SAN BERNARDINO COUNTY

Public Health

Environmental Health Services

Wildfire Best Practices for Water Systems

December 2020

During a wildfire, water system piping and infrastructure may become contaminated with benzene and other volatile organic chemicals (VOC). This type of contamination appears when several factors occur:

- Depressurization coupled with open or burned water lines
- Entry of smoke into open water lines
- Heating and burning of plastics and synthetic distribution materials
- The timing of the these factors

When contamination is suspected, water systems should unidirectionally flush their water lines as soon as possible. The use of multiple cycles or continual unidirectional flushing is strongly encouraged.

There is generally no way to tell where contamination occurs without performing specialized VOC testing. Each situation is unique and must be evaluated individually. During a wildfire, water systems may consider the following four scenarios to determine how to respond.

Scenario One

Structure loss (or physical damage) with depressurization: This unique situation requires extra caution. Water systems experiencing this situation, may be at risk of VOC contamination and must unidirectionally flush their water system when repressurizing and refilling water lines to limit potential contaminant migration. A "Do Not Drink-Do Not Boil" notice should be issued until repeated sampling indicates that the system is free of contaminants. The system must sample for coliform bacteria, disinfectant residual, physical parameters and nitrate. VOC testing using Method 524.2 is also highly recommended.

Scenario Two

Structure loss (or physical damage) with pressure maintained: Damage to water system components could cause localized contamination. Physically damaged system components must be immediately isolated and when possible replaced, unidirectionally flushed (multiple cycles preferred) and assessed on a case by case basis as to whether VOC sampling should be performed.

Scenario Three

No structure loss (or physical damage) with depressurization: Contaminants could have entered empty water lines through tanks, cross-connections or unidentified leaks (e.g. smoke, ash, auxiliary water supplies, groundwater contaminants, etc.). The system must be immediately unidirectionally flushed upon repressurization (multiple cycles preferred) and assessed for damages. The water system must perform necessary water quality sampling, including coliform bacteria, residual disinfectant, physical parameters and nitrate.

Scenario Four

No structure loss (or physical damage) with pressure maintained: If normal operations were maintained and no physical damage occurred, it is unlikely the water system was contaminated. If the water system was unattended for some period (e.g. under evacuation), it may be advisable to collect baseline water quality samples (coliform bacteria, disinfectant residual, physical parameters) as these samples could help to identify any unanticipated problems.

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EHS-FLR-LUPP-002-WT MM:ES

Note

Physical damage to any water system components may exist without the water system experiencing pressure loss. As a result, the water system may wish to sample for VOCs. Experimental data has shown that the heating and burning of plastics may contribute to VOC contamination. Pipelines or water system components that are heated or physically damaged by fire, should be removed and replaced as soon as possible. Unidirectional flushing is encouraged as much as possible in all circumstances.

Sampling

If contamination is suspected as the result of a damaged water main and/or service line, design a representative sampling plan to perform an initial investigation of the damage and contamination. Water mains, appurtenances (physical components that support the function of a pipeline during its operation) and service lines should be evaluated. When depressurization occurs, service lines supplying destroyed structures must be either sampled for VOCs (until determined to be free of contaminants) or replaced. The sampling plan must be adjusted as results come in.

Conducting Specialized VOC Sampling

A specialized method of VOC sampling is required following a wildfire. It takes time for contaminants to desorb from the pipes and dissolve back into water, thus a period of stagnation (no movement or flow of water) is needed. Experimental data shows that 72 hours is the optimal stagnation time, however, 24 or 48 hours may be used as an initial indicator.

Instructions for Specialized VOC Sampling

Use an Environmental Laboratory Accreditation Program-certified laboratory for VOC analysis (Method 524.2). If water is chlorinated, discuss using a dechlorinating agent (ascorbic acid is preferred) with the laboratory. Perform at least one round of unidirectional flushing prior to collecting samples. Stagnate water for an appropriate amount of time, after flushing (see *Conducting Specialized VOC Sampling* block above). When collecting the VOC sample, discard enough water (minimum one cup) to avoid sampling water that may have settled around fittings, gaskets, etc. When filling the vial, use a low flow of water so chemicals inside the vial do not spill out.