Backflow Prevention and Cross-connection Control 3rd Annual Conference

Jefferson County Fairgrounds

Colorado Rural Water Training Room

Ute Water Conservancy District

Eagle River Water and Sanitation District

City of Durango Carnegie Building

May 1, 2018 Colorado Rural Water Conference 1:00 PM - 3:00 PM

Purpose:

The goal of this exercise is to engage with public water system operators and administrators with regards to emergency response actions associated with water quality complaints and potential backflow contamination events. IAPMO's Dr. Stu Asay, Denver Water's Brad McClintock CWP, along with CDPHE's David Dani & Jorge Delgado P.E. will guide conference participants through four contamination event scenarios. The participants will be divided into four groups where the groups will evaluate the scenarios and discuss and develop appropriate response actions. Each group will be assigned a lead for one scenario and provide a summary of response to other groups.

Moderators:

Dr. Stu Asay, Senior Director of Research Programs at IAPMO, stu.asay@iapmo.org

David Dani, Emergency Response & Capacity Coach Lead, david.dani@state.co.us

Jorge Delgado, P.E. Senior Field Engineer and BPCCC Specialist, jorge.a.delgado@state.co.us

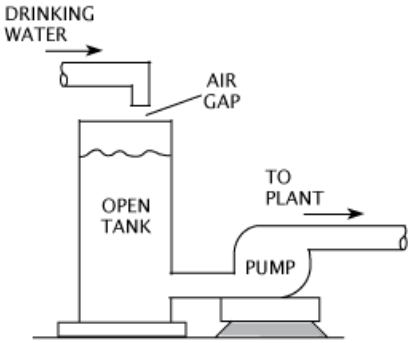
Brad McClintock CWP, Cross Connection Control Supervisor, Denver Water, brad.mcclintock@denverwater.org

Exercise Objectives & Benefits:

- Evaluate & assess four sample distribution system contamination scenarios
- Increase readiness & practice skills of response personnel & clarify roles and responsibilities
- Assess effectiveness of response plans and capabilities
- Network opportunity with other response agencies and partners
- Identify resource needs and opportunities for resource sharing
- Enhance backflow contamination event reporting knowledge
- Clarify special purpose bacteriological sampling reporting requirement

Agenda:

1:00 PM - 1:15 PM	Colorado Backflow Contamination Event History	Delgado
1:15 PM - 1:20 PM	Divide Into Four Groups	Delgado
1:25 PM - 1:30 PM	Small Introduction by Dr. Stu Asay, Jorge Delgado, David Dani. Brad McClintock	All
1:30 PM - 1:40 PM	Present Scenario 1 & Group Exercise	Delgado
1:40 PM - 1:45 PM	Group One Presents	Delgado
1:45 PM - 1:50 PM	Other Group Comments	Delgado
1:50 PM - 2:00 PM	Present Scenario 2 & Group Exercise	Asay
2:00 PM - 2:05 PM	Group Two Presents	Asay
2:05 PM - 2:10 PM	Other Group Comments	Asay
2:10 PM - 2:20 PM	Present Scenario 3 & Group Exercise	Dani
2:30 PM - 2:35 PM	Group Three Presents	Dani
2:35 PM - 2:40 PM	Other Group Comments	Dani
2:40 PM - 2:50 PM	Present Scenario 4 & Group Exercise	McClintock
2:50 PM - 2:55 PM	Group Four Presents	McClintock
2:55 PM - 3:00 PM	Other Group Comments	McClintock



Scenario 1 - Water Quality Control Compliant - Single Bldg.

Day 1 - Scenario 1

A mother of 2 toddlers calls the building inspection plumbing department complaining of kitchen tap water smelling musty. It looks cloudy in a clear glass. She believes the water made her kids sick. There is a delay of 3-4 hours providing the complaint to the water district that supplies water outside the city limits. Same water customer calls the water district the following day, stating that the children have stomach flu symptoms.

Potential Questions for Group:

- How is the complaint handled at the building department?
- How would your utility respond?
- What is the district's sampling protocol for this single family residence?
- What parameters are sampled for: chlorine residual, total coliform & fecal coliform (BacT's), organics, inorganics?
- Does your utility track complaints?
- Does your utility notify customers that if they are ill they should contact medical professionals?

Day 2 - Scenario 1

Chlorine residual results appeared low or near zero for the residence at the area so the supplier decided to pull a special Bac-t sample. This neighborhood is new construction. The family moved in approximately 3 months ago. After interviewing neighbors, no other complaints were provided. Chlorine residual at the hydrant downstream of the house appears normal.

Potential Questions for Group:

- What are potential causes for the low chlorine residual?
- How would your utility respond?
- What is the message to the customer? The neighbors?
- Does the supplier take measures against backflow?
- Does your utility sample for any other parameters?

Day 3 - Scenario 1

Bac-T sample comes back positive for E. coli. Supplier begins further investigation at property. Supplier notifies occupants to not drink the water and boil their water before consuming.

