



Federal Emergency
Management Agency

FEDERAL
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OFFICE

MOUNT ST. HELENS TECHNICAL INFORMATION NETWORK

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LETIN #26 - "Volcanic Ash Effects on Municipal Water Supply and Sewage Treatment Plants"

WATER TREATMENT SYSTEMS

Ashfall associated with the eruptive events at Mount St. Helens has affected surface drinking water supplies in the states of Washington, Oregon, and Idaho. Fortunately, the ash appears to be relatively inert with no chemical toxicity apparent to date. A comparison of laboratory analyses indicates approximately the same distribution of elements in the volcanic ash as would normally be found in the earth's crust. A number of laboratories have also performed leaching tests on a variety of ash samples and none have indicated soluble chemical contaminants at concentrations great enough to exceed the MCL (Maximum Contaminant Level) for public water supplies.

However, the ashfall has caused physical problems in uncovered surface water systems. Some community and non-community systems have experienced periodic high turbidities although these have returned to normal in a few days. During periods when turbidities in water distributed to customers was over 10 Jackson Turbidity Units, "boil water advisories" were issued. Boiling the water is a prudent measure whenever turbidity which may interfere with the disinfection process occurs. Perhaps the most critical problem was that of water quantity. Many systems experienced exceptionally high demand as property owners and municipalities used water to clean up the ash and control dust. In fact, several

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systems experienced the highest water demand in their history, and severely compromised their reserves.

To address the turbidity problem, samples of the ash from different locations have been sent to EPA's research laboratory in Cincinnati. Early investigation indicates that there is no standard treatment which will work for all cases. Techniques based on addition of soda ash to raise the alkalinity to 30-40 mg/l, followed by the addition of 15-25 mg/l of alum will usually produce a good floc. Standard filtration procedures can then be used by systems operating full treatment facilities. Additional work is being done, with emphasis on "low technology" processes for application to or in open reservoirs. A major consideration is the change in physical ash characteristics, with the average particle size decreasing as distance from the mountain increases. The extremely small particles tend to remain in suspension and are very difficult to remove.

SEWAGE TREATMENT SYSTEMS

As with water treatment systems, the chemical characteristics of the ash do not appear to have a detrimental effect on the sewage treatment process. However, its physical characteristics (especially its abrasiveness) can cause excessive wear on mechanical equipment (i.e. pumps, aerators, grinders, valves) and piping. During periods of heavy ashfall, air blowers/compressors should be shut down and switch gear vacuumed or blown off before resuming operation. In addition, all gear cases should be flushed and clean new oil added. All grease bearings should be purged with the appropriate (clean) grease. Walkways and other hard surfaces (asphalt and concrete) around the plant should be washed off to eliminate dust which could damage mechanical equipment.

Those treatment plants which receive influent from a combined storm/sanitary sewer system will usually experience very large ash loadings into the plant during the time of municipal cleanup operations. If the treatment plant has no primary clarifier, the plant should be shut down and the influent bypassed directly to the receiving stream.* Otherwise, if at all possible, retain the primary clarifier and pump out the settled ash directly to normal sludge disposal.

Those treatment plants receiving influent from a sanitary sewer system can continue to operate if the plant has a primary clarifier. If not, shut off the air or mixing device in the aeration basin and allow the ash to settle; then remove to an ultimate sludge disposal. For lagoons, let the influent go in and keep operating, as the settled ash acts as an excellent sealant.

* EPA-Region 10 and the State Environmental Agencies have given regulatory guidance to municipal permittees to allow bypassing during ash emergency conditions.