MIXING ZONES

DOCKET 58-0102-1401

Oil jets pre-mixed with soap are fired into layered fluid. Photograph by Steve Harenberg, et al. UNC Joint Fluids Laboratory

OUTLINE

- Review comments received
- Discuss draft rule version 3
- Discuss remaining sections (a, c, g and 02)
- Stormwater
- Presentation on nonflowing waters
- Discussion

COMMENTS RECEIVED

COMMENTERS

- Clearwater Paper
- EPA
- IACI
- IMA
- NOAA
- Simplot

SUMMARY OF COMMENTS

- See document Summary of Comments Received: Negotiated Rule Draft No. 2, June 27, 2014 comment deadline
- Changes made to the draft rule were in response to comments received during last meeting as well as written comments

DRAFT RULE VERSION 3

CHANGES AND ADDITIONS

060.01.d

Draft Version 2

Mixing zones shall not cause unreasonable interference with, or danger to, existing beneficial uses. Unreasonable interference with, or danger to, existing beneficial uses includes, but is not limited to, the following:

Draft Version 3

Mixing zones shall not cause unreasonable interference with, or danger to, ~~existing~~ beneficial uses, including species listed under the Endangered Species Act. Unreasonable interference with, or danger to, ~~existing~~ beneficial uses includes, but is not limited to, the following:

060.01.d.i

Draft Version 2	Draft Version 3
Interference with fish passage, spawning, egg incubation or rearing.	Blocking fish passage, or preventing successful spawning, egg incubation or rearing.

060.01.d.ii

Draft Version 2	Draft Version 3
Jeopardy to Endangered Species Act listed species, or destruction or adverse modification to critical habitat.	Removed this item and included text in 060.01.d to call out endangered species.

060.01.d.iii

Draft Version 2

Heat in the discharge that causes thermal shock, instant lethality or loss of cold water refugia.

Draft Version 3

Now 060.01.d.ii –

Heat in the discharge that causes thermal shock, lethality or loss of cold water refugia.

Added definition of thermal shock.

Thermal Shock. A rapid temperature change that causes aquatic life to become disoriented or more susceptible to predation or disease.

060.01.d.iv

Draft Version 2

In determining whether a mixing zone will cause unreasonable interference with or danger to, existing aquatic life beneficial uses, the Department shall consider the bioaccumulative nature of the pollutants involved.

Draft Version 3

Now 01.d.iii –

Bioaccumulation of pollutants (as defined in Section 010) greater than the bioaccumulation factor used in calculation of water column criteria.

060.01.d.v

Draft Version 2

Acute toxicity to aquatic life outside the zone of initial dilution.

Draft Version 3

Now 01.d.iv –

Lethality to aquatic life passing through the mixing zone.

060.01.d.vi

Draft Version 2

Concentrations of pollutants that exceed Maximum Contaminant Levels at drinking water intake structures.

Draft Version 3

Now 01.d.v –

Concentrations of pollutants that exceed Maximum Contaminant Levels at drinking water intake structures.

060.01.d.vii

Draft Version 2	Draft Version 3
Interference with public swimming areas.	*Now 01.d.vi –* Unreasonable interference with recreational uses.

060.01.i.ii

Draft Version 2

A larger mixing zone that exceeds the limits is needed by the discharger and does not cause an unreasonable interference with, or danger to, existing beneficial uses as described in Subsection 060.01.d, and the mixing zone meets the other requirements set forth in Section 060.

Draft Version 3

Added –

The discharger shall provide to the Department an analysis that demonstrates a larger mixing zone is needed given siting, technological and managerial options.

060.01.j

Draft Version 2

The Department recommends the following elements when designing an outfall:

Draft Version 3

The following elements shall be considered when designing an outfall:

060.01.a

MIXING ZONES IN IMPAIRED WATERS

060.01.a

Draft Version 2

Mixing zones shall not be authorized for a given pollutant when the receiving water does not meet water quality criteria for that pollutant.

Draft Version 3

Added –

Mixing zones shall not be authorized for E. coli.

Suggested changes to 060.01.a

Mixing zones shall not be authorized for a given pollutant when the receiving water does not meet water quality criteria for that pollutant unless the authorized discharge meets an approved TMDL allocation or other applicable requirements. Mixing zones shall not be authorized for E. coli.

STORMWATER

060.01

Mixing Zones for Point Source ~~Wastewater~~ Discharges

060.01.c

SIZE AND CONCENTRATION BASED ON DESIGN FLOW

060.01.c

The size of the mixing zone(s) and the concentration of pollutant(s) present shall be based on the point source wastewater permitted design flow. The Department shall not authorize a mixing zone that is determined to be larger than is necessary.

060.01.g

ADJACENT MIXING ZONES

060.01.g

Adjacent mixing zones of independent activities shall not overlap.

