UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
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MAR 17 2004

Mr. Jerry Brooks, Deputy Director
Division of Water Resource Management
Florida Department of Environmental Protection
Twin Towers Office Building
Mail Station 3500
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. ~~Brooks~~: Jerry

This letter serves to clarify recent discussions held between FDEP and the Environmental Protection Agency (EPA) with regard to mixing zone policy and its application through National Pollutant Discharge Elimination System (NPDES) permit actions. According to the provisions of 40 CFR Part 131.13 states may at their discretion adopt mixing zone policies in their standards that will ultimately affect the application and implementation of standards, with EPA retaining authority to review and approve or disapprove such policies.

Although there is no statutory or regulatory definition of a mixing zone, the Quality Criteria for Water (July, 1976) document defines a mixing zone as "an area contiguous to a discharge where receiving water quality may meet neither all quality criteria nor requirements otherwise applicable to the receiving water...The mixing zone should be considered as a place where wastes and water mix and not as a place where effluents are treated". Subsequently, a mixing zone has also been defined in the Water Quality Standards Handbook (August, 1994) as "a limited area or volume of water where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but acutely toxic conditions are prevented."

EPA does not interpret these definitions to allow mixing zones in streams with a 7Q10 flow of zero. Guidance transmitted to FDEP by the Region 4 Regional Administrator dated September 3, 1980 provides discussion of this issue and is enclosed for your information. This guidance is clear that mixing zones are intended for situations where the critical flow of the receiving water is much greater in magnitude than the discharge flow. The guidance states that, "where a discharge is of the same order of magnitude as, or greater than the stream flow under design conditions (e.g. 7Q10) ... no mixing zone shall be assigned." Based on this guidance, the issuance of an NPDES permit for a discharge to a receiving stream based on such a mixing zone would not be consistent with the Clean Water Act. As outlined in EPA's Advanced Notice of Proposed Rulemaking (July 7, 1998), our current policies would call for the objection of NPDES permits which are based on mixing zones which fall outside the limits of EPA's guidance on sizing and protection of aquatic life.

Should you require additional information or wish to discuss mixing zone policies further, please contact Gail Mitchell, Chief of the Standards, Monitoring and TMDL Branch at (404) 562-9234.

Sincerely,

James D. Giattina, Director
Water Management Division

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: SEP - 3 1980

SUBJECT: Mixing Zones for Wastewater Discharges

FROM: Regional Administrator

TO: Paul Traina, Director, Water Division
Sanford Harvey, Director, Enforcement Division
Jim Finger, Director, Surveillance and Analysis Division

SUMMARY

Several of the States in Region IV have recently expressed an interest in utilizing the concept of mixing zones in the development of effluent limitations. In order to preclude misuse of the concept, and inconsistency in review of State actions, it has become necessary to formalize the criteria by which EPA will review assignment of mixing zones. The attached guidance has been finalized after careful examination of the technical and legal issues involved, as well as consideration of previously published EPA policy.

ACTION

The attached guidance shall be implemented immediately for review and approval of State-assigned mixing zones by EPA Region IV. The primary responsibility for this review and recommendations for approval lies with the Water Quality Standards Section, Water Quality Management Branch, Water Division. Any comments or questions concerning this matter should be directed to R. F. McGhee, Section Chief, Water Quality Standards, at FTS 257-4793.

Rebecca

Rebecca Hanmer
Regional Administrator

SEP 03 1980

EPA Region IV Guidance on Mixing Zones

The Clean Water Act makes no provision for the establishment of mixing zones, and it could be argued that a strict interpretation of the Act requires discharges to meet stream standards at end-of-pipe. EPA, however, recognizing the need for mixing zones in some cases, has adopted a more liberal interpretation of the Act, and defines "mixing zones" as follows:

> "A mixing zone is an area contiguous to a discharge where receiving water quality may meet neither all quality criteria nor requirements otherwise applicable to the receiving water....The mixing zone should be considered as a place where wastes and water mix and not as a place where effluents are treated."

Source: Quality Criteria for Water (July, 1976), USEPA p103- "the Red Book".

