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## County of Hawaii

### CIVIL DEFENSE AGENCY

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Talmadge J. Magno  
*Civil Defense Administrator*

July 18, 2022

Ms. Lori Kato  
Staff Attorney  
Office of Information Practices  
No. 1 Capitol District Building  
250 South Hotel Street, Suite 107  
Honolulu, Hawaii 96813

RE: Request for Assistance to Access Records (U RFA-P-23-01)

Dear Ms. Kato,

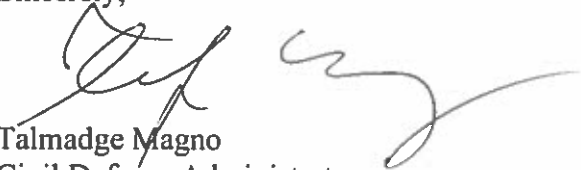
Enclosed please find Civil Defense Agency's response regarding request for assistance for access to the following records. Note that OIP letter dated July 7, 2022 was the first indication of Ms. Steiner's request and I offer my support to get her the information she seeks.

1. See attached electronic document; County of Hawaii, After Action Report, 2018 Kilauea East Rift Zone.
2. Upon a record check for email correspondence between Puna Geothermal Venture (PGV) and Hawaii County Civil Defense Agency (HCCDA) there were no messages found for the period May 1, 2018 to May 1, 2022 nor were there correspondence between any other entity and HCCDA regarding PGV.
3. There are no Notices from HCCDA on record to the Public to review and input PGV's 2020 and 2021 Emergency Response Plan.
4. PGV is permitted by the Department of Land and Natural Resources for drilling and regulated by the State of Hawaii Department of Health for air quality. HCCDA does not have the information pertaining to the location of the Hydrogen Sulfide Monitors.
5. And 8.\* See attached Hawaii County Civil Defense Geothermal Standing Operating Guidelines.
- 8\*. HCCDA SOG predates the 2018 Kilauea Lower East Rift Eruption and Lava Flows. The Chain of Craters Road was repaired in 2018 during the Eruption to serve as an escape route should the communities in this area become cut off from Highway 130 to Pahoa.

Ms. Lori Kato  
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If you have any questions, please feel free to contact me.

Sincerely,



Talmadge Magno  
Civil Defense Administrator

Attachments

County of Hawaii  
After Action Report  
2018 Kilauea East Rift Zone



## **PURPOSE**

The purpose of this After Action Report is to examine the actions of the County of Hawaii in response to the May 2018 volcano event to determine successes, challenges, lessons learned and recommendations. This report summarizes the After Action Report of the 2018 Kilauea East Rift Zone in respect to the County of Hawaii Emergency Management Program.

While responding to and recovering from any emergency presents challenges, organizations are also afforded the opportunity to take a close look at their response efforts and identify areas for improvement. Based on all the information received, findings were classified into three broad areas. Those categories are “worked well,” “needs improvement,” and “did not work.”

All items identified as opportunities for improvement are included in the Corrective Action Plan (CAP) attached to the AAR as Appendix 1. The items in this CAP have been assigned to the appropriate County agency for action. Hawaii County Civil Defense Agency (HCCDA) will monitor the actions taken to ensure the items in the CAP are all addressed according to the timeframe identified. Those items that worked well will be sustained and utilized in future incidents.

Although there were numerous organizations (Federal, State and DOD) that provided support to the response, the scope and focus of the After Action Report is on HCCDA and the county agencies that participated in the overall response from May to September. It is important to note that the report does not address the subsequent recovery operations that have taken place and continue to take place in Hawaii County.

## **METHODOLOGY**

Information for the After Action Report was compiled from several sources, including the following:

- an event chronology based on scribe notes, press releases, personnel feedback, and corroboration with partner agency timelines;
- facilitated interviews with personnel including: County staff, non-governmental organizations; Family and Community Services and Emergency Social Services personnel from across the county, external response organizations, and utility company personnel;
- collaboration on content development with County staff personnel; and
- fact-checking and feedback from relevant organizations on specific sections of the report.

## **LIMITATIONS**

The report was developed from the perspective of the County of Hawaii, with the goal of providing lessons learned and recommendations for the improvement of its Emergency Management Program. As

personnel led by an administrator focusing on the five mission areas of Prevention, Protection, Mitigation, Response, and Recovery. HCCDA has limited resources to manage Type III or greater incidents and without the assistance of partner agencies, the response will have significant limitations in duration and effectiveness. During this activation it became apparent that the County does not have enough personnel for large scale or extended emergency/disaster operations to staff both the EOC and field operations for a disaster response for an extended time. HCCDA managed the incident utilizing an ICS type structure but limited in data management process that can accept raw data inputs from the public and first responders to provide a product for decision makers assisting in utilization of resources in response to the emergency. The lack of an efficient data management affects the collection, processing, and dissemination of actionable information across the response.

