



Addressing DBPs in Drinking Water with the Drinking Water State Revolving Fund

Communities may use the Drinking Water State Revolving Fund (DWSRF) to reduce this public health concern in their drinking water systems.

BACKGROUND

In many cases, drinking water must be disinfected to treat microbial pathogens (e.g., bacteria, viruses, protozoa, parasites). However, disinfectants can also react with naturally-occurring materials in the water to form disinfectant byproducts (DBPs) including: trihalomethanes (THM), haloacetic acids (HAA), chlorite, and bromate. Together, the Stage 1 and Stage 2 Disinfection Byproduct Rules (DBPR) improve drinking water quality by balancing treatment for microbial pathogens and byproduct formation. Byproducts, if consumed in excess of the EPA's maximum contaminant level over many years, may increase health risks. The EPA developed the DBPR to limit exposure to these DBPs.

The Stage 1 DBPR reduces drinking water exposure to DBPs. The Rule applies to community water systems and non-transient non-community systems which add a chemical disinfectant during any part of the drinking water treatment process, and transient non-community water system that use chlorine dioxide.

The Stage 2 DBPR strengthens public health protection by tightening compliance monitoring requirements for THM and HAA.

MANAGING DBP IN DRINKING WATER

Water systems can control DBP levels using a variety of methods. One option is to optimize the amount of disinfectant and/or decrease the contact time of the disinfectant so that fewer DBPs form, while ensuring compliance with other requirements. Another option is to change the type of disinfectant being used to change the type of disinfectant residual. Additional treatment, like enhanced coagulation or membrane filtration, can be used to minimize precursors so DBPs do not form in the first place.

Additional EPA DBPs Resources:

<https://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules>

<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100C8XW.txt>

<https://www.epa.gov/dwreginfo/diving-regulations>



DWSRF ASSISTANCE

The DWSRF can provide financial assistance to publicly-owned and privately-owned community water systems, as well as non-profit non-community water systems, for drinking water infrastructure projects. Projects must either facilitate the system's compliance with national primary drinking water regulations or significantly further the health protection objectives of the Safe Drinking Water Act (SDWA).

Each of the 50 states and Puerto Rico operates its own DWSRF program. They receive annual capitalization grants from the EPA, which in turn provide low-interest loans and other types of assistance to water systems. Repayments of DWSRF loans begin up to 18 months after project completion, with loan terms up to 30 years for most communities, or up to 40 years for disadvantaged communities.

Additionally, states may use a portion of their capitalization grant from the EPA as "set-asides" to help communities build the technical, managerial, and financial capacities of their systems. With an emphasis on small systems, these funds help ensure sustainable infrastructure and public health investments.

Planning and Optimization

States can use DWSRF set-asides to help water systems conduct studies and evaluations to determine the best approach for addressing DBPs. For example, these evaluations include, but are not limited to, water age management studies, optimization studies, and pilot testing for treatment alternatives. Since these evaluations are likely to result in a capital improvement project, assistance can also be provided from the loan fund. DWSRF set-asides, or loans, can also be used for planning and design of infrastructure projects that address DBPs.

Infrastructure Improvements

If water treatment appears to be the cause of DBP issues, water systems may install enhanced coagulation technology, modify the disinfection process, or a combination of both. DWSRF assistance can be used to upgrade treatment technologies, like building a new

treatment plant or expanding an existing facility to add DBP precursor removal capability. DWSRF set-asides can be used for laboratory or testing equipment for research or contamination prevention.



Partnerships

Consolidation and restructuring of water systems can be a cost-effective alternative to treatment, particularly for small systems, where the quality of water treatment has deteriorated, or a water system is unable to maintain compliance for technical, managerial, or financial reasons. Costs associated with consolidation efforts or infrastructure required to connect two or more water systems are eligible DWSRF projects, including creating consecutive systems.

Outreach and Training

Although routine/compliance monitoring is not eligible for DWSRF funding, outreach and training for water system operators is an eligible set-aside activity. This can include one-time monitoring at a system to show operators how to conduct the monitoring themselves. States can also use DWSRF set-aside funds to present workshops, seminars, and other training events that provide operators with ongoing educational opportunities.

