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BULLETIN #15 - "Volcanic Ash And Your Water Supply"

As the nation's largest water resources data agency, the United States Geological Survey monitors the quantity and quality of the nation's water resources at more than 48,000 stations across the country. Reports received from the USGS main offices in Reston, Va., over the weekend indicate that there is no cause for alarm as to water purity in areas affected by the Mount St. Helens ashfall.

The chemical constituents expected to dissolve naturally from ash erupted from Mount St. Helens volcano and spread across Washington, Idaho, and Montana should not significantly affect water supplies, according to preliminary tests by the USGS, Department of the Interior.

USGS hydrologists have soaked ash samples collected in Spokane and Richland, Wa., and in Helena and Kalispell, Montana, in water for four hours and then analyzed the leachate (soaking water) for concentrations of about 70 soluble chemical elements and compounds. The test simulated the effects of 0.3 inches of rain falling on 0.5 inches of ash.

Dr. Jack Pickering, Chief, Quality of Water Branch, USGS National Center, Reston, Va., reports, "Based on the results so far, we do not believe domestic or livestock water supplies in areas that received 0.5 inches or less of ash are in danger of excessive chemical concentrations for most uses. We are less certain of the effects in areas that received heavier ashfalls and will continue to

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The USGS spokesman emphasized that the laboratory test results were designed to produce the "worst-case" results, that is, to produce the highest concentrations of chemicals in water draining through the ash. "Under natural conditions the concentrations would probably be much lower, but it is reassuring that even the extreme laboratory results were, for the most part, within acceptable limits for public drinking water supplies and other common uses of water in the Northwestern United States," Pickering said.

"Because the glassy volcanic rock is so much more soluble compared to harder, more crystalline rocks, the first water draining through the ash samples did contain concentrations that exceeded the water quality criteria for public water supplies for some constituents, including chloride, sulfate, fluoride, ammonium, cadmium, and selenium," he said. "Later soakings of the ash yielded much lower concentrations. Under natural conditions, reactions and resorption within the soil and dilution from other sources of surface or ground water would be expected to lower concentrations below the criteria levels."

"One potential source of annoyance might be excessive concentrations of manganese," Pickering said. "Manganese concentrations in the leachate were as much as 100 times higher than recommended levels for public water supplies. Such elevated concentrations of manganese can cause objectionable taste and stain laundry, but should not present a health problem. Under natural conditions, manganese dissolved by rainfall or runoff will probably be quickly resorbed by the soil, and concentrations in stream and ground water will be much lower than were found in the experiments."

The USGS results suggest that the ash may raise acidity levels slightly but probably not enough to damage crops. The pH of the leachate was about 5.0, only mildly acidic and only slightly higher than the average acidity of rain water in the Northwest, which has a pH of about 6.0.

Farmers in Eastern Washington have reported some damage to agricultural crops when light rain fell on ash-covered land. This damage is probably produced by high salinity--the small amount of water leaches the easily soluble chemicals from the ash producing high concentrations. Further precipitation or larger amounts of precipitation falling in one storm will eliminate this condition.

"Perhaps of equal concern to farmers are the high boron concentrations found in the water samples after soaking with the ash," the USGS spokesman said. "Boron concentrations were as much as 2.5 times the maximum recommended for long-term irrigation of boron-sensitive crops such as apples and some berries. Under natural conditions, however, it is doubtful that such extreme concentrations would reach the roots of these crops, particularly on irrigated land," Pickering said.

USGS hydrologists reported that the composition of the soaking water was about as expected for the solution of a glassy volcanic rock--high in the chemicals most abundant in surface- and ground-waters, such as calcium, sodium, sulfate, and chloride, and low in the metals that are normally present in trace concentrations.

Analyses of natural surface- and ground-water samples collected in the ashfall area have shown a slight increase in acidity in Washington streams and little such increase in Idaho or Montana

streams. The USGS now has more than 50 water-quality monitoring stations operating in a 5-state area and is routinely collecting rain-water samples at another 35 sites.