The focus of the After-Action Report intends to identify and discuss areas of improvement needed to improve the effective and efficient response for future incidents. Three focus areas of the review are organization, data management, and communication. During the incident there was not complete failures of the three categories, however multiple breakdowns occurred during the incident due to ad hoc discussions, limited information sharing platforms, limited resources to develop a common operating picture which supports assigning resources, decisions, making and end state objectives.



### **What Worked Well**

- a. The County used the Integrated Public Alert & Warning System (IPAWS) for warning level public emergency messages as mandated by the Federal Government. The IPAWS combines the Emergency Alert System (EAS) with the newly developed Wireless Emergency Alert (WEA). The current County of Hawaii Policy sets a hierarchy of commercial public radio (EAS uses this medium), followed by a mass notification system (WEA is via cellular telephone; for non-warning level messages individuals must subscribe to our notification system to receive messages). Door-to-door notification was also used in areas at risk or that may not have been reached with the first two methods.
  - a. The current Mass notification did not assist in developing a geo location for personnel living in the affected area. We were not able to develop a text message system to assist in quickly identifying a keyword to follow to assist in scripted communication.
- b. A weekly community town hall meeting was scheduled almost immediately after the start of the event to provide information updates to the affected communities with county leadership and subject matter experts participating. As the incident continued, the conduct of the meetings evolved resulting in the County hiring a moderator to facilitate meetings and having them at a variety of locations and with different size groups.
  - a. The need for a public viewing procedure and media is essential in documenting the discussions as well as broadcasting to larger audiences. One example was to utilize Na Leo TV.

### **What Needs Improvement**

- a. The public need and demand for information during this event was overwhelming. A lot of inaccurate information was presented about the Event by both individuals in the media and by "trusted persons." Additionally, this unprecedented event was covered extensively on the National News. Although there were several Public Information Officers working in the EOC, a Joint Information Center (JIC) was never established to present a coordinated message to the media and public.
  - a. Creating and utilizing a plan of action that allows all messaging to cycle back to an authoritative county website with accurate information for persons seeking information.

## **Operational Coordination.**

### **What Worked Well**

- a. The County of Hawaii is not designed or staffed to manage an incident of this size. The solution to this lack of capability was to request a Type 3 Incident Management Team (IMT) to plan operations and to direct response via the Emergency Management Assistance Compact (EMAC) program. Personnel from other states brought in through the EMAC program did have the skills necessary to fill the gap at the County.
- b. County of Hawaii department personnel have behavior patterns that allow functionality during an incident with organic behaviors for success to operate within the current systems of reporting timesheets, locations, and completion of their current work requirements.

- b. The EOC did not utilize the common ICS process, "the planning P" during this complex incident that at times resulted in poor use of resources, inappropriate strategies and tactics, safety problems, higher incident costs, and lower effectiveness.
- c. When crews were returning to the FOB, there was little transfer/sharing of information/intel from returning crews which should have been provided to the EOC that could have been utilized in the creation of other missions or new alternatives to the response.

### **Infrastructure Systems.**

#### **What Needs Improvement**

- a. Emergency Support Function (ESF) 2, Communications (a state organization), played a role in attempting to establish and to maintain communications within the affected area. County Radio coverage and cellular telephone coverage were not optimal in the lower East Rift Zone before the incident. Losing communication infrastructure within the affected area only exacerbated the communication problem.

### **Critical Transportation.**

#### **What Needs Improvement**

- a. The State of Hawaii did not agree with the County's opinion of Highway 130 and Highway 11 (State Highways) as vital and necessary roadways. This disagreement led to the County providing maintenance on the State-owned roadways to facilitate public mobility during the incident.

### **Environmental Response/Health and Safety.**

#### **What Didn't Work**

- a. Safety visits of personnel in the field during the first two months identified numerous safety issues of personnel working near/at the incident location. This included complacent attitude of some staff as it relates to the threats and the actions they would take: proximity to the lava flows, work assignments being completed while not in close proximity to the atmospheric meters, speeding, and action levels on safety sheets not being complied with.

### **Mass Care Services.**

#### **What Worked Well**

- a. The Salvation Army provided food and other supplies (basic needs for the evacuees) to the shelters during the entire event, providing 100's of meals per day.
- b. There was a spontaneous grassroots outpouring of volunteers who set up locations to provide food, needed supplies to those who were being affected by the lava.
- c. Hawaii Disaster Assistance and Recovery Team (HIDART) was activated and was able to provide significant assistance including travel funding, rental assistances to residents affected by the eruption and subsequent evacuations.