060.02

POINTS OF COMPLIANCE

060.02

Points of Compliance for Nonpoint Source Discharges. While it is recognized that mixing does occur for nonpoint sources, due to their generally intermittent and diffuse nature, the specification of mixing zones for nonpoint sources is not practicable. Instead, the Department may establish points for monitoring compliance with ambient water quality criteria in association with authorized nonpoint discharges.

060.02 Draft Version 3

Points of Compliance for Nonpoint Source Discharges. While it is recognized that mixing does occur for nonpoint sources, due to their generally intermittent and diffuse nature, the specification of mixing zones for nonpoint sources may not be practicable. ~~Instead~~ Thus, the Department may establish points for monitoring compliance with ambient water quality criteria in association with authorized nonpoint discharges.

Suggested 060.02

Points of Compliance for 404 Dredge and Fill Activities and Nonpoint Source Discharges. While it is recognized that mixing may occur for nonpoint source discharges and from 404 dredge and fill activities, due to their generally intermittent and diffuse nature, the specification of mixing zones for ~~nonpoint~~ these sources may not be practicable. ~~Instead~~ Thus, the Department may establish points for monitoring compliance with ambient water quality criteria in association with these authorized ~~nonpoint~~ discharges.

NONFLOWING WATERS

MIXING IN LAKES AND RESERVOIRS

DON A. ESSIG, IDEQ

JULY 10, 2014

OUTLINE

- What is meant by nonflowing
- What's the problem
- Understanding near-field versus far-field mixing
- What have some other states done
- Some options
- Our proposal

WHAT IS MEANT BY NONFLOWING?

- Lakes, reservoirs, wetlands …
- What would be classified as lentic waters from an ecological perspective
- Fairly obvious, but we lack a clear definition in rule
  - Flow ‘direction’ hard to discern, may vary
  - Little to no velocity
  - Water bodies that typically thermally stratify in temperate climates

WHAT'S THE PROBLEM

- Stagnant or nonflowing waters don't mix very well
- Most of the concepts and language in EPA guidance and our rules address mixing as if there were a single direction of flow:
  - "Low *flow* design discharge conditions"
  - Zone of passage
  - Organism drift time

NEAR-FIELD VERSUS FAR-FIELD

- Mixing processes can be divided into near-field and far-field
- Based on momentum or energy of flow
  - Near field mixing is dominated by discharge flow
  - In streams far field mixing is dominated receiving water flow
  - In lakes far field mixing depends on diffusion, density currents, wind – in general is very slow
- We can control near-field mixing

A LOOK AT SOME OTHER STATES

- Sent out set of six questions to states, received 12 replies
- Most states do allow mixing in lakes (8) or reservoirs (9), 2 with some exceptions
- Most states do not allow mixing in wetlands (7), 2 unclear
- However, like Idaho, most states do not have definitions for various water body types

OPTIONS FOR MIXING IN LENTIC WATERS

1) Do not allow it going forward
2) Allow limited mixing zones. Options include:
   a) Limit fraction of surface area as Idaho does currently
   b) Limit absolute size, in meters or feet
   c) Combine the previous 2, with a "whichever is smaller" construct
   d) Require a diffuser to maximize near-field mixing
   e) Limit based on extent of dilution near-field mixing achieves

OUR PROPOSAL

Our preliminary draft rule is silent on mixing limitations in lakes and reservoirs

Our suggestion is three-fold:

- Limit size based on combinations of area and absolute dimension, e.g. no more than 5% of the area or 100 meters from the point of discharge, whichever is smaller.
- Require a diffuser.
- Prohibit shore-hugging plumes.

SUGGESTED LANGUAGE FOR 060.01.h

h. Mixing zones shall meet the following restrictions; provided, however, that the Department may authorize mixing zones that vary from the restrictions under the circumstances set forth in Subsection 060.01.i. below:

i. For flowing waters:

(1) The width of a mixing zone is not to exceed twenty-five percent (25%) of the stream width; and

(2) The mixing zone shall not include more than twenty-five percent (25%) of the low flow design discharge conditions as set forth in Subsection 210.03.b of these rules; or leaning towards using rivers/streams rather than flowing.

SUGGESTED LANGUAGE FOR 060.01.h

ii. For all new discharges to nonflowing waters authorized after July 1, 2015:

(1) The size of the mixing zone is not to exceed 5% of the total open surface area of the water body or 100 meters from the point of discharge, whichever is smaller;

(2) Shore-hugging plumes are not allowed; and

(3) Diffusers shall be used.

DEFINE LAKES AND RESERVOIRS

- Lake or reservoir: A water body with a detention time around the time of annual low outflow greater than 15 days.
- Detention time: Volume of a water body divided by outflow. This can be calculated for any time period.

SUGGESTED LANGUAGE FOR 060.01.h

iii. Reservoirs with a mean detention time of fifteen (15) days or greater shall be considered lakes for this purpose.

COMMENT DEADLINE JULY 24, 2014

THANK YOU