Volcanic ashfall impacts on water supplies: briefing note

Volcanic ashfall can have serious effects on water supply systems. Systems with intakes on streams and rivers are particularly vulnerable. In some cases, water treatment plants may have to slow down or stop production to remove ash from the treatment train. Water restrictions may need to be imposed on customers, and alternative supplies, such as bottled water, may need to be provided.

Water demand is likely to be high during ash clean-up operations and, if unchecked, may lead to shortages. During clean-up, the public should be advised to shovel the ash, and to lightly dampen ash surfaces before sweeping to reduce the hazard of breathing airborne ash. As far as possible, try to conserve treated water supplies. Information on personal protection during ashfall clean-up is available at ivhhn.org/ash-protection.

While ash can impact water quality by adding some soluble elements, this is a secondary consideration after water quantity (having sufficient water per person per day for drinking, cooking, washing dishes, hand washing) and microbiological safety of drinking water. The risks posed by waterborne pathogens are more immediate and serious.

Disinfection of water supplies at the household level is strongly recommended, as microbiological safety of drinking water is the priority concern. Options for disinfection include filtration (e.g., through a membrane filter), adding chemical disinfectant such as bleach, or boiling. If the water is visibly cloudy, the suspended solids need to be reduced by settling or filtering prior to disinfection.

Some customers may report unusual metallic tastes in tap water following ashfall. This is almost always due to elevated concentrations of iron, aluminium, manganese and/or zinc, which are not of health concern as their guideline values in drinking water are based on taste and nuisance thresholds. As drinking-water guidelines for most potentially toxic elements are based on a lifetime's exposure to those concentrations, short-term increases are not necessarily of public health concern.

However, as the public are commonly concerned about water contamination by ashfall, rapid analyses of drinking water are recommended. The main element of health concern from ashfall is fluoride (F). Turbidity, pH, aluminium, iron, manganese, zinc, copper and fluoride are recommended for testing and, if resources allow, arsenic, barium, cadmium, chromium, mercury, nickel and lead. These recommendations are based on experience from volcanic eruptions worldwide. Local response efforts should be informed by direct testing of ash and water. IVHHN has a leachate protocol designed for assessing the leachable elements from volcanic ash.

Results should be communicated to the public in a timely manner. It is unknown how long an eruption will continue, and repeat testing may be necessary.

Summary of actions for emergency managers and public health officials:

- Dampen ash if sufficient water is available, otherwise encourage dry ash clean-up methods (shovelling or sweeping ash rather than using a hose). Conserve treated water supplies and use untreated water where wetting is required for clean-up.
- Provide alternative water supplies such as bottled water to households in need.
- Initiate rapid analyses of drinking-water and communicate results to public in a timely and informative manner.
- Reinforce advice to public to disinfect water supplies; advise on methods for doing so and provide equipment and/or supplies for disinfection.

For water supply managers:

For concise, evidence-based advice on how to prepare for, respond to and recover from volcanic ashfall, see the poster for water treatment plant managers here: https://www.gns.cri.nz/Home/Learning/Science-Topics/Volcanoes/Global-Ash-Impact-Posters

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