4. Mixing zones need not be restricted for human health toxics standards since they are calculated considering a lifetime of exposure or at least 30 days of exposure for the noncarcinogens. It is only appropriate to restrict mixing zones for aquatic organisms who are constantly exposed to toxicants. That is why the mixing zone policy specifically states that mixing zone concepts shall be used in evaluating permit limits for acute and chronic standards.