#### **What Needs Improvement**

- a. VOAD was not a functional asset to organize the NGOs and allowed for development of HIDARRT in addition to organic response with no communication and coordination.

## **Operational Communications.**

### **What Worked Well**

- a. When the initial first responders were establishing the initial command post down range, the Fire Department was able to provide the Police and Public Works point of contact with a radio, so all would have a common radio. They were then able to use their own systems to convey information from the command post.

### **What Needs Improvement**

- a. There were some conductivity issues throughout the incident between the different responders (Fire, Police, Public Works) due to differences in the radios that were utilized as well as some agencies using cell phones for communication.
- b. Creating a radio network providing centralized communication for various departments responding to an incident versus allowing departments to communicate individually without knowing what the other department operating within the same evacuation, rescue or geographic area.

**Public Health, Health Care, and Emergency Medical Services.** Provide lifesaving medical treatment via Emergency Medical Services and related operations and avoid additional disease and injury by providing targeted public health, medical, and behavioral health support, and products to all affected populations.

### **What Worked Well**

- a. Some monitoring systems that had previously been deployed around the volcano to monitor volcanic gases were lost when power was lost in some locations due to the lava. The solution was to utilize portable monitors carried by individuals as well others that were moved and placed pending on the lava/volcanic activity during the day.
- b. Department of Health assisted in local community health concerns at the shelters and surrounding areas with regards to mental, physical, food safety, and communicable disease.

## **Situational Assessment.**

### **What Needs Improvement**

- a. During much of the event, use of the Incident Command System (ICS) was not used in theory and the EOC utilized a command and control type management system the emergency response to the volcano eruption, resulting in less than optimal management of the event, unclear chain of command, duplication of efforts, failure to capture all data and lack of an orderly, systematic planning process. All incident personnel need to be trained in a process that has a collective data collection and analyzation that prevents stove piping of decisions and information. One tool to assist this process is ArcGIS, which needs to be developed.
- b. Much of the EOC information/status/updates was only captured on white boards mounted in the EOC instead of having an effective electronic information process or sharing system using such common disaster products as WebEoc or products available to the EOC such as the Geospatial Information System (GIS) resulting in a disconnect with collecting, processing, and disseminating actionable information that could have assisted in the overall response during this event



Standing Operating Guideline No. HCCDA 26

HAWAII COUNTY CIVIL DEFENSE AGENCY

Geothermal Standing Operating Guidelines

- I. **PURPOSE:** This Standing Operating Guideline (SOG) prescribes how the Hawaii County Emergency Operations Center (EOC) will respond to incidents that originate from within the Puna Geothermal Venture (PGV) Plant located at 14-3860 Kapoho Paho Road, Paho, HI 96778. It establishes the task organization, threat and response levels, Emergency Support Function responsibilities, and the public information required to respond to a PGV incident.
- II. **APPLICABILITY:** This SOG applies to all Hawaii County Civil Defense Agency (HCCDA) personnel, all federal, state, and county departments and agencies responding to the incident and volunteers assisting with EOC operations.
- III. **SCOPE:** This SOG covers the incident from initial notification by PGV through the resolution of the incident.
- IV. **BACKGROUND:**
  - A. PGV has been in operation at its current location since 1993. During plant construction and well drilling the PGV experienced an uncontrolled release of steam on June 11, 1991 which resulted in levels of hydrogen sulfide (H<sub>2</sub>S) in close proximity to the release site above the current "Immediately Dangerous to Life and Health" (IDLH) level of 100 parts per million (ppm). (Note: the hydrogen sulfide levels did not exceed the 1991 existing IDLH of 300 parts per million).
  - B. The Geothermal Resource Permit GRP 87-1 requires PGV to monitor their well sites and the perimeter of the operation for hydrogen sulfide. The permit does not allow well sites and abatement structures within 600 feet of the perimeter. Per the 2016 "Emergency Response Guidebook" the initial isolation distance for a small spill is 100 feet and the initial isolation distance for a large spill is 1250 feet, which is mostly within the PGV boundary with the exception of the West end of the plant bordering Pohoiki (Paho Pohoiki) Road and part of the Lanipuna Gardens. The permit requires PGV to pay for the costs associated with an evacuation and requires the Hawaii County Civil Defense Agency to provide the public warning and public information for the incident.
  - C. The Department of Health (DoH) Permit to Operate provides the air quality levels with which PGV must comply. PGV cannot exceed 10 parts per billion (ppb) of H<sub>2</sub>S on a 24 hour rolling average or 25 ppb on a 1 hour average at or beyond the project boundary. The plant must cease operations if one of these conditions exist and cannot resume operations without DoH approval. PGV cannot be in

excess of 5 ppb above the background or ambient H<sub>2</sub>S level which ranges between 1 ppb and 4 ppb at the monitoring station located on Leilani Avenue in Leilani Estates. PGV cannot emit more than 70 decibels (dBA) at any time as measured at the nearest residence.

