



AMERICAN BACKFLOW PREVENTION ASSOCIATION

September 28, 2010

Water Docket, Environmental Protection Agency
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Mailcode 4101T
1200 Pennsylvania Ave N W
Washington, DC 20460

The American Backflow Prevention Association (ABPA) is an organization whose members have a common interest in protecting drinking water from contamination through cross-connections. ABPA is dedicated to education and technical assistance. ABPA enters the following comments for the revisions to the Total Coliform Rule.

The Revised Total Coliform Rule (RTCR) aims to increase public health through the reduction of potential pathways of contamination into the distribution system. Although, ABPA is in agreement with the basic philosophical changes made in the rule, ABPA believes a major pathway for contamination is unprotected cross-connections which are not directly addressed by RTCR. ABPA feels the RTCR falls short in protecting public health by not requiring public water systems to have an active, on-going cross-connection control (CCC) program acceptable to the primacy agency.

The original TCR and the RTCR have three objectives 1) To evaluate the effectiveness of treatment, 2) To determine the integrity of the distribution system, and 3) To signal the possible presence of fecal contamination. By not addressing CCC, the EPA is failing to address a key part of the 2nd objective. The need for CCC has been recognized as necessary to protect public health by many drinking water industry professionals. The Stage 2 Microbial Disinfection Byproducts Federal Advisory Committee Agreement in Principle, December 29, 2000 stated "...recognizes that cross-connection control and backflow in the distribution system represents a significant public health risk." In the RTCR EPA is going to require water systems to take action when sampling results indicate that contamination or a potential pathway for a contaminant may be present. Without having an existing CCC program, key potential pathways that exist are not being investigated until after a contamination event has occurred. These potential pathways may not be addressed unless deemed by the primacy agency as a sanitary defect.

In the RTCR, EPA recognizes the value of a CCC program by recognizing it as one of several criteria for water systems to apply for a reduced monitoring schedule. Water suppliers also see the value it provides to their systems because in the 2000 EPA *Community Water System Survey Volume 1* (Overview) it states that 90% of water systems serving > 100,000 population have some form of CCC program. Although many large water systems currently have some form of a CCC program, antidotal conversation indicates many CCC programs spent up to 30 percent of their time defending why they have a program and not implementing the program. The major comment heard is "If this is so important, why doesn't EPA mandate a CCC program?"

Although not federally mandated, CCC is recognized as a good engineering practice to protect the distribution system and a good element of a multi-barrier approach for protection from contamination. "Most documented cases of waterborne disease outbreaks attributed to distribution systems have been caused by breaches in physical integrity, such as a backflow event through a cross-connection or contamination occurring during repair or replacement of distribution infrastructure" as stated on page 7 of the 2006 *Drinking Water Distribution Systems - Assessing and Reducing Risks*, National Research Council (2006 NRC).

The new find and fix philosophy of the RTCR lends itself to adoption of a CCC program. A key trait of a CCC program is to be proactive and have the needed protection in place at identified hazardous connections or susceptible areas (i.e. high

demand, low pressure zones, etc.) before a backflow event occurs. To wait until a sampling event confirms a contaminant is present in the distribution system is not protecting public health, but forensically showing what damaged public health. The RTCR chose to not mandate a CCC program and delayed addressing the public health risk. The RTCR proposed to address the need for CCC in the future by requiring more research even though the public health risk is apparent. ABPA believes this is an error that will only produce redundant data showing a CCC program as necessary to protect public health, and therefore, delays protection of the public from unprotected cross connections.

The 2006 NRC on page 109 quotes Craun/Calderon 2001 by stating from 1981 – 1998 CDC documented that contamination from cross-connections caused the majority (50.6%) of the waterborne outbreaks associated with the distribution system. CDC documented 57 outbreaks that led to 9,734 reported illnesses. In the 1986 paper titled *Waterborne Diseases in the United States* by Gunther Craun, he further reported from 1971-1980 that 74.4% of the outbreaks caused by distribution system deficiencies were cross connection related. Of the reported waterborne illnesses from a distribution system deficiency, 81.4% were from these backflow events. It is important to note CDC waterborne disease outbreak data collection is not required to be reported and is a passive collection process. The numbers of illnesses and outbreaks presented should be viewed as a low estimate.

In the AWWA Research Foundation (AWWARF) Study from 2002 titled *Impact of Cross-Connections in North American Water Supplies* (AWWARF 2002) on page 38 stated that 38% of the respondents had experienced a documented backflow incident in their system. In the 1999 ABPA *Survey of State & Public Water System Cross Connection Control Programs* (ABPA 1999) their respondents reported that 51% had reported a documented backflow incident. In the AWWARF 2002 study on page 26, it was reported that 16% of the incidents affected the distribution system. In the ABPA 1999 survey, they reported a 21.5% of the incidents affected water quality in the distribution system. A backflow incident can be a one time occurrence or because of hydraulics conditions could be an on-going sporadic event. The contaminant can travel in either a slug form or be dispersed in its movement through the distribution system depending upon the hydraulic conditions and the bacteriological and chemical components of the contaminant. For this reason it is unreasonable to expect to identify a backflow incident with a sampling protocol. Only with proper CCC before the incident can public health be protected.

A backflow incident can occur for many reasons. The AWWARF 2002 and ABPA 1999 studies had statistics on the many types of water using equipment that were improperly connected with an unprotected cross connection. Plumbing codes are designed to address new construction. Plumbing codes do not provide ongoing inspection or surveillance to ensure no modifications take place to create a cross connection. Plumbing codes are enforced during a permit process, and permits are usually obtained during new construction or major re-model. Plumbing code compliance cannot be guaranteed beyond these parameters.