Potential Questions for Group:

- What are potential causes for the E. coli positive?
- Should the Supplier suspend the service to the connection?
- What resources are needed at this point?
- Does CDPHE need to be notified of a positive Bac T? Yes, but as a special purpose sample.
- Should the supplier continue to monitor for residual in the main?
- Is the Supplier required to collect additional BacT and E. coli samples? Yes, but as a special purpose samples.

Day 4 - Scenario 1

Due to debris in the service line ditch during construction, the line was kinked and punctured by a nail. The leak coupled with prolonged wet weather, the groundwater table submerged the leak allowing aspiration and bacteriological contamination into the service connection.

Potential Questions for Group:

- What resources are needed at this point?
- How does the district protect itself from litigation from such an event?
- Who is held responsible for this event?
- Does CDPHE need to be notified?
- Does the media need to be notified?
- Should the home be flushed and disinfected before it is brought back in to service?

Scenario 1 - Conclusions:

- Supplier should have better process in place to begin investigation on Day 1.
- Supplier needs to notify CDPHE of any positive E. coli sample in this case as a special purpose sample.
- Supplier has found a contaminated home and needs to take the appropriate measures to ensure that the home has been flushed and disinfected before it can be brought back into routine service. This may be contracted out or performed by the supplier. Safe water quality will need to be verified by a negative E. coli sample and chlorine residual samples.

Scenario 2 – Pressure Loss Compliant - Potential to Impact Distribution System

Customer A - Scenario 2

Water customer A calls the supplier stating there's a significant water pressure loss within the plumbing system and was wondering why. Supplier goes to investigate and the utility crew determines that customer A has good pressure at the street-side hose connection, but discovered the pressure provided a trickle flow from the kitchen faucet. There was no water quality complaint. Chlorine residual was adequate for the area.

Potential Questions for Group:

- What resources are needed at this point?
- What is the utility protocol for responding to low pressure complaints?
- Is the utility performing any DS work in the area such as hydrant flushing or main break repair?
- Could a fire response event near the area have occurred?
- Is this a contamination risk?
- Is the problem now an internal plumbing issue for the building inspector/plumbing contractor?

Customer B - Scenario 2

The utility crew noted that the customer had a water softener installed, and advised the customer to call a service tech for the softener. As the utility crew was leaving, the next door neighbor (customer B) reported that some chemicals had 'disappeared' from his mixing tank in the yard via what he suspected the yard hose he was using to fill the mixing tank, essential confirming a backflow contamination event.

Potential Questions for Group:

- What resources are needed at this point?
- Who is held responsible for this event?
- Does sampling need to occur and for what parameters?
- Does CDPHE need to be notified? Does the public need to be notified? Does the media?
- Should the area impacted be flushed and disinfected before it is brought back in to service?

Customer A & B - Scenario 2

Customer B was mixing 2-4D when, due to a loss of pressure, pesticides siphoned into the main. As Customer A used water the contaminated water passed through the softener, a floc was formed which resuled in a plugged softener media. The hose connection was a yard hydrant directly connected to the main.

Scenario 2 - Conclusions:

- Supplier has identified an uncontrolled cross connection to the main and must control with a minimum hose bib vacuum breaker a backflow prevention assembly or remove the yard hydrant.
- Supplier must take appropriate action to flush the impacted area.
- Supplier must notify potentially impacted customers of contamination event and issue bottled water advisory
- Supplier must notify CDPHE of a confirmed backflow contamination event.

Scenario-3 - Chemical Backflow Contamination Event – Impact to Localized Area

Day 1 - Scenario 3

At 10:00AM, the utility taste and odor complaint office starts receiving calls regarding the water smelling and tasting like gasoline. During the next 3 hours, 22 complaints are received from a service area of 4 city blocks. The utility staff is limited due to a repair of a 12" main break near a chemical company. Several crews are flushing through hydrants to remove sediment resulting from the break.

Potential Questions for Group:

- What resources are needed at this point?
- What response will the utility provide to assess the contaminant?
- How far out does the sampling occur and for what parameters?
- Does CDPHE need to be notified? Does the public need to be notified? Does the media? How about the local health department? What do you tell them? Does your utility have agreements between one another to help in a potentially large-scale water quality incident?
- Does the Utility issue a localized bottled water advisory or a utility wide bottled water advisory?
- How does the Utility issue a bottled water advisory? Who is the public face?
    - Reverse 911, door to door to immediately impacted areas, multi-lingual communication
    - Social Media, Facebook, Twitter, Instagram
    - News Outlets, Radio , TV, Newspaper
    - Signage in and out of the impacted area.
- Does the utility have the authority to inspect service connections for cross connections?

- Does the supplier begin to provide bottled water to the impacted area?
- Responders and operators are tired in the community. Is there a way to give them some relief?
- Does the supplier set up an incident command center? Who is in charge?