- D. Hydrogen sulfide (H<sub>2</sub>S) is a colorless, flammable, extremely hazardous gas with a "rotten egg" smell. The Emergency Response Guide identification number for H<sub>2</sub>S is 1053 and the guide number is 117. It occurs naturally in crude petroleum, natural gas, and hot springs. In addition, hydrogen sulfide is produced by bacterial breakdown of organic materials and human and animal wastes (e.g., sewage). Industrial activities that can produce the gas include petroleum/natural gas drilling and refining, wastewater treatment, coke ovens, tanneries, and craft paper mills. Hydrogen sulfide is heavier than air and may travel along the ground. It collects in low-lying and enclosed, poorly-ventilated areas such as basements, manholes, sewer lines, underground telephone vaults and manure pits.
- E. For persons working around hydrogen sulfide the Recommended Exposure Limit (REL) of 10 ppm time weighted average over an eight hour period is a National Institute for Occupational Safety and Health (NIOSH) limit and is not enforceable by law. The permissible exposure limit (PEL) of 20 ppm time weighted average over an eight hour period is an Occupational Safety and Health Administration (OSHA) limit and is enforceable by law. The immediately dangerous to life and health (IDLH) limit is 100 ppm time weighted average over one hour.
- F. Acute Exposure Guideline Levels (AEGLs) describe the human health effects from once-in-a-lifetime, or rare, exposure to airborne chemicals. Used by emergency responders when dealing with chemical spills or other catastrophic exposures. All levels are expressed as parts per million or milligrams per cubic meter (ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population could experience, including susceptible individuals:
  - 1. AEGL Level 1: Notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
  - 2. AEGL Level 2: Irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
  - 3. AEGL Level 3: Life-threatening health effects or death.

Final AEGLs for Hydrogen sulfide (7783-06-4)						
Exposure Period	AEGL-1		AEGL-2		AEGL-3	
	ppm	ppb	ppm	ppb	ppm	ppb
10 minutes	0.75	750	41	41,000	26	76,000
30 minutes	0.6	600	32	32,000	20	59,000
60 minutes	0.51	510	27	27,000	16	50,000
4 hours	0.36	360	20	20,000	13	37,000
8 hours	0.33	330	17	17,000	11	31,000

Table 1

G. Emergency Response Planning Guidelines (ERPGs) ERPGs estimate the concentrations at which most people will begin to experience health effects if they are exposed to a hazardous airborne chemical for 1 hour. (Sensitive members of the public—such as old, sick, or very young people—aren't covered by these guidelines and they may experience adverse effects at concentrations below the ERPG values.) A chemical may have up to three ERPG values, each of which corresponds to a specific tier of health effects.

1. ERPG-1: is the maximum concentration in air below which nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.
2. ERPG-2: is the maximum concentration in air below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action.
3. ERPG-3: is the maximum concentration in air below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

Chemical	ERPG-1	ERPG-2	ERPG-3
Hydrogen Sulfide (7783-06-4)	0.1 ppm (odor should be detectable)	30 ppm	100 ppm
	100 ppb (odor should be detectable)	30,000 ppb	100,000 ppb

