Workplan: *E. coli* Rulemaking

Introduction

In 1986, the USEPA published ambient water quality criteria for bacteria in order to protect against excessive risk to humans of gastrointestinal illnesses in waters used for full body contact recreational activities. The ambient criteria established limits on the levels of indicator bacteria, namely *Escherichia coli* (*E. coli*) and enterococci, which should not be exceeded in order to protect bathers in fresh and marine recreational waters. *E. coli* and entercocci have long been known to demonstrate the presence of fecal pollution in surface and ground water. Prior to 1986, EPA had recommended the use of fecal coliforms as an indicator organism for protecting bathers in recreational waters. However, epidemiological studies conducted by EPA from 1972 to 1982 demonstrated that *E. coli* and enterococci were better indicators of risk to public health from pathogens than fecal coliforms. Following the epidemiological studies, EPA began recommending the use of *E. coli* as an indicator for fresh recreational waters and enterococci for fresh and marine recreational waters.

The 1986 ambient water quality criteria for bacteria recommended that states adopt both a monthly average and single sample daily maximum limit for fresh recreational waters. The monthly average value corresponded to an illness rate of approximately 8 illnesses in 1000 swimmers in the EPA epidemiological studies. The daily maximum value could be chosen based on the "confidence limits" around the 126 monthly average. The guidance document gave confidence limits of 75% to 95% with corresponding daily maximum *E. coli* limits ranging from 235 cfu to 576 cfu. States could choose what confidence limit they wanted to use depending on whether they wanted to err on the side of false positives or false negatives.

In 1990 Indiana adopted *E. coli* bacteriological criteria for all waters. IDEM chose to adopt 125 cfu as a monthly average (the geometric mean of five equally spaced samples taken in a one-month period) and a single sample daily maximum value of 235 cfu (which corresponded to the 75% confidence limit in the 1986 guidance document). These criteria were applied to all waters whether or not they were used as bathing beaches. The 1997 Great Lakes Basin rulemaking continued to apply the 125/235 *E. coli* criteria to the Great Lakes Basin portion of the state.

In May 2002 EPA released a draft implementation guidance document for the 1986 ambient water quality criteria for bacteria. The guidance document provides a summary of EPA's 1986 recommended water quality criteria for bacteria as well as recommendations on the implementation of the bacteriological criteria for protection of recreational uses adopted by the states. In this guidance, EPA provides increased flexibility for states in implementing the 1986 criteria. EPA is allowing the states to use different risk levels for the full body contact recreation use. Instead of allowing only one risk level, the states can use risk levels ranging from 8 illnesses in 1000 swimmers to 14 illnesses in 1000 swimmers. The monthly average values for these risk levels range from 126 cfu for 8 illnesses in 1000 swimmers from the 1986 criteria document to 548 cfu at 14 illnesses in 1000 swimmers. The states can also choose to use higher confidence limits (now referred to as "percentiles") for the daily maximum values.

The Problem

IDEM has identified eight issues that need to be discussed during this rulemaking:

1. Full body contact designation – Should different risk levels/different criteria be applied to various types of waters?

EPA's new Draft Guidance issued in May 2002, on Implementation of the 1986 Bacteriological Criteria allows states to select different risk levels for protection of human health as a result of recreational activities. This guidance indicates that states can choose risk levels between 8 and 14 illnesses per 1000 swimmers and still consider this a full body contact recreation use. This would mean that states could assign different risk levels to different bodies of water while maintaining the use designation of full body contact. Additional, somewhat similar guidance can be found in the recently published BEACHES guidance document and this guidance should also be reviewed.

a. Should there be a partial body contact use designation? Is this possible without a Use Attainability Analysis?
b. Should there be a multi-risk classification for waters in Indiana? For example, risk level of 8 gastrointestinal illnesses per 1000 swimmers for actual beaches (Class A), other risk levels and their associated monthly geometric means and single maximum criteria for other water bodies less risk of full body contact, e.g. tributaries to beaches, rafting/kayaking streams, etc.
c. How does antidegradation impact potential “classifications”?

2. Is *E. coli* the appropriate indicator organism? Are there other organisms or approaches that should be considered?

Some members of this workgroup indicated that there is currently ongoing research into new indicators and/or methodologies for assessing the safety of ambient waters for full body contact recreation. The workgroup thought we should investigate and review this information, as it becomes available during the course of our meetings.

