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INITIAL DISTRIBUTION SYSTEM EVALUATION GUIDANCE MANUAL

FOR THE FINAL STAGE 2 DISINFECTANTS AND DISINFECTION BYPRODUCTS RULE

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Note on the Initial Distribution System Evaluation Guidance Manual for the Final Stage 2 Disinfectants and Disinfection Byproducts Rule

Purpose:

The purpose of this guidance manual is solely to provide technical information for water systems and states to assist them in complying with the Initial Distribution System Evaluation (IDSE), a component of the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR). This guidance is not a substitute for applicable legal requirements, nor is it a regulation itself. Thus, it does not impose legally-binding requirements on any party, including EPA, states, or the regulated community. Interested parties are free to raise questions and objections to the guidance and the appropriateness of using it in a particular situation. Although this manual describes many methods for complying with IDSE requirements, the guidance presented here may not be appropriate for all situations, and alternative approaches may provide satisfactory performance. The mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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Acronyms

CBI	Confidential Business Information
CWS	Community water system
DBP	Disinfection byproduct
DBPR	Disinfectants and Disinfection Byproducts Rule
EPA	U.S. Environmental Protection Agency
EPS	Extended period simulation
FOIA	Freedom of Information Act
GIS	Geographic information system
GWUDI	Ground water under the direct influence of surface water
HAA	Haloacetic acid
HAA5	The sum of five HAA species
HPC	Heterotrophic plate count
ICR	Information Collection Rule
IDSE	Initial distribution system evaluation
IPMC	Information Processing and Management Center
LRAA	Locational running annual average
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MCL	Maximum contaminant level
M-DBP	Microbial and disinfection byproduct
NOM	Natural organic matter
NPDWR	National Primary Drinking Water Regulation
NTNCWS	Nontransient noncommunity water system
PWS	Public water system
PWSID	Public water system identification number
SDWA	Safe Drinking Water Act
SSS	System-specific study
STEP	Simple Tools for Effective Performance
SUVA	Specific ultraviolet absorbance
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
THM	Trihalomethane
TOC	Total organic carbon
TNCWS	Transient noncommunity water system
TTHM	Total trihalomethanes
TTHMFP	Total trihalomethane formation potential
UV	Ultraviolet light
VSS	Very small system

Definitions

Aquifer: a geological formation composed of rock, gravel, sand, or other porous material that yields water to wells or springs.

Biodegradation: a biological process where HAA5s are broken down into smaller compounds by microbes.

Booster disinfection: the practice of adding disinfectant in the distribution system to maintain disinfectant residual concentration throughout the distribution system.

Combined distribution system: the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water. 40 CFR 141.2

Community water system: a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. 40 CFR 141.2

Consecutive system: a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems. 40 CFR 141.2

Disinfectant: any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms. 40 CFR 141.2

Disinfectant residual concentration: the concentration of disinfectant that is maintained in a distribution system. Disinfectant could be free chlorine (the sum of the concentrations of hypochlorous acid (HOCl) and hypochlorite (OCl⁻)) or combined chlorine (chloramines). It is used in Surface Water Treatment Rule as a measure for determining CT.

Disinfection: a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents. 40 CFR 141.2

Disinfection byproduct (DBP): compound formed from the reaction of a disinfectant with organic and inorganic compounds in the source or treated water during disinfection and distribution.

Dual Sample set: a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purpose of conducting an IDSE under subpart U and determining compliance with the TTHM and HAA5 MCLs under subpart V. 40 CFR 141.2

Entry Point: the point(s) where finished water first enters the distribution system from one or more sources. Samples taken at these points represent minimum residence time in the distribution system.

Finished Water: water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals). 40 CFR 141.2

GAC10: granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with subpart V MCLs under §141.64(b)(2) shall be 120 days. 40 CFR 141.2

GAC20: granular activated carbon filter beds with an empty-bed contact time of 20 minutes based on average daily flow and a carbon reactivation frequency of every 240 days. 40 CFR 141.2

Ground water system: public water systems that use ground water only or purchase ground water from other systems (40 CFR 141.2). For the purposes of this guidance manual, ground water systems refers to the subset of systems that disinfect their water, or purchase disinfected ground water, even if they do not apply any additional treatment.

