

VOLCANIC ASH FALL

Advice for WATER SUPPLY MANAGERS

Fresh water supply and wastewater collection and treatment become vulnerable during a volcanic ashfall

General Impacts

- > Changes to water quality in raw water sources.
- > High water demand during the cleanup phase, which can in turn lead to water shortages.
- > Cause operational problems for water treatment plants.

TYPICAL EFFECTS OF ASHFALL ON THE QUALITY OF SURFACE WATER BODIES

Turbidity

Ash suspended in water will increase turbidity in lakes, reservoirs, rivers and stream. Very fine ash will settle slowly and residual turbidity may remain in standing water bodies. In streams, ash may continue to be mobilised by rainfall events, and lahars may be a hazard in some regions.

Acidity (pH)

Fresh ashfall commonly has an acidic surface coating. This may cause a slight depression of pH (not usually below pH 6.5) in low-alkalinity surface waters.

Potential toxic elements

Fresh ash has a surface coating of soluble salts that are rapidly released on contact with water. The most abundant soluble elements are typically Ca, Na, K, Mg, Al, Cl, S and F. Compositional changes depend on the depth of ashfall and its 'cargo' of water-soluble elements; the area of the catchment and volume available for dilution; and the pre-existing composition of the water body.

In rivers and streams, there will be a short-lived pulse of dissolved constituents

In lakes and reservoirs, the volume is usually large enough that changes in composition are not discernible

The constituents most likely to be elevated above background levels in natural waters are Fe, Al and Mn, because these are normally present at very low levels. Thus water is likely to become unpalatable due to discolouration or a metallic taste before it becomes a health hazard.

WHERE TO FIND WARNING INFORMATION (ASH CLOUD FORECAST)

The Volcano Ash Advisory Centre (VAAC) or the USGS Volcano Observatories will issue volcanic advisories and graphics forecasts on ash in the atmosphere affecting aviation.

Current Volcanic Ash Advisories – Washington VAAC <http://www.ssd.noaa.gov/VAAC/messages.html>

Current Volcanic Ash Advisories – Alaska VAAC <http://vaac.arh.noaa.gov>

Current Alerts for U.S. Volcanoes - USGS <https://volcanoes.usgs.gov/vhp/updates.html>

Advice for **WATER SUPPLY MANAGERS**

An increased water demand is extremely common following an ashfall, as the cleanup phase begins.



Cleaning filter beds at Bariloche WTP, Argentina after June 2011 eruption of Cordon Caulle, Chile when 30-45 mm ash fell locally. Ash enters sand filter from direct fallout and through intake.



Water supply reservoir in Hunua Ranges, Auckland. Reservoirs are relatively insensitive to changes in composition from volcanic ashfall, because of the large volume of water.

HOW TO PREPARE

- > At-risk water treatment plant should ensure that their emergency response plans include provision for ashfall events, including site cleanup.
- > The plan should have procedures for incorporating up-to-date information from USGS into operational decisions.
- > Where possible, use alternative, non-potable sources of water for cleanup and firefighting. Do not use recycled wastewater (e.g. treated effluent) for these purposes.
- > Encourage cleanup using brooms and shovels rather than hoses.
- > Anticipate increased maintenance schedule: review stocks of essential items.
- > Ensure access to back-up power generation.

HOW TO RESPOND

- > Close intake before turbidity levels become excessive
- > If necessary adjust coagulation/flocculation dosage to remove excess turbidity
- > Consider covering open filter beds and clarifiers
- > Protect other exposed equipment such as electrical control panels
- > Maintain a clean site to reduce contamination.
- > Ensure regular monitoring of turbidity, pH, chlorine residuals and indicator bacteria in distribution network.
- > Be aware of the possibility of pH depression in low alkalinity water sources and adjust any pH-sensitive treatment steps as required.
- > For treatment processes that do not include pH adjustment, remind consumers of the need to flush their taps briefly before drawing water.

ADDITIONAL INFORMATION

- > <https://volcanoes.usgs.gov/ash/index.html>
- > <http://www.ssd.noaa.gov/VAAC/messages.html>
- > Primary source: https://volcanoes.usgs.gov/volcanic_ash.html



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