Day 3 - Scenario 3

Two days later, it was discovered that the chemical company had an indirect cross connection to an oil-based contaminant. The service connection to the chemical company had been surveyed but not controlled within 120 days. The oil-based substance adhered to the interior pipe surface. Super chlorination or flushing would not remove the contaminant from the distribution or plumbing systems. Replacement will be necessary.

Potential Questions for Group:

- Has the contamination event been mitigated? Has the contamination stopped?
- Has the service connection been either controlled or removed?
- Should the supplier work with the chemical company to identify the parameters to sample?
- Who pays for the repairs/replacement and who over sees the repair work?
- Is the bottled water advisory still in effect and who continues to provide bottled water?
- Can the supplier flush contaminated water into the street, storm drain or water of the state?
- How will response be coordinated with the building officials, county & state health dept.?
- Has a violation occurred?

Scenario 3 - Conclusions:

- Supplier has identified an uncontrolled cross connection to the main and must control the service connection to the chemical company within 120 days or within ten days of being ordered by CDPHE.
- Supplier must disposed of contaminated water accordingly. Supplier must disposed of impacted infrastructure accordingly.
- Supplier must verify that all non-single-family-residential service connections must be surveyed and controlled in required.
- Supplier needs to identify the reason that control was not required.
- CDPHE could issue a violation against the supplier.
- Supplier and Chemical Company should continue to provide bottled water and work with CDPHE to determine the appropriate amount of sampling and work that will be required to remedy the situation and suspend the bottled water advisory.
- Large Scale events supplier may rely on resources such as CO WARN
- The supplier wants financial relief from lost revenue during the incident. What do they need to do and who do they go to. May not be able to recoup if it was the suppliers fault.

Scenario 4 –Bacteriological Backflow Contamination Event – Impact to Full Distribution System

Day 1 - Scenario 4

The mayor's office begins receiving calls from medical offices and hospitals throughout town regarding illness resulting from e-coli. The water supply is suspected, but after discussing water quality with the plant operator, it was learned that the chlorine residual leaving the plant was 0.6ppm. The following day, a wastewater collection crew discovered a ruptured pump seal in a lift station wet well. This lift station uses potable water for pump seal water.

Potential Questions for Group:

- Has the contamination event been mitigated? Has the contamination stopped?
- Has the service connection been either controlled or removed?
- What is the communication link between the water and wastewater staffs that would provide this information to the distribution crews?
- What type of sampling is performed?
- Does the supplier begin to immediately flush and disinfect the area? What is the treatment protocol? And what parts of the DS?

Day 2 - Scenario 4

Due to the distance from the water treatment plant to the lift station, the pipe material/aging reduces the chlorine residual significantly. Indeed, there is very little if any residual. CDPHE and CO-WARN are both advised that raw sewage had been introduced into the distribution system for an unknown period of time. A request is made for assistance and staff to flush and disinfect the distribution system.

Potential Questions for Group:

- What resources are needed at this point?
- What response will the utility provide to assess the contaminant?
- How far out does the sampling occur and for what parameters?
- Does CDPHE need to be notified? Does the public need to be notified? Does the media? How about the local health department? What do you tell them? Does your utility have agreements between one another to help in a potentially large-scale water quality incident?
- Does the Utility issue a boil water advisory or a bottled water advisory?
- How does the Utility issue a bottled water advisory? Who is the public face?
    - Reverse 911, door to door to immediately impacted areas, multi-lingual communication
    - Social Media, Facebook, Twitter, Instagram
    - News Outlets, Radio , TV, Newspaper
    - Signage in and out of the impacted area.
- Does the supplier begin to provide bottled water to the impacted area?
- Responders and operators are tired in the community. Is there a way to give them some relief?
- Does the supplier set up an incident command center? Who is in charge?

- How does the utility protect itself from future litigation?
- Can the supplier flush contaminated water into the street, storm drain or water of the state?
- How will response be coordinated with the building officials, county & state health dept.?
- Has a violation occurred?
- How would the water provider learn about the sicknesses?
- How would your system investigate a possible E.coli outbreak where drinking water could be the cause?

Scenario 4 - Conclusions:

- Supplier has identified an uncontrolled cross connection to the main and must control the service connection to the chemical company within 120 days or within ten days of being ordered by CDPHE.
- Supplier must flush and disinfect the impacted areas accordingly. Supplier must disposed of contaminated water accordingly. Supplier must disposed of impacted infrastructure accordingly. Supplier must dispose of highly chlorinated water appropriately.
- Supplier should continue to provide bottled water and work with CDPHE to determine the appropriate amount of sampling and work that will be required to remedy the situation and suspend the bottled water advisory.
- Supplier must verify that all non-single-family-residential service connections must be surveyed and controlled including all waterworks and wastewater service connections.
- Supplier needs to identify the reason that control was not required.
- CDPHE could issue a violation against the supplier.
- For large scale events, supplier may rely on resources such as COWARN.
- The supplier wants financial relief from lost revenue during the incident. What do they need to do and who do they go to. May not be able to recoup if it was the suppliers fault.