Table 2

V. TASK ORGANIZATION:

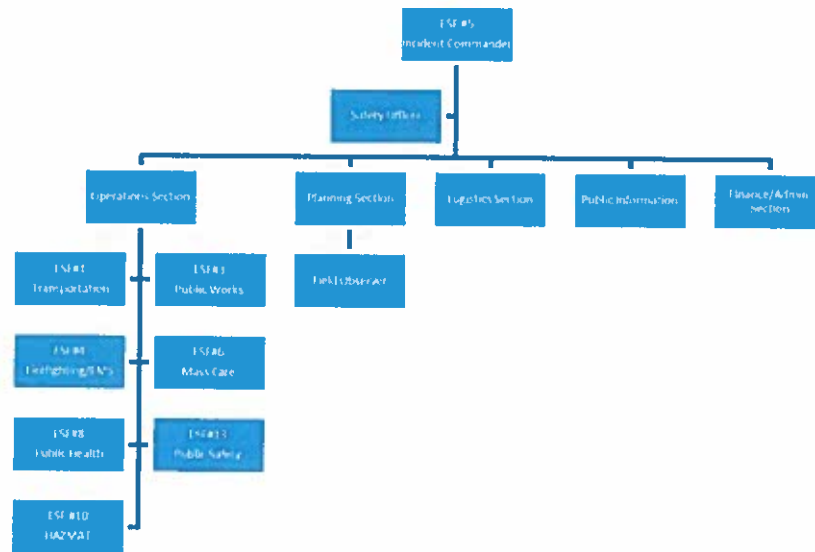


Figure 1

VI. **LINES OF EFFORT:** A line of Effort links multiple tasks and missions using the logic of purpose—cause and effect—to focus efforts toward establishing operational and incident objectives. Lines of effort all lead to the overarching objective of returning the affected communities to their normal state. Each incident may have any combination of these lines of effort:

- A. **Public Health & Medical Services.** PGV has the potential to be a public health concern due to the presence of hydrogen sulfide (H<sub>2</sub>S). Evacuation should be considered if H<sub>2</sub>S levels on the PGV boundary reach AEGL-2 or ERPG-2 levels.
- B. **Energy.** PGV has the capacity to produce 38 megawatts of electricity. At current operation levels PGV provides nearly one fourth of HELCO's energy requirements. When PGV is off-line HELCO will need to increase production from other electricity generating sources.
- C. **Sheltering.** Providing mass care services may be necessary if the incident is prolonged or H<sub>2</sub>S concentrations reach evacuation levels. County facilities staff by the Department of Parks and Recreation will be used if evacuation is necessary. A Shelter may be opened during an Advisory to accommodate residents who voluntary evacuated.
- D. **County Services.** The Hawaii Fire Department (HFD) may be affected by this incident. At least one engine company and the HAZMAT unit from Station 4, Kaumana, will respond to the incident to take H<sub>2</sub>S readings in the surrounding communities and assist with evacuation, as needed.

E. **Infrastructure Systems.** See Energy.

F. **Mass Search & Rescue.** This incident should not require MSAR, but may require HFD personnel to conduct door-to-door notification and to clear the area in affected communities.

G. **Food.** This line of effort should not be affected by this incident.

H. **Water.** This line of effort should not be affected by this incident.

VII. RESPONSE:

A. Responsibilities.

1. Operations Section. The Hawaii Fire Department and the Hawaii Police Department are the primary members of the operations section in the EOC. The operations section will provide objectives and mission assignments to the incident commander on scene if they have not already been established. The operations section may include:

a. ESF #1, Transportation. Transportation will coordinate resources to facilitate evacuation.

b. ESF #3, Public Works. Public Works will assist with road closures and evacuation of residents, if ordered.

c. ESF #4, Firefighting.

i. Firefighting will provide Emergency Medical Treatment and patient evacuation.

ii. Firefighting will also assist with door-to-door notification and evacuation, if ordered.

iii. Evaluate the situation within the PGV boundary.

iv. Extinguish any fires within the PGV boundary.

v. Conduct search and rescue operations within the PGV boundary, if required.

d. ESF #5, Emergency Management, will direct operations in the EOC.

i. PGV has a set of notification procedures that they will follow. ESF #5 will follow their notification procedures that may duplicate the PGV notifications.

ii. Monitor the situation in and around PGV.

- iii. Provide public information.
    - iv. Coordinate emergency shelters with ESF #6.
  - e. ESF #6, Mass Care. Mass Care will coordinate sheltering, if evacuation as needed.
  - f. ESF #8, Public Health. The Department of Health (DoH) will staff ESF #8. ESF #8 will:
    - i. Provide input to the public information on process for health effects, first aid, and protective measures for the affected residents.
    - ii. Authorize PGV to resume operations in accordance with the permit to operate, when applicable.
  - g. ESF #10, Hazardous Materials. HFD will provide the HAZMAT personnel. ESF #10 will:
    - i. Take hydrogen sulfide readings every hour, unless directed otherwise, outside the PGV boundary at the following locations.
      - a) The intersection of Leilani Avenue and Kahukai Street.
      - b) The intersection of Hinalo Street and Pohoiki Road.
      - c) The intersection of Hinalo Street and Lauone Street.
    - ii. Develop the plume model for longer-term incidents in order to identify at risk areas.
  - h. ESF #13, Public Safety. HPD will staff ESF #13. ESF#13 will:
    - i. Facilitate the evacuation of at risk areas, as needed.
    - ii. Provide site security.
- 2. Planning Section. HCCDA personnel will staff the planning section. The planning section is responsible for:
  - a. Developing the common operating picture in the EOC.
  - b. Documenting the incident.
  - c. Tracking incident responding resources.
  - d. Providing a field observer in the PGV Control Room to provide situational awareness.