At the present time there are two major model plumbing codes used in different parts of the country. Both model plumbing codes address CCC with different ways of protection; this could lead to different types of protection depending on the model code used. Model codes are adopted by State, county and/or local jurisdictions with changes to fit their local needs. This continual changing from the model code to the adopted code leads to inconsistencies in protection. For this reason plumbing codes may provide inconsistent protection from unprotected cross connections and their potential health hazards. This is illustrated in the 2004 University of Southern California, Foundation for Cross Connection Control and Hydraulic Research (FCCCHR) study, *Prevalence of Cross Connections in Household Plumbing Systems* (USCFCCCHR 2004) where 95.7% of all residential connections surveyed had an unprotected direct or indirect cross connection to a health hazard.

Most CCC programs have chosen to not rely solely on plumbing code compliance alone. In the ASDWA *1999 Survey of States Cross Connection Control Programs* (ASDWA 1999) only 6.7% of State programs rely on plumbing code only for CCC (internal protection). In the ABPA 1999 survey, only 5.2% of state and water system CCC programs rely on plumbing code only. The ABPA 1999 survey went on to state that 35.5% of the state and water system's CCC programs surveyed were service protection only, while the remaining 59.3% were a combined service and internal protection type of CCC program.

A backflow incident can be triggered by many normal operations within a water distribution system. Any action that can lead to a change in pressure can start the reversal of flow of water and where an unprotected cross connection exists can carry a contaminant with it into the distribution system. The AWWARF study *Distribution System Performance Evaluation* Project #804, Fall 1995 (AWWARF 1995) suggests 25-30 main breaks per 100 miles of piping per year is a reasonable expectation of performance. Every main break, pump failure, high demand event, etcetera can lead to a potential backflow incident that can carry a contaminant through an unprotected cross connection.

The RTCR provides rationale for a Level 1 or Level 2 assessment if so required by the results of sampling. In the RTCR as printed on page 40931 of the Wednesday July 14, 2010 Federal Register it gives as examples of sanitary defects "Cross connection and backflow issues such as a required backflow prevention device not in place or not operating properly; or an unprotected cross connection found." If a properly operating CCC program is in place, any distribution system cross-connection related sanitary defect could be minimized. As part of a CCC program, the areas of water quality complaints, main breaks, low pressure events or simple pump cycle changes must be evaluated. This evaluation can assure all identified cross connections in these areas are protected and would help eliminate potential contamination of the distribution system. This could lead to a cost saving to the water supplier by minimizing the number of Level 1 or Level 2 assessments and a health benefit to the public.

In the AWWARF 2002 study the cost to a water supplier to administer a CCC program ranged from \$14,995 per year for <500 service connection systems (8% of respondents) to \$258,771 for >100,000 service connection systems (4% of respondents) and was averaged at \$44,835. Annual administrative costs included equipment, personnel and other. The study went on to show the average cost of cleanup from a backflow incident to the water supplier and consumer was \$19,916 which does not include the potential loss of consumer confidence in the water supplied by the system. In addition, the ABPA 1999 study showed specific examples of backflow incident clean up costs of \$117,000 (Charlotte-Mecklenberg) and \$200,000 (Ziratec). The AWWARF 2002 study showed an average of 3.3 documented incidents per system for each 5 year period over 30 years. The water system investment of running a CCC program leads to a better protected distribution system and helps eliminate contaminants from inadvertently entering the distribution system and will benefit public health as well as limit the number of triggered assessments. The cost to fix sanitary defects is better addressed in a proactive CCC program as it is more economical to do the corrections in a scheduled or non-emergency scenario.

The ABPA 1999 study showed the average cost to run a CCC program from the State level. The study showed the average cost was 0.83 of a Full Time Employee (FTE). This investment of requiring water systems to have a CCC program leads to better protected distribution systems and helps eliminate contaminants from inadvertently entering the distribution systems which will benefit public health and reduce the number of assessments triggered and investigations required by state staff.

A 1993 U.S. General Accounting Office report *Drinking Water: Key Quality Assurance Program is Flawed and Underfunded* stated the review of 200 sanitary surveys, and a nationwide survey of states, identified inadequate cross-connection control programs as the most common deficiency. This indicates an overall lack of compliance where CCC programs are currently required and the deficiency has been recognized for at least 17 years. To further illustrate the lack of consistent enforcement, in 1999 EPA presented a position paper to the Disinfection ByProducts Federal Advisory Committee (DBP FAC). Even though this paper stated 96% (48/50) of the states have minimum CCC requirements in state codes, only 28% (14/50) of states require all systems to have CCC programs and yet in the EPA 2002 *Potential Contamination Due to Cross-Connections and Backflow and the Associated Health Risks* only 3 states (6%) conduct periodic reviews of CCC programs. The paper further states "State CCC programs vary widely because the regulations are placed in many various regulations; Drinking Water, Health Code, Policy Decisions of Utilities and Building Codes."

In conclusion, ABPA believes EPA can best provide for the improved protection of public health by mandating a CCC program for public water systems in the RTCR. EPA needs to remove the ambiguities of where a CCC program should be located and what a CCC program should contain. Mandatory verbiage as simple as "You shall have a CCC Program acceptable to the primacy agency" will go a long way to cause the current CCC programs to be enforced and those areas where no CCC program exists to be implemented. Enforcement of existing CCC programs and establishment of programs

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in areas with no existing programs will go a long way to protect public health. This will enable a proactive evaluation to find any unprotected cross-connections and cause the sanitary defects to be corrected before a contamination event occurs. If we can supply further information please call 1-877-227-2127.

Respectfully,

AMERICAN BACKFLOW PREVENTION ASSOCIATION

A handwritten signature in cursive script, appearing to read "Bruce Rathburn".

Bruce Rathburn
National President