

Iowa Water Quality Standards Update TDS, Chloride, and Sulfate

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History

- Prior to June 2004 – 750 mg/L TDS Standard
 - Seldom applied to NPDES permits
 - Probably over 100 dischargers exceeded 750 mg/L
- June 2004 – IDNR Enacted Interim TDS Standard
 - Requires WET test if $>1,000$ mg/L TDS
 - EPC directed IDNR to develop standards by 2007
 - Problems in implementation

History

- June 2005 – IEC, Sierra Club, et. al. Lawsuit
 - Sued US EPA for failure to disapprove the interim TDS standards
 - Requires IDNR to develop chloride standards by Dec. 31, 2007
 - Extended deadline to Dec. 31, 2008

History

- November 2007 IDNR TAC meeting
 - US EPA presented proposed recalculation of National Guidelines for chloride water quality standards
 - US EPA proposed to use very old and technically questionable data in recalculation
 - IDNR and TAC suggested more thorough review of National Guidelines and lab WET tests
 - EPA claimed they had no money for research

History

- January 2008 IWPCA, AMI members and others raised funds for technical support
 - Retained services of Environ (expert toxicologists)
- March 2008 EPA draft work plan on chloride toxicity testing for National Guideline revision

EPA Work Plan Development

- EPA proposed WET tests to establish new national chloride guidelines
 - Initial acute WET tests on one species
 - Low hardness (50 mg/L) – not indicative of toxicity in Iowa waters (300 – 400 mg/L)
 - Forces states and dischargers to perform additional testing or site specific studies at higher hardness for less stringent standards

EPA Work Plan Development

- Results of initial Iowa WET tests at higher hardness for less stringent chloride standards
 - *C. dubia* preliminary data on hardness effects

Hardness (mg/L CaCO ₃)	LC ₅₀ (mg/L chloride)
40	1,370
80	1,700
160	2,370

EPA Work Plan Development

- Iowa IDNR Technical Advisory Committee
Input to USEPA
 - Proposed to conduct additional tests to establish relationship between chloride toxicity and hardness (supplement EPA research)
 - EPA revised their Work Plan and Scope for National Guideline Review
 - EPA responded to interest (threat) of Iowa group consideration of conducting additional research

EPA Work Plan Development

- EPA revised proposed WET tests to establish new national chloride guidelines
 - Initial acute WET tests on one species
 - Water flea (*Ceriodaphnia dubia*)
 - Test at seven hardness concentrations
 - 25, 50, 100, 200, 300, 600, and 800 mg/L hardness
 - Ca/Mg mass ratio 2.25
 - Test at seven sulfate concentrations
 - 25, 50, 100, 200, 300, and 600 mg/L sulfate
 - Organisms will be fed during test for reduced stress

EPA Work Plan Development

- After tests on *Ceriodaphnia dubia*, conduct acute WET tests on two of the following three identified sensitive species:
 - Fingernail clam (*Sphaerium simile*)
 - Snail (*Gyraulus circumstriatus*)
 - Tubificid worm (*Tubifex tubifex*)
- Develop revised Acute Value based on four most sensitive organisms in data base

EPA Work Plan Development

- No plans to conduct chronic tests for revising Acute Chronic Ratio (ACR)
 - But revise ACR by deleting rainbow trout data
- EPA may replace old toxicity data or add new data to existing data base
- Eliminate some old chronic data on rainbow trout
 - Results in lower Acute Chronic Ratio (ACR)
 - Results in less stringent chronic standard

EPA Work Plan Development

- Develop new National Chloride Guideline that is a function of hardness

Current Status

- Great Lakes Environmental Laboratory under contract to perform WET tests
- EPA developing final Work Plan
 - Iowa (IWPCA TAC members) requested review of final EPA Work Plan
- Lab work started May 9 (acclimating *C. dubia* to test conditions)
- EPA report on lab tests by October 1

Projected Iowa Standards

- Expected range of revised EPA guideline chloride standards:
 - Acute 600 – 850 mg/L (860 mg/L current)
 - Chronic 300 – 500 mg/L (230 mg/L current)
 - Could be more stringent at low hardness
 - May adopt a single value standard for average state water hardness rather than a hardness variable standard

Projected Iowa Standards

- Repeal the interim TDS standard
- New sulfate standards
 - Based on new Illinois standards
 - Hardness and chloride conc. dependent
 - 500 – 2,000 mg/L
- Adopt new standards by December 31, 2008

Impact of New Standards

- Most dischargers will comply with sulfate standards
- Many dischargers will not comply with chloride standards
 - Cities with hard water and ion exchange softeners
 - Discharges from industries that use salt or hydrochloric acid in production operations
 - Discharges to low flow streams

Potential Relief from Chloride Stds

- Site specific standards
- Economic hardship
- Dilution (standard is not technology based)

Other States

- Illinois new standards
 - Repeal old 1,000 mg/L TDS standard
 - Adopt new sulfate standard (hardness dependent)
 - Keep existing 500 mg/L chloride standard
- Missouri: Replace current standards with new Iowa standards
- Kansas: Currently no chloride standard, but may adopt Iowa standard

Other States

- Nebraska: Adopted 230 mg/L chloride standard a few years ago and has problems
- Wisconsin:
 - 760 mg/L chloride acute
 - 395 mg/L chloride chronic
 - Considering revising standards to less stringent based on new State of Wisconsin WET test data