3. Finance and Administration Section. HCCDA will staff the Finance and Administrative Section, if required. The Finance and Administration Section will:
  - a. Track evacuation costs when an evacuation is ordered.
  - b. Prepare an expenditure report for the incident.
  - c. Coordinate with Corporation Counsel on which evacuation expenditures are billable to PGV.
  
4. Logistics Section. HCCDA will staff the Logistics Section, if required. The Logistics Section will:
  - a. Order resources requested by the Incident Commander.
  - b. Coordinate evacuation facilities with the Department of Parks and Recreation, if required.
  - c. Coordinate transportation of evacuees with ESF #1, if required.
  - d. Coordinate shelter sustainment with ESF #6, if required.
  
5. Public Information. HCCDA will staff this position. The Public Information Officer will:
  - a. Notify or verify incident notification of all responding agencies.
  - b. Provide emergency public information to at risk areas.
  - c. Coordinate a press release with PGV and DOH.
  
- B. Concept of Operations. PGV incident response begins with PGV notifying HCCDA of "Upset Conditions" associated with the PGV plant. HCCDA will make a quick assessment of the situation based on the information provided to determine the status of the incident (Alert, Advisory, Watch, or Warning). The incident may move up or down the scale during the incident; response will be adjusted to correspond with the conditions. (NOTE: Once an evacuation shelter is opened it will remain open until incident is declared over.) HCCDA will provide public information and develop a common operating picture for the incident. The incident will end when conditions at the PGV plant return to "Normal Conditions." The table below depicts the four incident status categories.

Incident Status	Conditions	Evacuation	Reference
Alert	H2S readings 5 ppb above ambient levels is detected at the PGV boundary; or H2S levels at the PGV boundary are 10 ppb on a 24 hour time weighted average or 25 ppb on a 1 hour time weighted average.	Shelter-in-Place or leave the area if sensitive to H2S. At least one Evacuation Shelter will be coordinated and placed on stand-by.	Planning Department GRP 87-1; DOH Permits to Operate P-833-1524 & P-834-1582
Advisory	AEGL-1 or ERPG-1 conditions are met or exceeded; The noise level exceeds 70 decibels (dBA) at the nearest residence; or a release persists and is not controlled within 20 minutes.	Shelter-in-Place or leave the area if sensitive to H2S. At least one Evacuation Shelter will be opened.	Environmental Protection Agency (AEGL); NOAA Office of Response and Restoration (ERPG); DOH Permits to Operate P-833-1524 & P-834-1582
Watch	AEGL-2 or ERPG-2 conditions are met or exceeded; or Noise levels exceed 70 dBA. NOTE: 2012 guidance establishes a Watch at 1.0 ppm or earlier.	Shelter-in-Place or voluntarily evacuate. At least one Evacuation Shelter will be opened.	Environmental Protection Agency (AEGL); NOAA Office of Response and Restoration (ERPG)
Warning	AEGL-3 or ERPG-3 conditions are met or exceeded. NOTE: 2012 guidance establishes a Warning at 10.0 ppm or earlier.	Compulsory Evacuation for at risk areas. Evacuation Shelters will be opened.	Environmental Protection Agency (AEGL); NOAA Office of Response and Restoration (ERPG)

Table 3

C. Alert status actions.

1. PGV will notify Hawaii County Civil Defense Agency of the "Upset Condition."
2. PGV will notify Hawaii Fire Department Dispatch and Police Dispatch (911) of the "Upset Condition."
3. HCCDA will notify the Office of the Mayor to provide situational awareness and receive policy guidance.
4. HCCDA will notify DLNR (████████████████████).
5. HCCDA will issue a public information statement by Blackboard Messaging.
6. HCCDA will notify DOH/DHO (████████████████████).
7. HCCDA will notify the HAH Regional Health Coordinator (████████████████████).
8. HCCDA will notify Director, Department of Parks and Recreation (████████████████████) to coordinate an emergency shelter.
9. HCCDA will notify Director, Planning Department (████████████████████) and advise him of the situation and of a potential PGV permit to operate violation.
10. HCCDA will access and monitor readings of the H2S monitors on the PGV boundary at the following URL: <http://72.253.107.171/pgv/pgv.asp>.
11. HCCDA will access and monitor readings of the DOH H2S monitor in Leilani Estates at the following URL: <http://emdweb.doh.hawaii.gov/air-quality/>.
12. HCCDA will issue a public information statement.
13. HCCDA will coordinate at least one evacuation shelter which will be placed on stand-by status until H2S readings are confirmed.
14. PGV will notify HCCDA and HFD when conditions return to normal.