3. Should application of the *E.coli* criteria be the same throughout the state?

Currently, the *E.coli* criteria are applied at the end of the pipe in the Great Lakes portion of the state. Downstate, based on a recent court ruling, the *E.coli* criteria allows for consideration of assimilative capacity whereby IDEM models the receiving stream to determine if the receiving stream has assimilative capacity based on the Q7, 10 with the criteria applying at the edge of the mixing zone. Sub-issues to be addressed:

a. Great Lakes Basin – end-of-pipe application, no mixing zone
b. Outside Great Lakes Basin – consider assimilative capacity, use BAT
All end-of-pipe, all BAT, other?

4. *E. coli* - Seasonal Vs. Year Round Disinfection

Indiana currently requires wastewater treatment facilities to disinfect their waste water effluents only during the "recreational season" defined as the months of April through October. Our *E.coli* criteria only apply during those times of the year also. The one current exception is for dischargers on the Ohio River where ORSANCO requirements are such that year round disinfection is required. Historically, *E.coli* and other fecal coliforms were thought to have a very limited ability to survive outside the intestinal tract once they were released into the environment. Thus, the seasonal disinfection requirements were thought to be protective of human health during the recreational season and also would not result in impacts during the recreational season from the periods when disinfection was not occurring. Recent studies from Purdue University and other researchers have indicated that *E.coli* may have a much longer life span in the environment than previously thought raising questions as to whether this standard needs to be revised.

Sub-issues to be addressed:

a What is the practical recreational season?
b. Is this a disinfection issue for dischargers or a use designation issue?
c. Is this a pathogen issue or indicator organism issue?
d. Is there sufficient published evidence that E. coli is more resistant that previously assumed and/or what evidence/studies/research exists on actual pathogens?

5. *E.coli* – Options for daily max, monthly average and/or monthly percentage

USEPA's 2002 draft guidance document allows for greater flexibility in implementing bacteriological criteria. The guidance recommends using both a daily maximum and monthly average for bathing beaches but seems to allow for more flexibility for waters not used for full body contact recreation. Indiana currently applies the 125 cfu monthly average and 235 cfu daily maximum to all waters.

Sub-issues to be addressed:

a. What is the antibacksliding impact, if any?

6. *E.coli* – Should Best Available Technology limits be established?

Technology based treatment requirements represent the minimum level of treatment required for industrial/municipal point sources based on currently available treatment technologies. OWQ currently ensures compliance with the bacteriological requirements of 327 IAC 2-1-6(d) through the application of water quality-based effluent limits (WQBELs) for *E. coli* during the recreational season. However, a recent court ruling (see Number 4 below) requires that IDEM consider the available assimilative capacity in determining effluent limits for *E. coli* in waters outside the Great Lakes System. In some cases (relatively small discharges into large waterbodies), it is possible that the calculation of effluent limits may result in permitting large numbers of *E. coli* to be discharged. This could result in potential serious health risks in areas immediately downstream of these discharges. Should best technology based limits be established to handle these situations?

Sub-issues to be addressed:

a. A court ruling outside of the Great Lakes basin required IDEM to consider the available assimilative capacity of the receiving waterbody (Carmel decision).
b. Does BAT mean no discharge of indicator organisms?

7. Are other *E.coli* testing methodologies appropriate?

There are other testing methodologies for *E.coli* that are available other than the one in the current rules. These additional testing methodologies might be more appropriate to use in certain situations such as beaches, than others. The workgroup thought that we should investigate these methodologies. Methodology – are the proper testing procedures being used by beaches and/or dischargers? Do the current rules permit the use of improved methods, or does the current rule language prohibit other accepted techniques? EPA is preparing a change to the list of approved Methods for *E. coli* in 40 CFR 136. Publication in the Federal Register is scheduled for Jan 2003. Until that happens, methodology discussion should be postponed.

