Overview of the Class C (Freshwater) Chronic Aquatic Life Standard for Silver & Comments on the NCWQA Petition

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January 12, 2022

History of the Chronic Silver Standard

Current chronic standard adopted by EMC in 1989

Adopted to address discharge of silver from industrial facilities

Implemented as an “Action Level” for NPDES

- Facilities required to show reasonable potential to exceed standard
- Facilities required to pass Whole Effluent Toxicity (WET) testing
- Failure resulted in permit limit based on action level value (0.06 ug/L)

History of the Chronic Silver Standard

Silver standard timeline:

- 1989 - Action levels established
- 2016 – Most metals revised from total to dissolved including
  - Acute silver (EPA NRWQC) - dissolved, hardness-dependent
  - Chronic silver (02B .0208) as NC Action Level - dissolved, not hardness-dependent
  - ***EPA disapproved use of the action levels
- 2019 - Action level language removed from 02B .0211 due to EPA disapproval of action levels in 2016
  - Chronic silver standard retained @ *0.06 ug/L (dissolved, not hardness-dependent)*

Regulatory & Scientific Basis

CWA requires states adopt standards to protect designated uses (such as aquatic life)

NC adopts numeric & narrative standards to achieve this goal

Chronic silver standard is a numeric standard that is based on the narrative standard for toxic substances as described in 15A NCAC 02B .0208

Regulatory & Scientific Basis

Standard uses the final acute value (FAV) from EPA's 1980 Ambient Water Quality Criteria for Silver

FAV is an estimated concentration that should be protective of 95% of aquatic species excluding the most sensitive species

~80 toxicity data points from 10 freshwater species

Eight of the ten species evaluated are found in NC surface waters with the most sensitive species being common throughout NC

- Water flea (most sensitive), Fathead minnow (second most sensitive), Bluegill

Regulatory & Scientific Basis

The standard of 0.06 ug/L was calculated per 02B .0208 as:

The lowest LC_{50} x safety factor, where

- Lowest LC50 = 1.2 ug/L (1980 EPA FAV @ 50 mg/L hardness)
- Safety factor = 0.05 (per 02B .0208)

EPA (2016) determined this to be consistent with NC's standards & scientifically defensible for CWA purposes as required per 40 CFR 131.11

Significance of the Chronic Silver Standard

Silver is demonstrated via toxicity testing to be toxic to aquatic life

Aquatic life standards designed to protect for various health effects

Chronic standards protect organisms from long-term exposures to toxics that may result in impacts to:

- Growth
- Reproduction
- Behavior (social, hunting/foraging, survival)

Acute standards protect organisms from short-term exposures that may result in mortality

Other States & Tribes

Other states & tribes have also adopted a chronic silver standard to protect freshwater aquatic life including:

State/Tribe	Chronic Silver Standard (ug/L)
Florida	0.07
Minnesota	0.12
New York	0.1
Oregon	0.1
St. Regis Mohawk Tribe (NY)	0.1
Northern Cheyenne Tribe (MT)	0.12

Division Comments

Statements in the petition do not accurately reflect some aspects of the standard:

- Regulatory & scientific basis of the standard
- Use of Water Effects Ratios (WERs)
- Significance of chronic standard in protecting aquatic life

Division Comments

Petition questions the regulatory basis of the standard

NC DWR comments:

40 CFR 131.11 requires states to adopt standards to protect designated uses

Accomplished via numeric & narrative standards

No existing federal NRWQC for chronic silver

15A NCAC 02B .0208 provides narrative standard for toxic substances

- Indicates that toxics cannot result in chronic toxicity to aquatic life
- Informs how to interpret the narrative standard through calculation of numeric criteria

Division Comments

Petition questions the scientific basis of the standard

NC DWR Comments:

Basis is the 02B .0208 narrative standard for toxic substances

Details of the scientific basis discussed earlier in this presentation (EPA FAV x safety factor)

EPA 2016 decision document for the triennial review determined the chronic silver standard to be:

1. *Consistent with the approved language in the 02B .0208 narrative standard for calculation of toxics criteria to protect aquatic life*
2. *Scientifically defensible as required per 40 CFR 131.11*

Division Comments

Petition states that chronic silver standard would be better if it was a hardness-dependent standard

NC DWR Comments:

Not untrue, however...

- Standard is based on the 1980 EPA FAV @ 50 mg/L hardness
- Developing hardness based chronic standard requires additional tox information to establish relationship between hardness & chronic toxicity (*data may not be available*)
  - Stakeholders can provide data
  - Stakeholders can also recommend a scientifically supported alternative to the existing standard

Division Comments

Petition states that Water Effects Ratios (WER) are not allowed for chronic silver

NC DWR Comments:

15A NCAC 02B .0211 (11)(c) provides WER option (*eff. date Jan. 1, 2015*)

(c) Freshwater metals standards that are not hardness-dependent shall be as follows:

(i) Arsenic, dissolved, acute: WER· 340 ug/l;
(ii) Arsenic, dissolved, chronic: WER· 150 ug/l;
(iii) Beryllium, dissolved, acute: WER· 65 ug/l;
(iv) Beryllium, dissolved, chronic: WER· 6.5 ug/l;
(v) Chromium VI, dissolved, acute: WER· 16 ug/l;
(vi) Chromium VI, dissolved, chronic: WER· 11 ug/l;
(vii) Mercury, total recoverable, chronic: 0.012 ug/l;
(viii) Selenium, total recoverable, chronic: 5 ug/l;
(ix) Silver, dissolved, chronic: WER· 0.06 ug/l;

NORTH CAROLINA
Department of Environmental Quality

Division Comments

Petition states that Water Effects Ratios (WER) are not allowed for chronic silver

NC DWR Comments:

- WER would account for the site-specific effects of hardness and organics on chronic silver toxicity
- One facility has already used this approach

Division Comments

The petition states chronic standard unnecessary

NC DWR Comments:

Protecting aquatic life from the effects of chronic exposure is required per 02B .0208 narrative standard for toxic substances

Significance of chronic impacts touched on earlier in this presentation

- Protection from long-term exposures and impacts to growth, reproductions, and behavior

Division Comments

Petition states that standard is unecessary due to Whole Effluent Toxicity (WET) testing:

NC DWR Comments:

- WET testing was integral to the Action Level implementation
- EPA 2016 triennial review decision document disapproved Action Levels stating that:
  - "Per 40 CFR 122.44(d)(1)(i), controls must be in place for discharges with reasonable potential to cause or contribute to an excursion of standards in surface waters"
  - "WET testing alone is not suitable to protect uses because a discharge can pass WET while still contributing to an excursion of a standard in-stream"

Next Steps

Should EMC grant the petition:

- Proceed to rulemaking with proposed deletion in 02B .0211
- Satisfy NC APA & CWA public notice & hearing requirements
- If adopted, EPA will review change to 02B .0211 for compliance with CWA
  - Requires scientific justification for removal of standard
  - Includes EPA consultation with USFWS or NOAA for ESA compliance

*Note: The NC acute hardness-dependent standard (0.3 ug/L @ 25 mg/L hardness) remains in effect

Questions?

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