ADVICE FOR WATER SUPPLY MANAGERS

VOLCANIC ASH IS: HARD, HIGHLY ABRASIVE, MILDLY CORROSIVE AND CONDUCTIVE WHEN WET.

ASH IMPACTS ON DRINKING WATER TREATMENT

A VOLCANIC ASH FALL CAN:
• Increase turbidity in raw water sources
• Create high water demand during the cleanup phase.
• Cause operational problems for water treatment plants.

IN GENERAL, THE MAJOR EFFECT OF ASH FALL ON RAW WATER SOURCES IS LIKELY TO BE INCREASED TURBIDITY RATHER THAN CHANGES IN CHEMICAL COMPOSITION.

EFFECTS OF ASH FALL ON RAW WATER SOURCES

In general, the major effect of ashfall on raw water sources is likely to be increased turbidity rather than changes in chemical composition.

TURBIDITY

- Ash suspended in water will increase turbidity in raw water sources. Very fine ash may settle slowly and residual turbidity may remain in standing water bodies. In streams, ash may continue to be remobilised by rainfall events, and lahars may be a hazard in some regions.

ACIDITY

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

POTENTIALLY 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, S and Cl, followed by Mg, K, Al, Si, Fe and F. Compositional changes depend on the ash surface chemistry, the amount of ashfall and the dilution volume.
  • In streams, there will be a short-lived pulse of dissolved constituents.
  • In lakes and reservoirs, the volume of dilution is usually large enough that compositional changes are not discernible.

The constituents most likely to be elevated above background levels are Fe, Mn and Al. Thus water is likely to become unpalatable due to discoloration or a metallic taste before it becomes a health hazard.

WATER DEMAND

HIGH DEMAND FOR WATER TYPICALLY OCCURS AFTER AN ASH FALL DURING THE CLEANUP PHASE.

Demand may remain high for months afterwards if water is needed to dampen down wind-remobilised ash.

EFFECTS ON TREATMENT PLANTS

Volcanic ash can enter sand filter beds both from direct fallout, and through the intake. Cleaning of filter beds creates heavy additional labour demands, such as at Bariloche WTP following the June 2011 Puyehue-Cordon Caulle eruption (below).

WHERE TO FIND WARNING INFORMATION

See www.geonet.org.nz for ashfall forecasts in the event of an explosive eruption.

HOW TO PREPARE

PLANNING

At-risk water treatment plants should ensure that their PHRM procedures provide for ashfall events, including site cleanup. The plan should have procedures for incorporating up-to-date information from Geonet into operational decisions.

Anticipate increased water demand following an ashfall. 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

Take precautions to exclude ash:
• Close intake before turbidity levels become excessive.
• If necessary adjust coagulation/floculation 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.

Public anxiety about contamination of water supplies is common after a volcanic eruption. Refer consumers to the Drinking-Water Assessor at the Public Health Unit of your local DHB.

THE FOLLOWING RESOURCES PROVIDE FURTHER INFORMATION ON VOLCANIC HAZARDS:

http://www.geonet.org.nz
http://www.gns.cri.nz
http://volcanoes.usgs.gov/ash/
http://www.ivhhn.org
http://www.19live.org

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30 January 2013