Ground water under the direct influence of surface water (GWUDI): any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia*, or *Cryptosporidium*, or significant and relative rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the State. The State determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well construction characteristics and geology with field evaluation. 40 CFR 141.2

Haloacetic acid (HAA): one of the family of organic compounds named as a derivative of acetic acid, wherein one to three hydrogen atoms in the methyl group in acetic acid are each substituted by a halogen atom (namely, chlorine and bromine) in the molecular structure.

Haloacetic acids (five) (HAA5): the sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition. 40 CFR 141.2

Heterotrophic plate count (HPC): a procedure for estimating the number of heterotrophic bacteria in water, measured as the number of colony forming units per 100 mL.

Information Processing and Management Center (IPMC): a receiving, processing, and mailing facility with a web-based data management system that allows EPA and states to access, track, and respond to IDSE submissions.

Influence zone: the portions of the distribution system supplied with water from a particular source of supply.

Locational running annual average (LRAA): the average of sample results taken at a particular monitoring location during the previous four calendar quarters. 40 CFR 141.2

Maximum contaminant level (MCL): the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. 40 CFR 141.2

Maximum contaminant level goal (MCLG): the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. Maximum contaminant level goals are nonenforceable health goals. 40 CFR 141.2

Mixing Zone: an area in the distribution system where water flowing from two or more different sources blend.

Monitoring site: the location where samples are collected.

Non-community water system: a public water system that is not a community water system. A non-community water system is either a “transient non-community water system (TNCWS)” or a “non-transient non-community water system (NTNCWS) 40 CFR 141.2

Non-transient non-community water system (NTNCWS): a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year. 40 CFR 141.2

Population served: the retail number of people served by a water system. Systems typically work with their State to determine population served for compliance purposes. Note that IDSE and Stage 2 compliance monitoring requirements (e.g., number of samples and sampling frequency) are based on the population served by the water system. IDSE and Stage 2 compliance monitoring schedules, however, are based on the largest population served by systems in the combined distribution system. If you do not know the population of your system, ask your state.

Public water system (PWS): a system for the provision to the public of water for human consumption through pipes or, after August 5, 1998, other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year. Such term includes: any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Such term does not include any “special irrigation district.” A public water system is either a “community water system” or a “noncommunity water system. 40 CFR 141.2

Residence time: the time period lasting from when the water is treated to a particular point in the distribution system. Also referred to as water age.

Residual disinfection: also referred to as “secondary disinfection.” The process whereby a disinfectant (typically Chlorine or Chloramines) is added to finished water in order to maintain a disinfection residual in the distribution system.

State: the agency of the State or Tribal government which has jurisdiction over public water systems. During any period when a State or Tribal government does not have primary enforcement responsibility pursuant to Section 1413 of the Safe Drinking Water Act, the term “State” means the Regional Administrator, U.S. Environmental Protection Agency. 40 CFR 141.2

Subpart H systems: public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the requirements of 40 CFR 141.2 (H). 40 CFR 141.2

Surface water: all water which is open to the atmosphere and subject to surface runoff. 40 CFR 141.2

Total chlorine residual: the sum of combined chlorine (chloramine) and free available chlorine residual.

Total trihalomethanes (TTHM): the sum of the concentration in milligrams per liter of the trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane, and tribromomethane [bromoform]), rounded to two significant figures. 40 CFR 141.2

Tracer study: a procedure for estimating hydraulic properties of the distribution system, such as residence time. Where more than one water source feeds the distribution system, tracer studies can be used to determine the zone of influence of each source.

Transient Non-Community Water System (TNCWS): a non-community water system that does not regularly serve at least 25 of the same persons over six months per year. 40 CFR 141.2

Trihalomethane (THM): one of the family of organic compounds named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure. 40 CFR 141.2

Water distribution system model: a computer program that can simulate the hydraulic, and in some cases, water quality behavior of water in a distribution system.

Wholesale system: a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems. 40 CFR 141.2

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