GUIDELINES ON PREPAREDNESS BEFORE, DURING AND AFTER AN ASHFALL

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This document has been prepared by the International Volcanic Health Hazard Network (IVHHN), Cities and Volcanoes Commission, GNS Science and the United States Geological Survey (USGS) to promote the safety of those who experience volcanic ashfall.

It details procedures to follow if warning of a volcanic ashfall is given, recommends what to do during ashfall, and what methods are most effective for cleaning up volcanic ash after the event.

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Essential items to stock before an ashfall

A sustained ashfall may keep people housebound for hours or even days. Keep these items in your home in case of an ashfall:

- Dust masks and eye protection (see IVHHN Recommended Masks document at www.ivhhn.org).
- Enough drinking water for at least 72 hours - one gallon (3-4 litres) per person per day.
- Enough non-perishable food for at least 72 hours for family and pets.
- Plastic wrap (to keep ash out of electronics).
- If available, a battery-operated radio and extra batteries.
- Lanterns or torches (flashlights) and extra batteries.
- If cold, extra wood for a fireplace or stove.
- If cold, extra blankets and warm clothing.
- Extra stocks of medication for both family and pets.
- First aid kit.
- Cleaning supplies such as a broom, vacuum cleaner with spare bags and filters, and a shovel.
- A small amount of money (as sources such as ATMs and banks may not be operating).
- Consider that you could be stuck in your vehicle, so store emergency supplies in your vehicle too.

Actions to be taken in preparedness

- Close doors and windows.
- Place damp towels at door thresholds and other draft sources. Tape draughty windows.
- Protect sensitive electronics and do not uncover until the environment is totally ash-free.
- Disconnect drainpipes/downspouts from gutters to stop drains clogging, but allowing ash and water to empty from gutters onto the ground.
- If you use a rainwater collection system for your water supply, disconnect the tank prior to ash falling.
- If you have chronic bronchitis, emphysema or asthma, stay inside and avoid unnecessary exposure to the ash.
- Ensure livestock have clean food and water.
- If you have children, know your school's emergency plan and have indoor games and activities ready.

What to do if volcanic ash is falling

- Don't panic - stay calm.
- Stay indoors.
- If outside, seek shelter (e.g. in a car or building).
- Use a mask, handkerchief or cloth over your nose and mouth.
- If warning is given before ashfall starts, go home from work.
- If at work when ashfall starts, stay indoors until the ash has settled.
- Do not tie up phone lines with non-emergency calls.
- Listen to your local radio for information on the eruption and clean-up plans.
- Do not wear contact lenses as these will result in corneal abrasion.
- If there is ash in your water, let it settle and then use the clear water. If there is a lot of ash in the water supply, do not use your dishwasher or washing machine. Water contaminated by ash will usually make drinking water unpalatable before it presents a health risk.
- You may eat vegetables from the garden, but wash them first.

Why should we clean up the ash?

Volcanic ash is a great nuisance and gets everywhere in the house and office, including inside televisions, computers, cameras and other valuable equipment, where it can cause irreparable damage. Ash is different from ordinary house dust. Its sharp, crystalline structure causes it to scratch and abrade surfaces when it is removed by wiping or brushing. In wet weather the ash deposits are dampened down and the air can be clear, but in drier weather ash can easily be stirred up and remobilised by wind and traffic. As a result suspended dust levels become much higher and can reach levels potentially harmful to health. Rainfall and wind are effective in removing the ash and grass and other plants will eventually bind it to the soil, but with large ashfalls this process is too slow and the ash must be cleaned up and taken away from populated areas. In addition, wind may also bring ash into areas which were previously clean so ash may be present in the environment for months or even years following an eruption.

What precautions should be taken before cleaning up ash?

Those undertaking clean up operations should always wear effective dust masks (see IVHHN Recommended Masks document). In fine-ash environments, wear goggles or corrective eyeglasses instead of contact lenses to protect eyes from irritation. Lightly water down the ash deposits before they are removed by shovelling, being careful not to excessively wet the deposits on roofs, causing excess loading and danger of collapse. Dry brushing can produce very high exposure levels and should be avoided. Use extra precaution on ladders and roofs. The ash makes surfaces much more slippery, consequently many people have died from falls while cleaning ash from their roofs. Be aware of the extra load caused by standing on an already overloaded roof - tread carefully. It is preferable to clean roofs before more than a few centimetres of ash have accumulated. Where possible use a harness.