D. Advisory status actions.

1. PGV will notify Hawaii County Civil Defense Agency of the "Upset Condition."
2. PGV will notify Hawaii Fire Department of the "Upset Condition."
3. HCCDA will activate the EOC.
4. HCCDA will request a HFD liaison and a HPD liaison to report to the EOC.
5. HCCDA will notify the Office of the Mayor to provide situational awareness and receive policy guidance.
6. HCCDA will verify that HFD Dispatch has dispatched HAZMAT and one Engine Company to the scene.
7. HCCDA will notify DLNR [REDACTED] and request his assessment of the situation.
8. HCCDA will notify DOH/DHO [REDACTED] and request a DOH representative to report to the EOC.
9. DOH Clean Air Branch will monitor air quality and noise levels in relation to the permit to operate.
10. HCCDA will notify the HAH Regional Health Coordinator [REDACTED] and request that she notify the Hilo Medical Center Emergency Room of the situation.
11. HCCDA will notify Director, Department of Parks and Recreation [REDACTED] and request that a representative report to the EOC to coordinate evacuation centers.
12. HCCDA will notify Director, Planning Department [REDACTED] and advise him of the situation and of a potential PGV permit to operate violation.
13. HCCDA will issue an "Advisory" to lower Puna via mass notification system to inform residents of the situation and that responders are enroute to PGV to monitor the situation.
14. HFD will respond to the scene with one Fire Company and the HAZMAT Unit.
15. HFD will assess the conditions within the PGV plant and take appropriate action to mitigate the situation.
16. HFD will take H2S readings at the designated intersections every hour and report the findings to the EOC.
17. HCCDA will send an agency representative to PGV to monitor conditions around the plant and in the plant when possible.
18. HCCDA will monitor the H2S monitors on the PGV boundary at the following url: <http://72.253.107.171/pgv/pgv.asp>.
19. HCCDA will access and monitor readings of the DoH H2S monitor in Leilani Estates at the following URL: <http://emdweb.doh.hawaii.gov/air-quality/>.
20. If conditions reach or exceed the H2S levels/noise thresholds cited in the DoH Permit to Operate (see Section IV, C.), PGV is required to cease operations. DoH will give PGV

approval to resume operations when conditions at PGV returns to normal after assessing the plant.

21. HCCDA will release a public information statement stating that conditions have returned to normal at the PGV Plant.

E. Watch status actions.

1. PGV will notify Hawaii County Civil Defense Agency of the "Upset Condition."
2. PGV will notify Hawaii Fire Department of the "Upset Condition."
3. HCCDA will activate the EOC.
4. HCCDA will request a HFD liaison and a HPD liaison to report to the EOC.
5. HCCDA will notify the Office of the Mayor to provide situational awareness and receive policy guidance.
6. HCCDA will verify that HFD Dispatch has dispatched HAZMAT and one Engine Company to the scene.
7. HCCDA will notify DLNR [REDACTED] and request his assessment of the situation.
8. HCCDA will notify DoH/DHO [REDACTED] and request a DoH representative to report to the EOC.
9. DoH Clean Air Branch will monitor air quality and noise levels in relation to the permit to operate.
10. HCCDA will notify the HAH Regional Health Coordinator [REDACTED] and request that she notify the Hilo Medical Center Emergency Room of the situation.
11. HCCDA will notify Director, Department of Parks and Recreation [REDACTED] and request that a representative report to the EOC to coordinate evacuation centers.
12. HCCDA will notify Director, Planning Department [REDACTED] and advise him of the situation and of a potential PGV permit to operate violation.
13. HCCDA will coordinate opening a shelter for persons who wish to leave the immediate area.
14. HCCDA will issue a "Watch" to lower Puna via mass notification system to inform residents of the situation and that responders are enroute to PGV to monitor the situation. Persons sensitive to H2S should remain in-doors or voluntarily leave the area.
15. HFD will respond to the scene with one Fire Company and the HAZMAT Unit.
16. HFD will assess the conditions within the PGV plant and take appropriate action to mitigate the situation.
17. HFD will take H2S readings at the designated intersections every hour and report the findings to the EOC.
18. HFD will prepare a plume model based on current conditions to identify areas at risk.
19. HCCDA will release a second public advisory that identifies areas at risk, actions to take, and shelter location(s). NOTE: evacuation will become mandatory when ERPG 2

thresholds persist for more than one hour and the status will be elevated to a "Warning" (see Table 2 for ERPG thresholds).

