



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

WSG 203


Date Signed: April 18, 2018

APR 18 2018

OFFICE OF WATER

MEMORANDUM

Subject: Compliance Determination for Inactivation Requirements of the National Primary Drinking Water Regulations when a Public Water Systems Uses Dichlor and Trichlor for Primary Disinfection

From: Anita M. Thompkins, Director  
Drinking Water Protection Division 

To: Regional Water Division Directors  
Regions I-X

This memorandum is being issued to assist the Safe Drinking Water Act (SDWA) primacy agencies in the implementation of the microbial inactivation/disinfection requirements of the National Primary Drinking Water Regulations (NPDWRs) and the use of Dichlor (Dichloroisocyanuric acid) or Trichlor (Trichloroisocyanuric acid) for primary disinfection to meet those requirements.

It should be noted that under the SDWA, EPA's Office of Ground Water and Drinking Water does not approve disinfectants for disinfection of drinking water. These uses are approved through the Office of Pesticide Programs under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).<sup>1</sup> However, the NPDWRs establish requirements for inactivation/disinfection that public water systems must meet. EPA researchers have identified concerns regarding the measurement of free chlorine residual, measured in finished drinking water, using the NPDWRs-approved c DPD<sup>2</sup> and indophenol methods in the presence of the cyanuric acid found in Dichlor and Trichlor. Free chlorine residual measurement is necessary to apply the inactivation contact time tables found in the NPDWRs to determine the inactivation achieved in the treatment process for compliance with inactivation/disinfection requirements.

Based on the available literature, Dichlor and Trichlor, when dissolved in water, rapidly hydrolyze to release chlorine-containing species, where only a portion is free chlorine (i.e., hypochlorous acid and hypochlorite ion). The actual free chlorine percentage depends on several factors, including pH, temperature, chemical dosage and source (i.e., Dichlor or Trichlor), and the water's chlorine demand. The NPDWRs-approved DPD and indophenol methods cannot measure free chlorine residual in the presence of cyanuric acid when Dichlor or Trichlor are

<sup>1</sup> For more information on the intersect between SDWA and FIFRA, see <https://www.epa.gov/pesticide-registration/guidance-disinfectant-products-intended-treat-drinking-water>.

<sup>2</sup> DPD stands for N,N-diethyl-p-phenylene diamine. The method is generally referred to as DPD.

being used for primary disinfection. This has raised concerns that the inactivation determined based on chlorine residual measurements using the approved DPD and indophenol methods, in the presence of the cyanuric acid in Dichlor and Trichlor, may not be sufficient to meet inactivation requirements for the Surface Water Treatment Rules (SWTRs) or, if applicable, the Ground Water Rule (GWR) since free chlorine is not being measured.

The EPA has developed a web-based calculator to determine free chlorine residual in the presence of Dichlor and Trichlor at 25°C. That calculator is available at: <https://usepaord.shinyapps.io/cyanuric/>. EPA researchers intend to develop an enhanced web-based calculator that would determine free chlorine residual in the presence of Dichlor or Trichlor at a range of temperatures. Upon publication of the updated web-based calculator, EPA will conduct a webinar to train the states and public water systems on how to utilize the tool.

In the interim, the EPA recommends that primacy agencies review information from public water systems that have installed (or are considering installing) primary disinfection using Dichlor or Trichlor. Primacy agencies can conduct the review through their existing Public Water System Supervision Program oversight activities programs (e.g., sanitary surveys, plan review and treatment change approval process, required SWTR/GWR monitoring). The review should focus on SWTR and, if applicable, GWR inactivation requirements and should include:

- Determining the primary disinfectant(s) being used by the public water system,
- Identifying the location(s) for measurement of disinfectant residual(s) used in the calculation of inactivation achieved,
- Calculating inactivation routinely achieved compared to inactivation required, and;
- Requesting information about the analytical method being used for disinfection residual measurement.

This review will allow the primacy agency and the public water system to work together to identify and address vulnerabilities that might potentially compromise the public water system's ability to meet disinfection requirements. EPA will continue to work closely with the water sector community to identify new information regarding the use of Dichlor/Trichlor as a primary disinfectant and with primacy agencies reviewing public water systems' disinfection practices.

Should you have any questions or concerns regarding this memorandum, please contact me or Cathy Davis of the Protection Branch at [Davis.CatherineM@epa.gov](mailto:Davis.CatherineM@epa.gov).

cc: Regional Drinking Water Program Managers  
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