Health Recommendations Update for Volcanic Emissions

Sulfur Dioxide gas (SO_2) and Fine Particulate ($PM_{2.5}$) Levels:

Sulfur dioxide gas is a primary air contaminant and fine particulate matter can be a primary or secondary air contaminant from volcanic emissions. Both these air pollutants may affect the respiratory and/or heart health of those exposed to elevated levels, especially those more susceptible such as children and the elderly, and those with pre-existing respiratory disease (e.g. asthma, emphysema, bronchitis) or heart disease.

USGS reports that SO_2 emission rates from Kīlauea volcano have been low since the eruption at Fissure 8 in Leilani Estates subsided, lower than measured since at least 2007 (before the Halema‘uma‘u eruption at the volcano summit in 2008). As a result, SO_2 gas levels measured at HDOH air monitoring stations in the Lower East Rift Zone and areas immediately downwind have also been low recently, indicated as a green color-code on air monitoring sites, meaning ‘good air-quality’. Similar to the SO_2 gas levels, fine particulate ($PM_{2.5}$) levels at monitoring stations downwind of the eruption sites have also been low since the eruption at Fissure 8 subsided (this includes monitoring sites in West Hawai‘i) and are generally in the green color-code ‘good air quality’ range on air monitoring sites now. There are other common sources of fine particulates in addition to volcanic emissions, such as smoke or dust, that could cause local/temporary elevations in $PM_{2.5}$ levels.

Recommendations:

- Listen to news from USGS and Civil Defense regarding any changes in volcanic emissions that could indicate significant increases in SO_2 and/or $PM_{2.5}$ in your area.
- Remember that gas emissions could suddenly increase in areas where recent eruptive vents are located. The closer you are to these recent eruptive vents, the more likely you could experience some change or increase in volcanic emissions, so stay alert to the potential smell of sulfur dioxide (burnt match or fireworks-like smell) or hydrogen sulfide (rotten egg smell) and to how the air quality may be affecting you. If you have breathing issues related to the air quality, limit time outdoors and stay indoors.
- If increases of SO_2 and/or $PM_{2.5}$ are identified as an issue in your area, check the air monitoring and vog forecasting sections on the Interagency Vog Dashboard (https://vog.ivhhn.org/) closely, and follow recommendations based on levels of these air contaminants (color-codes) for your area.

- Also follow any specific advice or warnings from Civil Defense or the Dept. of Health for your area.

Pele's Hair/Tephra:

Some areas close to the eruptive vents in the Lower East Rift Zone or close to the explosive events at the Summit may have been impacted by deposits of ejected Pele's Hair or Tephra. These materials are volcanic glass or sharp volcanic fragments that may present physical hazards/irritation to bare feet, eyes, and skin. In addition, if these materials are broken up and breathed in, irritation of the respiratory system or aggravation any existing respiratory problem could result. These materials should be cleared from catchment water systems to avoid consumption or physical damage to water pumps or related devices.

Recommendations: If these volcanic materials are present:

- Wear shoes as a precaution against cuts and avoid touching sharp materials with bare hands or getting on the skin.
- If you are performing tasks that could break these materials up, (e.g. mowing or weed-eating), wear skin and eye protection and an N-95 particulate mask (available at hardware stores and big box stores) to avoid potential exposure. Particulate masks commonly available are made to fit adults only, so are not appropriate to provide effective respiratory protection for children. See this resource for information on how to properly fit and wear an N-95 particulate mask: https://www.ivhhn.org/uploads/Leaflet_English.pdf
- Empty and clean out existing catchment tanks that may have been contaminated with Pele's Hair, Tephra, or ash.
- Make sure any previous deposits of these materials have been washed off your roof and out of your gutters, so they do not re-contaminate your catchment tank.
- If your roof and gutters contain these materials and are not washed off, keep the gutters disconnected from the catchment and fill your (cleaned) catchment using a water supply company, or use water from county water supply spigots/sources.
- If you are concerned about re-contamination directly into your catchment tank, cover it with a solid plastic layer, if needed.
- See the 'Water Catchment Systems' section of the Interagency Vog Dashboard (https://vog.ivhhn.org/catchment-systems) for additional resources regarding protection of water catchment systems.

Ash:

Ash is made up of tiny (less than 2 mm wide) volcanic rock and glass particles that have been ejected by volcanic eruptions/explosions. If you have remaining accumulations of ash on your property, re-suspension of that ash could result in a nuisance and cause discomfort (or worse) if breathed, deposited on your skin, or gets into your eyes. Because ash is made up of very small sharp particles, it could also scratch or abrade

surfaces when you wipe them off. Rainfall and wind are expected to remove ash from areas over time, and it will bind into soils.

Recommendations: If there are obvious ash residues left on your property or ash can be seen in the air from wind re-suspension in your area, take precautions to avoid exposure and clean up areas you are utilizing:

- Use an N-95 particulate mask, eye protection, and long-sleeves/pants to avoid breathing, eye, and skin contact during clean-up activities.
- Dampen ash in yards and on pavement to reduce suspension of ash. Sweep or scoop up dampened ash accumulations best you can into plastic bags for disposal.
- Water ash in yards to help incorporate it into the soil.
- Cut or weed-eat grass with ash accumulations after a light rain or dampening (wearing eye and skin and respiratory protection) and dispose of clippings in plastic bags.
- Wash ash off cars or other artificial surfaces (rather than wiping) to avoid scratching the surfaces.
- Wash off any ash accumulated on clothes during cleanup activities under running water before bringing them inside.
- See the recommendations for Pele's Hair/Tephra above for handling ash and catchment-related issues.
- Additional resources for addressing ash related concerns and protective measures can be found on the Interagency Vog Dashboard at these links:
    - http://www.ivhhn.org/ash-pamphlets
    - http://www.ivhhn.org/ash-protection

Note: Check the HVO USGS website 'Current Alerts' section for regular updates on the status of volcanic activity on the island https://volcanoes.usgs.gov/volcanoes/kilauea/status.html and the Interagency Vog Dashboard, https://vog.ivhhn.org/ Air Monitoring and Vog Forecasting Sections for the current status of air quality for the island.