

IMPACTS ON WASTEWATER COLLECTION AND TREATMENT SYSTEMS

VOLCANIC ASH

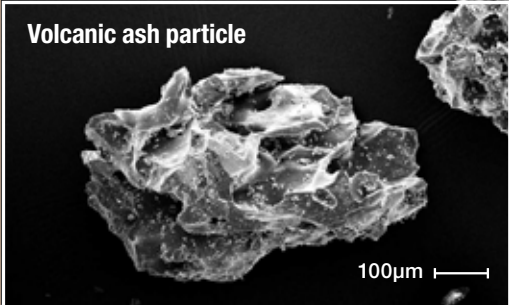
RECOMMENDED ACTIONS

ADVICE FOR WASTEWATER MANAGERS

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

VOLCANIC ASH CAN CAUSE SERIOUS DAMAGE TO WASTEWATER TREATMENT PLANTS.

- Cities with combined stormwater and sewer lines are particularly at risk
- Ash will enter sewer lines where there is inflow or infiltration (through illegal connections, cross connections, gully traps, manhole covers, cracks in sewer pipework etc).



SYSTEM COMPONENT	IMPACTS OF VOLCANIC ASHFALL
Sewerage pumping network	<ul style="list-style-type: none">• Ash may form unpumpable masses in sewer lines and catchpits which may cause blockages and overflows.• Ash in sewer lines will cause accelerated damage to pump impellers (pitting and thinning of metal).• Ashfalls can cause power outages which will affect pumping stations without backup generation. Lack of pumping can lead to overflows if storage capacity is exceeded.
General effects on plant	<ul style="list-style-type: none">• Expect accelerated wear and tear on pump components (pistons, impellers, seals, etc).
Pre-treatment equipment	<ul style="list-style-type: none">• Ash may damage comminutors and grit classifiers.• Coarse (>1 mm) ash is likely to block mechanical screening equipment, overloading motors and gear boxes. <p>Mechanical pre-treatment equipment is highly vulnerable to damage from ash-laden raw sewage. To avoid serious damage, consider bypassing treatment plant.</p>
Primary settling tanks	<ul style="list-style-type: none">• Coarse ash will increase volume of sludge for disposal.• Ash will change the proportion of organic to inorganic matter entering the plant.
Secondary treatment	<ul style="list-style-type: none">• Ash will enter open reactors and tanks from direct fallout but the main ingress is likely to be through the sewer lines.• The main effect is likely to be reduced capacity (due to ash accumulation on tank floors) rather than interference with bacterial processes.• Cleaning reactors while operational is difficult.
Tertiary treatment	<ul style="list-style-type: none">• Any residual very fine ash may increase suspended solid load of effluent, which may interfere with disinfection.
Sludge treatment	<ul style="list-style-type: none">• Expect an increased mineral content of sludge.

CASE STUDY: CITY OF YAKIMA, WASHINGTON STATE, USA

Volcanic ash can cause serious damage to wastewater treatment plants. The City of Yakima, Washington State, USA, sustained US\$4 million (1980 value) damage to its plant following the 1980 eruption of Mt St Helens volcano which deposited approximately 10 mm of sand-sized ash on the city. This was primarily due to damage to the mechanically-cleaned bar screen and grit classifier.



Ashfall will cause accelerated wear and tear on sewage pump impellers (metal pitting and thinning)



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 wastewater treatment plant should develop operational plans for ashfall events, including site cleanup. Plans should include provision for:

- incorporating up-to-date information from GeoNet into operational decisions;
- monitoring the presence of ash in raw sewage;
- monitoring torque on motor-driven equipment;
- shutting down non-essential equipment;
- covering exposed equipment such as HVAC systems, switchboards and electric motors to protect them from airborne ash;
- limiting the ingress of ash into buildings;
- equipment and labour requirements for site cleanup; and
- coordination with local and regional emergency plans.

Review stocks of essential items, as an ashfall may affect road and air transport.

Ensure access to back-up power generation, particularly for pumping stations

HOW TO RESPOND

Work with local authorities to limit ingress of ash into stormwater drains and sewer lines.

Step up preventive maintenance.

Be aware that increased maintenance and site cleanup will create significant additional labour demands.

Consider bypassing pumping stations and treatment plant as a protective measure to avoid severe and costly damage to pumping and pre-treatment equipment.



THE FOLLOWING RESOURCES PROVIDE FURTHER INFORMATION ON VOLCANIC HAZARDS:

- <http://www.geonet.org.nz>
- <http://volcanoes.usgs.gov/ash/index.html>

- <http://www.ivhnh.org>
- <http://vatlab.org>

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