Cleaning up: outside

Keep ash out of buildings, machinery, vehicles, downspouts, water supplies, and wastewater systems (for example, storm drains) as much as possible. The most effective method to prevent ash-induced damage to machinery is to shut down, close off or seal equipment until ash is removed from the immediate environment, though this may not be practical in all cases. Coordinate clean up activities with your neighbours and community-wide operations. After an ashfall, remove ash from roofs in a timely manner to prevent streets from being repetitively cleaned.

Cleaning up: outside

DO:

- Put on a recommended mask before starting to clean. If you don't have one, use a wet cloth. In dry conditions, wear eye protection (such as goggles) during clean-up.
- Moisten the ash with a sprinkler first. This will help to stop the wind remobilizing it.
- Use shovels for removing the bulk of thick deposits of ash (over 1 cm or so). Stiff brooms will be required to remove lesser amounts.
- Place the ash into heavy duty plastic bags, or onto trucks if available.
- Since most roofs cannot support more than four inches (10 cm) of wet ash, keep roofs free of thick accumulation.
- Volcanic ash is slippery. Use caution when climbing on ladders and roofs.
- Guttering systems clog very easily so, if fitted underneath your roof, sweep away from the gutters.
- Cut grass and hedges only after rain or light sprinkling, and bag clippings.
- Seek advice from public officials regarding disposal of volcanic ash in your community. In most cases, ash should be separated from normal rubbish for collection for disposal at a designated location - mixing ash with normal rubbish can result in damage to collection vehicles and take up space in landfills.

- Dampen ash in yards and streets to reduce suspension of ash, however try to use water sparingly - do not soak the ash. Widespread use of water for clean-up may deplete public water supplies. Follow requests from public officials regarding water use during clean-up operations.
- Remove outdoor clothing before entering a building.

DON'T:

- Do not soak the ash as it will cake into a hard mass, making clean-up more difficult. On roofs the added weight of the water will increase the risk of roof collapse.
- Do not dump the ash in gardens or on the roadside.
- Do not wash the ash into the guttering, sewers or storm drains. (It can damage waste water treatment systems and clog pipes).
- Do not drive unless absolutely necessary - driving stirs up the ash. Furthermore, ash is harmful to vehicles.

Cleaning up: inside

In general, surfaces should be vacuumed to remove as much ash as possible from carpets, furniture, office equipment, appliances, and other items. Portable vacuum systems equipped with high-efficiency particulate filtering systems are recommended whenever possible. The severity of ash intrusion depends on the integrity of windows and entrances, the air intake features, and the care exercised to control the transport of ash into a building or home via shoes and clothing. Care should also be taken to avoid further contamination during the emptying, cleaning, and maintenance of vacuum equipment. In hot climates, where windows are permanently open, or absent, clean up of houses may be needed several times per day. Clean-up inside should only be undertaken after the outside areas have been well cleared.

DO:

- Clean your house when public-works crews are cleaning the areas outside your house as a co-ordinated approach
- Put on your mask before starting to clean. If you don't have one, use a wet cloth.
- Ensure good ventilation by opening all doors and windows before you start to clean.
- Only use one entrance to the building while cleaning to ensure occupants do not bring in ash into clean areas.
- Use a dustless method of cleaning such as washing with water and an effective detergent/wetting agent. Damp rag techniques or vacuuming should be used whenever possible. After vacuuming, carpets and upholstery maybe cleaned with a detergent shampoo. Avoid excess rubbing action because the sharp ash particles may cut textile fibres.
- Glass, porcelain enamel and acrylic surfaces may be scratched if wiped too vigorously. Use a detergent-soaked cloth or sponge, and dab rather than wipe.
- High-shine wood finishes will be dulled by the fine grit. Vacuum surfaces and then blot with a wet cloth. A tack cloth used by furniture refinishers should also work well.
- Ash-coated fabrics should either be rinsed under running water and then washed carefully, or they can be taken outside and beaten to remove the ash.
- Soiled clothing will require extra detergent. Wash small loads of clothing, using plenty of water so the clothes will have room to move freely in the water. Brush or shake clothes before washing.