8. Should standards for standards for *E.coli*, be established for Waste stabilization lagoons?

In the past, OWQ has granted a waiver from *E. coli* limits to minor municipal WWTP's whose treatment consists of a waste stabilization lagoon (WSL) system. The waiver was based on 327 IAC 5-10-6(a), where disinfection is not required for multi celled waste stabilization ponds. The 10 state standards defines waste stabilization ponds as those systems having a retention time greater than 90 days. The assumption in the past has been that waste stabilization ponds with greater than 90 days retention time are adequately designed for the natural attrition of bacteria. For the past 18 to 24 months, municipal permits for WSL's have been written to include reporting requirements for *E. coli*. The intent of the reporting requirement is to accumulate sufficient data to perform an RPE analysis on *E. coli* with the subsequent renewal of the permit. Current evidence (both national studies and accumulated effluent data from WSL's) does not support the assumption that a 90 day retention period is sufficient to ensure a natural attrition of bacteria. An automatic waiver is also inconsistent with OWQ's current RPE policy in the non-GLI area and with the RPE rule in the GLI area. Application of *E. coli* limits in permits for WSL's will likely present a variety of challenges to smaller dischargers.
Sub-issues to be addressed:

a. Focus of workgroup is *E. coli*; therefore only include macro and micro nutrients as they apply to *E. coli* or other indicator growth.
b. Does recent monitoring data support the premise that *E. coli* is controlled by 90-day retention in waste stabilization lagoons?

The Proposed Solution

The *E. coli* workgroup will meet as necessary to discuss the issues identified by IDEM and others regarding the *E. coli* criteria and implementation procedures. The workgroup will make recommendations to IDEM, possibly in the form of proposed rule language, which will be presented to the steering group for further discussion.

Previous Rulemaking Related Efforts

The 1990 triennial review of Indiana's water quality standards established the current *E. coli* criteria for all waters in Indiana. The previous, unfinished triennial review had some proposed language to potentially address concerns about the single sample maximum value as it was applied in effluent limits.

Project Objectives

The objectives of this project are to develop recommendations for proposed rule language to address the issues identified above.

Project Team

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Communications

The project team is free to contact each other for information or clarifications. Email is an effective way to exchange information and resolve issues involving several project team members. The IDEM facilitator is responsible for forwarding and/or copying all documents to the IDEM Chief of the Rules Section who will maintain a file of all written materials, and Meeting Summaries, related to this project.

An IDEM representative will record all team meetings, and will prepare Meeting Summaries. These Meeting Summaries are not expected to contain verbatim recording of the discussions, but rather a summary of the main points discussed, agreements, disagreements and action items. At the end of each meeting, the designated recorder shall go over his/her notes to clarify these items. The recorder shall submit a draft written meeting summary via email to all meeting participants within 2 working days after conclusion of the meeting. Meeting participants are expected to provide comments on draft meeting summaries within 2 working days upon receipt of the draft summary to the designated meeting recorder for consideration of corrections, clarifications, etc. In turn, the designated meeting recorder shall submit final meeting summaries to the above team members within 8 working days upon conclusion of the meeting.

Operating Guidelines

Communications – Open communications and the sharing of information among the project team members is encouraged.

Timelines - The workgroup may establish deadlines for submission of communications and ideas related to topics under consideration; workgroup members are expected to adhere to the established timelines as much as possible so that the overall project can progress.

Roles and Responsibilities –

1. IDEM workgroup facilitator:
    - creates an open and interactive climate
    - ensures that everyone's opinions are heard
    - approaches problem-solving as a cooperative activity to enhance overall group effectiveness
    - promotes effective teamwork by systematically following the established workplan process
    - manages conflict constructively
2. Workgroup members:
    - Attend all meetings as practicable

- Contribute ideas
- Collect applicable data and information
- Prepare position papers as applicable
- Recommend solutions

Workgroup meetings – Workgroup members are expected to attend workgroup meetings as practicable. Workgroup members may be asked to participate in additional meetings such as appropriate.

Decision Making – The overall and primary decision making process will be by mutual agreement. If mutual agreement cannot be reached, then IDEM will exercise best professional judgement to decide upon a course of action in settlement of a disputed subject manner, note the differences in opinion and ensure that these opinions are expressed to the Water Pollution Control Board if appropriate.