APPLY FOR FUNDING

Water systems receive DWSRF assistance directly from state agencies. Each state has its own application procedure. Contact information for each state is posted at <https://www.epa.gov/drinkingwatersrf/state-dwsrf-website-and-contacts>.





DWSRF Case Studies: DBPs in Drinking Water

How communities are using the Drinking Water State Revolving Fund (DWSRF) to address this public health concern in drinking water systems.

WESTHAVEN COMMUNITY SERVICES DISTRICT, CA

Westhaven Community Services District faced maximum contaminant level (MCL) violations for disinfection byproducts (DBPs). The District received \$65,000 in financial assistance from the DWSRF program for a planning and design study. The District's study included an evaluation of DBP avoidance procedures, site investigation, preliminary design report, and bench testing of potential treatment systems. This project also included site surveys, pilot testing, preparation of environmental documentation, and plans and specification development for the proposed infrastructure project. Completed in February 2018, recommendations from this study, once implemented, assisted the District in returning to compliance with the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR).

FONDA, NY

The Village of Fonda, New York received DWSRF assistance for various water system improvements. A new mixing system was installed inside a 500,000-gallon storage tank to reduce stagnant water and help maintain a consistent chlorine residual, which will reduce DBP formation. A new telemetry system is being installed, allowing the Village to remotely monitor the tank water level, with both high and low water level alarms. The Village plans to rehabilitate a pressure reducing valve at its chlorine house and make other improvements throughout the distribution system. Construction began in September 2018. DWSRF assistance totaled approximately \$1.4 million, with an additional \$2.2 million grant from the state.

Additional EPA DBP Resources:

<https://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules>

<https://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules>

<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100C8XW.txt>

BRADY COUNTY, MT

Unable to meet DBP MCL limits, Brady County Water and Sewer District needed to decide whether to update its water treatment plant or find a new source of water. The District found a new source from the North Central Montana Regional Water Authority. To prepare for existing water source abandonment, the District received \$257,000 in DWSRF assistance in 2013 for water system improvements. This project replaced all existing distribution system water mains and replaced an existing storage tank with a new 125,000-gallon elevated water storage tank. A new chlorine building was also constructed. This regionalization project provided the County's residents with a reliable source of safe drinking water.



DBP SAMPLING STUDY IN KS

The Kansas Department of Health and Environment (KDHE) and EPA Region 7 utilized DWSRF set-asides and a Regional Applied Research Effort (RARE) grant from the EPA for a special study sampling DBPs for consecutive public water systems (PWS). The first round of sampling was performed in July 2018. Thirty-nine water systems participated in the first round. The second round of sampling was performed in September 2018, with 36 water systems from the first round also participating in the second round. The study results suggested that the primary issue was parent water systems forming DBPs at the treatment plants and then passing these down to their consecutive water systems. In 2019, KDHE and EPA will focus on water systems from the 2018 participants that may have potential DBP issues.

DESOTO PARISH, LA

The DeSoto Parish Water Works District #1 is implementing an ion exchange resin pre-treatment system to reduce DBPs formation. This technology can be used to reduce natural organic matter and dissolved organic carbon, which are precursors to DBPs. Removal of these organic compounds will help the water system reduce its DBPs. The project includes the construction of a new ion resin exchange building, purchase of resin regeneration equipment, salt saturator, brine tank circulation pumps, flow monitors, air compressors, and upgrades to the existing instrumentation and control system. This project, started in August 2017, received \$2.3 million in DWSRF assistance with 20 percent as loan principal forgiveness.

FUNDING INCENTIVE FOR DBP-RELATED PROJECTS IN OK

The Oklahoma DWSRF program provides funding incentives to water systems with a health-based violation, specifically a DBPR violation, which is one of the most common violation types in the state. As of Fall 2018, there were approximately 120 Oklahoma water systems under Consent Orders for DBPR violations. Eligible projects can receive up to \$100,000 in loan forgiveness and benefit from a streamlined loan application process. The Oklahoma DWSRF program is utilizing DWSRF funding to reduce DBP violations and address public health and compliance issues throughout the state.

APPLY FOR FUNDING

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For more information, visit: [epa.gov/dwsrf](https://www.epa.gov/dwsrf)