Once accepted, the concept of a mixing zone then raises several important questions:

1. When is it appropriate to assign a mixing zone to a discharger?
2. What level of water quality should be maintained in a mixing zone and surrounding waters?
3. What factors should govern the size and shape of a mixing zone?

Rather than try to answer the first question directly, it is, perhaps, easier to ascertain when it is not appropriate to assign a mixing zone. In cases where essentially complete mixing occurs at the point-of-discharge (POD), a mixing zone is neither required nor appropriate. In general, where a discharge is of the same order of magnitude as, or greater than the stream flow, under design conditions (e.g. 7Q10), it may be assumed that mixing is essentially complete at the POD. Under these conditions, and wherever a discharger provides complete mix (e.g., with diffusers), regardless of flow regime, no mixing zone shall be assigned, and wasteload allocations (WLA's) may be developed assuming complete mix at the POD. By the process of elimination then, we find that mixing zones may be assigned to, and only to, those dischargers which provide no artificial mixing of effluent with the receiving waters, and for which the critical flow of the receiving waters is much greater in magnitude than the discharge flow.

The question of propriety for a mixing zone is also parameter-specific. For non-toxic, non-conservative parameters (eg. oxygen-demanding wastes) in flowing streams, the area of critical concern normally lies far downstream of the POD, beyond any reasonable zone of mixing. For such parameters, then, mixing zones are inappropiate, and WLA's may be developed assuming complete mix. Thus mixing zones may be assigned for, and only for, pollutants which are toxic or persistent. Due to the unusual nature of impacts resulting from thermal discharges, no criteria for thermal mixing zones will be issued at this time. Assignment of a mixing zone for a thermal component of any discharge will be subject to case-by-case review for consistency with the goals of the Clean Water Act.

Toxicity limitations are the major criteria governing water quality within a mixing zone. No pollutant shall be present at any point in a mixing zone in concentrations which exceed 1/3 of the amount lethal to half the population of a test organism in a ninety-six hour period (96 hr LC_{50}), where the test organism is a species significant to the indigenous aquatic community. Furthermore, any mixing zone shall be kept free of objectionable color, odor, and turbidity, as well as substances which settle or float. At the mixing zone boundary, and in the surrounding waters, water quality is governed by water quality standards. For the purposes of this paragraph, a dissolved oxygen deficit is considered a toxic pollutant.

The width of a mixing zone in a stream shall not exceed one third the width of the receiving stream segment. The maximum length of the zone shall be no greater than the distance between the POD, and the point downstream at which pollutant levels at the width boundary have risen to water quality standards limitations. No mixing zone, or combination of mixing zones, shall exceed ten percent (10%) of the total length of the receiving stream segment.

Where dispersive forces predominate, such as in coastal areas and lakes, the combined areas of all mixing zones shall not exceed ten percent (10%) of the surface area of the lake or coastal ecosystem. When applied to coastal areas, this policy shall be construed to mean the smallest portion of the affected coastal area which can be considered an integrated ecosystem.

In estuaries, both dispersive and advective forces are important, and mixing zones shall be limited to ten percent of the cross-sectional area or to one third the width of the receiving water, whichever is less.

Mixing zones in offshore waters (i.e. for ocean discharges) shall be reviewed on a case-by-case basis or as may be provided for in the Ocean Discharge Criteria document which is to be published by EPA.

Under no circumstances, however, may a mixing zone be of such a size or in such a location as to interfere with existing or designated uses, nor shall it include, damage or endanger areas important to the aquatic community, including but not limited to nursery areas, spawning areas, etc.

In addition to the foregoing, further guidance on the use of mixing zones is provided in the Red Book and Chapter 5 of Guidelines for State and Areawide Water Quality Management Program Developement (November, 1976).

EPA will approve the assignment of mixing zones as long as the above concepts are utilized. States should insure that their regulations on mixing zones comply with and do not allow deviations from the above. In cases where State regulations allow significant deviations from the above concepts, EPA will disapprove the assignment of mixing zones, and take whatever actions are appropriate to correct the situation.

Rebecca Hanmer

Rebecca Hanmer
Regional Administrator