Advice for

WASTEWATER MANAGERS

Impacts on collection and treatment systems

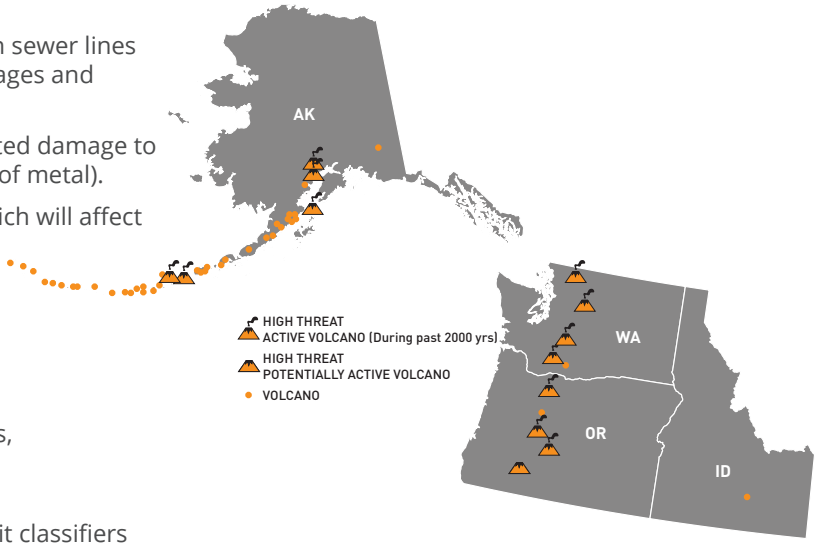
Cities with combined stormwater and sewer lines are particularly at risk. Ash will enter sewer lines where there is inflow or infiltration (through illegal connections, cross connections, gully traps, manhole covers, cracks in sewer pipework, etc.)

Sewerage pumping network

> 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

> Expect accelerated wear and tear on pump components (pistons, impellors, seals, etc).

Pre-treatment equipment

> Ash will damage comminutors and grit classifiers

> Coarse (>1 mm) ash will block mechanical screening equipment, overloading motors and gear boxes.

> **Mechanical pre-treatment equipment is highly vulnerable to damage from ash-laden raw sewage. To avoid serious damage, consider bypassing treatment plant.**

Primary settling tanks

> Coarse ash will increase the volume of sludge for disposal.

> Ash will change the proportion of inorganic matter entering the plant

Secondary treatment

> Ash will enter open reactors (biological 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 a reduction in capacity (due to ash accumulation on tank floors) rather than interference with biological processes.

> Cleaning reactors while the system is operational.

Tertiary treatment

> Any residual very fine ash may increase the suspended solid load of the effluent, necessitating adjustments to disinfection treatment.

Sludge treatment

> Expect an increased mineral content of sludge.

WHERE TO FIND WARNING INFORMATIONC (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

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VOLCANIC ASHFALL

Advice for WASTEWATER MANAGERS

Ash removed from drainage canal at Clark Air Base, Philippines, 1991 (USGS).

Yakima, WA sustained $4 million (1980 dollars) in damage to its plant following the Mt. St. Helens eruption, which blanketed the city in 10mm of ash. The most expensive damage included a mechanically-cleaned bar screen and grit classifier.

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 labor demands.

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

HOW TO PREPARE

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 labor 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.

ADDITIONAL INFORMATION

> https://volcanoes.usgs.gov/volcanic_ash/aviation.html

> http://www.ivhhn.org

> U.S. National Volcanic Ash Operations Plan for Aviation, 2007, http://www.ofcm.gov/p35-nvaopa/fcm-p35.htm=

> International Civil Aviation Organization, 2015, Manual on volcanic ash, radioactive material and toxic chemical clouds. Document 9691-AN/954, 2015, third edition.

> http://www.caa.govt.nz/

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