Understanding Iowa's Chloride Water Quality Standards

Background

Iowa adopted water quality standards for chloride and sulfate in November 2009. These two new standards replaced the previous water quality standard for total dissolved solids. Total dissolved solids is a measure of all chemical elements that have become dissolved in water. It includes chloride, sulfate, nitrate, sodium, potassium, and magnesium, among other chemicals. The total dissolved solids standard was designed to protect aquatic life from toxic conditions caused by these chemicals. However, research by DNR showed that in Iowa waters, chloride and sulfate are more accurate predictors of toxicity to aquatic life than the combined measurement of total dissolved solids. DNR thus undertook to replace the water quality standard for total dissolved solids with specific standards for chloride and sulfate.

Further research showed that in Iowa waters, the amount of chloride that would prove toxic to aquatic life depended on the amount of sulfate in the water and on the hardness of the water. In general, the harder the water in a stream, the more chloride it can receive without becoming toxic to aquatic life. Iowa therefore adopted a chloride standard that varies based on the levels of hardness and sulfate in the receiving stream. The standard assumes a default level of sulfate and hardness in the receiving stream based on statewide monitoring of Iowa waters.

Common sources of chloride:

-Home water softeners

-Filter backwash from drinking water plants

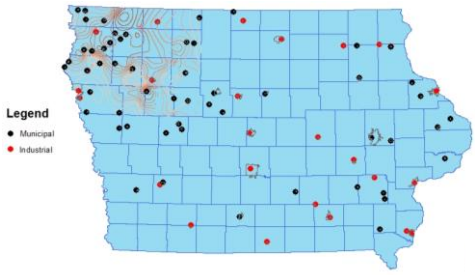
-Industries that use salt in production

The standard is flexible in that it allows dischargers, if they choose, to collect site-specific measurements of the chloride, sulfate, and hardness in the stream to which they discharge. These site-specific measurements can replace the default values and can be used to calculate site-specific chloride permit limits for a discharger.

Implementation

Since the standards were adopted in 2009, DNR has included chloride limits in discharge permits whenever sampling data demonstrates reasonable potential for the discharger to cause the standard to be exceeded in the receiving stream. If the discharger cannot immediately comply with the limit, DNR can allow additional time to come into compliance by including a compliance schedule in the permit.

Facilities with chloride limits



Across the state, 108 industrial facilities and 65 cities have chloride limits in their wastewater discharge permits. These facilities are largely concentrated in northwest Iowa, where naturally hard water leads to greater use of water treatment. Limits have become effective for 24 of the industrial facilities and 12 of the cities.

Sources of chloride

Chloride is contributed to wastewater treatment facilities from a variety of sources. Primary contributors are water softeners and industries that use salt in their production processes. A good first step for any discharger struggling to comply with chloride limits is to identify the sources contributing chloride to the system and the relative amount from each source.

Compliance Options

Removing chloride at a wastewater treatment facility can be very expensive. DNR encourages dischargers to instead achieve compliance by reducing the amount of chloride coming into the facility and by collecting site-specific data about the receiving steam that can be used to raise permit limits.

Source reduction:	Reduce chloride contributions from home softening systems or industrial users
Recycle/reuse:	Reuse industrial wastewater instead of discharging
Site-specific limits:	Collect 1-2 years of chloride, sulfate, and hardness samples in the receiving stream to replace the default assumed levels
Mixing zone study:	Submit a study demonstrating that actual dilution in the receiving stream is greater than state default values
Pipe to larger steam:	Construct a pipe to carry wastewater to a larger stream with greater dilution capacity
Consolidate outfalls:	An industry with multiple outfalls combines them to increase dilution
Stepwise limits:	Modify the permit to allow discharge only when stream flow is above a certain level
Install a diffuser:	Install a pipe across the bed of a perennial steam which allows the wastewater to be discharged through multiple ports, thereby achieving greater dilution
Flow variable limits:	Modify the permit so that limits vary according to flow in the receiving stream
Disadvantaged status:	Extend the compliance schedule based on an economic report showing a city qualifies as a Disadvantaged Community
Variance:	Obtain a temporary variance from the chloride standard. Requires approval from US EPA.

Each of these options takes significant time to implement. The key to pursuing any of these options is to start early and communicate with DNR often. DNR's ability to extend compliance schedules can depend on the degree to which the discharger has been proactively addressing the problem.

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