Cleaning up: inside

DO:

- Moisten thick ash deposits on hard floors and place in bags (avoid sweeping dry ash).
- Use a damp mop or wet cloth to clean hard floors.
- Clean your computer, TV and radio equipment using a vacuum cleaner or compressed air (see USGS guidelines (http://volcanoes.usgs.gov/ash/build/index.html#elec) on looking after electronics following an ashfall). Switch off the main power supply to the machine before carrying out this operation.
- For several months after an ashfall, filters may need replacing often. Air conditioner and furnace filters need careful attention. Clean refrigerator air intakes. Clean any surface that may blow air and recirculate the ash. Stove fans and vents should be cleaned thoroughly.
- Keep children indoors and discourage play in dusty settings.
- Keep pets indoors. If pets go out, brush them before letting them indoors.

DON'T:

- Do not use floor sweepers with side brushes to clear aisles and floors because they may re-entrain dust particles into the air.
- Do not clean by blowing with compressed air or dry sweeping as ash will be remobilised into the air.
- Do not use fans or electric clothes dryers which might remobilise ash.

Vehicles

- If possible, avoid driving. Ash is harmful to vehicles, the roads may be slippery and driving suspends ash into the air which causes low visibility and may be harmful or irritating to others.
- If driving is crucial, drive slowly, use headlights and ample windscreen fluid. Using wipers on dry ash may scratch the windscreen. In heavier ashfall, driving should only be undertaken in an emergency. Use water bottles and a cloth to clean the windscreen as required. This may be every few tens of metres.

- Change oil, oil filters and air filters frequently (every 50-100 miles (80-160 kms)in heavy dust; every 500-1000 miles (800-1600 kms) in light dust.
- Do not drive without an air filter. If you cannot change it, clean it by blowing air from the inside out. Do not change it until you notice a loss of power to the engine, as a dirty filter is more effective than a clean one.
- Cleaning your car - clean ash from inside your engine, boot/trunk and spare tyre storage area as well as the seating area. Brushing ash off the car can cause scratching.

Vehicles

- Have a service garage clean wheel brake assemblies every 50-100 miles (80-160 kms) for very severe road conditions, or every 200-500 miles (320-800 kms) for heavy dust conditions. The brake assemblies should be cleaned with compressed air.
- Have a service garage clean alternators with compressed air after heavy accumulation, every 500 to 1000 miles (800-1600 kms), or after severe dust exposure.
- Clean the vehicle, including the engine, radiator, and other essential parts daily, if necessary, using water to flush the ash.
- Wash the engine compartment with a garden hose or steam cleaner. Be sure to seal off air intakes and electrical components before cleaning.

Sources and further information

Further information on the logistics of cleaning up volcanic ash, applicable to companies, larger organisations and local governments, can be found on the United States Geological Survey website, at http://volcanoes.usgs.gov/ash

The International Volcanic Health Hazard Network (IVHHN) was founded in 2003, and is a group of experts who have a common aim of understanding and addressing the health effects of volcanic emissions. Expert members work in a range of disciplines such as volcanology, public health and toxicology. For further information, visit the IVHHN website (www.ivhhn.org). Many resources, such as a guide to recommended dust masks, are available on the website.

This guide is based on the following sources:

Residents' guide to the state of the Soufriere Hills volcano following the scientific assessment of July 1998 and the dangers of volcanic ash, with tips for cleaning up ash. Emergency Department, St Johns, Montserrat, West Indies, August 1998.

Volcanic ashfall: how to be prepared for an ashfall. USGS Cascades Volcano Observatory, Vancouver, Washington, November 1999.

Ash particles and home clean-up problems: advice from the University of Idaho. Mt. St. Helens Technical Information Network Bulletin 7, Federal Coordinating Network, May 1980.

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Preventive health measures in volcanic eruptions. By P.J. Baxter, American Journal of Public Health 76, pp 84-90, 1986..

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