Public Participation Guidelines

- IDEM will develop website for e.coli rulemaking workgroup. This website shall contain a brief explanation of the purpose of the group and how citizens can provide feedback during this workgroup process
- Once approved by workgroup, the meeting minutes shall be posted on IDEM's website
- Quarterly briefings on the workgroup's progress will be given to the Triennial Stakeholders group and the Water Pollution Control Board
- Workgroup members are encouraged to discuss workgroup progress and issues with other entities and bring this feedback to the workgroup
- First Notice of this rulemaking shall contain a discussion and explanation of the issues in the context of a preamble

Project Scope

Several tasks have been identified for this project:

- Identification of additional participants in the workgroup.
- Develop workgroup operating guidelines.
- Review and revision, if necessary, of project workplan.
- Identification and agreement on issues to be discussed.
- Identification of background research and technical assistance needs
- Development of a timeline with milestones for the workgroup activities.
- Development of approach for public participation in the workgroup process.
- Discussion of background research and technical assistance reports and current issues.
- Development of recommendations for rule language on the identified issues.

The following describes the project work breakdown structure:

Task 1. Identification of workgroup members

Input from the workgroup needed here as to potential additional members of this workgroup. Suggest workgroup size about 10 or so (5 or 6 additional members), with rather equitable representation of all stakeholders.

Deliverables and Schedule:

- Identification of additional workgroup members by September January 15, 2003

Task 2. Develop workgroup operating guidelines

Develop guidelines for the workgroup to follow during future meetings to assure appropriate conduct and process to allow for fair and equal participation by all members of the workgroup

Deliverables and Schedule:

- Workgroup guidelines developed at first full workgroup meeting week of November 18, 2002
- Review and final approval of guidelines (Second meeting- January 15, 2003)

Task 3. Review and revision, if necessary, of project workplan

Full workgroup would review and revise the workplan, if necessary.

Deliverables and Schedule

- Review workplan and propose revisions if necessary at first full workgroup meeting (week of November 18, 2002)
- Approve the revised workplan at second meeting on January 15, 2003

Task 4. Identification and agreement on issues to be discussed

Full workgroup discussion of potential issues and agreement on issues that will be focused on by the workgroup

Deliverables and Schedule

- Discussion of potential issues to be discussed -- first workgroup meeting (week of November 18, 2002)
- Agreement on issues to be the focus of workgroup -- second full workgroup meeting on January 15, 2003

Task 5. Identification of background research and technical assistance needs

Identify relevant background materials available for review. These might include federal guidance, Indiana GLI language, recent triennial review language and comments, SEA 431,Water Quality Advisory Group Report, other state's antidegradation requirements, etc.

Deliverables and Schedule

- Identify relevant background materials at second meeting of full workgroup (week of November 18)
- Compile list of materials to be gathered for workgroup use/review at second workgroup meeting on January 15, 2003
- Continue to compile relevant background materials as appropriate

Task 6. Develop timeline with milestones for workgroup activities

Full workgroup would review various tasks and propose schedule for discussion and milestones for each activity.

- Discussion of tentative timeline and milestones at second full workgroup meeting (week of November 18)
- Finalize and approve tentative timelines and milestones at second workgroup meeting on January 15, 2003

Task 7. Develop approach for public participation in the workgroup process

Workgroup would discuss and agree on approach for involving others outside the workgroup in workgroup's process, discussions and recommendations

- Discussion of how to involve/inform those outside the workgroup as to the workgroup activities—first workgroup meeting on November 19, 2002
- Finalization and agreement on process—second workgroup meeting on January 15, 2003

Task 8. Discussion of background research reports and various issues identified in Task 4.

Full workgroup will begin discussion of background materials and the various issues identified to be discussed. The following preliminary timeline with milestones is proposed

- Begin discussion of background information and issues—second workgroup meeting on January 15, 2003
- Discussions of these issues would continue at subsequent workgroup meetings (about 1 per month)
- Publication of First Notice of Proposed Rulemaking in Indiana Register on March 1, 2003
- Continue discussion of issues and comments received after publication of First Notice (meetings 3 through 8 (December 2002 through July 2003)

Task 9. Development of Rule Language

Full workgroup makes recommendations as to proposed rule language for Second Notice based on discussions, review of materials gathered and response to comments from first notice.

- Make recommendations to the agency for rule language Second Notice publication in October Indiana Register at meetings 9 and 10 (August and September)
- Review comments to Second Notice and make recommendations for changes to proposed rules at meetings 11, 12 and 13 (December 2003 and January and February 2004)
- Review comments and propose changes to preliminary adopted rules at meetings 14 and 15 (June and July 2004).
- Review proposed Prepare language for Final Adoption by Water Board at September 2004 Water Board meeting.