20. HCCDA will send a field observer to PGV to monitor conditions in the plant.
21. HCCDA will monitor the H2S monitors on the PGV boundary at the following url: <http://72.253.107.171/pgv/pgv.asp>.
22. HCCDA will access and monitor readings of the DOH H2S monitor in Leilani Estates at the following URL: <http://emdweb.doh.hawaii.gov/air-quality/>.
23. DOH will give PGV approval to resume operations when after assessing the plant once PGV returns to normal conditions, when applicable. HCCDA will release a public information statement stating that conditions have returned to normal at the PGV Plant.
24. HCCDA will release a public information statement stating that conditions have returned to normal at the PGV Plant.

F. Warning status actions.

1. PGV will notify Hawaii County Civil Defense Agency of the "Upset Condition."
2. PGV will notify Hawaii Fire Department of the "Upset Condition."
3. HCCDA will notify DLNR [REDACTED]
4. HCCDA will issue a "Warning" to lower Puna via mass notification system to inform resident of the situation and that responders are enroute to PGV to monitor the situation. Persons sensitive to H2S should remain in-doors or voluntarily leave the area.
5. HCCDA will notify the Office of the Mayor to provide situational awareness and receive policy guidance.
6. HCCDA will activate the EOC.
7. HCCDA will request a HFD liaison and a HPD liaison to report to the EOC.
8. HCCDA will verify that HFD Dispatch has dispatched HAZMAT and one Engine Company to the scene.
9. HCCDA will notify DLNR [REDACTED] and request his assessment of the situation.
10. HCCDA will notify DoH/DHO [REDACTED] and request a DoH representative to report to the EOC.
11. HCCDA will notify the HAH Regional Health Coordinator [REDACTED] and request that she notify the Hilo Medical Center Emergency Room of the situation.
12. HCCDA will notify Director, Department of Parks and Recreation [REDACTED] and request that a representative report to the EOC to coordinate evacuation centers.
13. HCCDA will notify Director, Planning Department [REDACTED] and advise him of the situation and of a potential PGV permit to operate violation.
14. HCCDA will coordinate opening shelters for persons ordered to evacuate at risk areas.
15. HCCDA will prepare an EAS message and activate designated outdoor warning siren systems in lower Puna.

16. HCCDA will issue a "Warning" to lower Puna via mass notification system and by radio announcement(s) to inform resident of the situation and that responders are enroute to PGV to monitor the situation. Persons sensitive to H2S outside of at risk areas should remain in-doors or voluntarily leave the area (to be determined by plume modeling).
17. HFD will respond to the scene with one Fire Company and the HAZMAT Unit.
18. HFD will assess the conditions within the PGV plant and take appropriate action to mitigate the situation.
19. HFD will take H2S readings at the designated intersections every hour and report the findings to the EOC.
20. HFD will prepare a plume model based on current conditions to identify areas at risk.
21. HCCDA will release a second public advisory that identifies areas at risk, actions to take, and shelter locations. NOTE: if areas of risk have not been identified 45 minutes after the initial upset conditions the entire protective distance area based on size of spill and time of day will be ordered to evacuate (see Table 2 for ERPG thresholds).
22. HPD closes roads into at risk areas.
23. HPD facilitates the evacuation of at risk areas.
24. HFD assists with clearing the at risk areas of people.
25. HCCDA will send a field observer to PGV to monitor conditions in the plant.
26. HCCDA will monitor the H2S monitors on the PGV boundary at the following URL:  
<http://72.253.107.171/pgv/pgv.asp>.
27. HCCDA will access and monitor readings of the DoH H2S monitor in Leilani Estates at the following URL: <http://emdweb.doh.hawaii.gov/air-quality/>.
28. DoH will give PGV approval to resume operations when after assessing the plant once PGV returns to normal conditions.
29. HCCDA will release a public information statement stating that conditions have returned to normal at the PGV Plant.

Alert Level Civil Defense Message

THIS IS A CIVIL DEFENSE MESSAGE FOR

\_\_\_\_\_ (day of week)

\_\_\_\_\_ (date)

\_\_\_\_\_ (time)

At \_\_\_\_\_ am/pm today Puna Geothermal reported a release of steam from one of its wells. The Situation was contained as of \_\_\_\_\_ am/pm.

Hawaii Fire Department is on scene with HAZMAT continuously monitoring the air quality at the site, the perimeter, and the surrounding community. Based on all available data, there is no threat to the public and no evacuation is necessary.

I say again.

At \_\_\_\_\_ am/pm today Puna Geothermal reported a release of steam from one of its wells. The Situation was contained as of \_\_\_\_\_ am/pm.

Hawaii Fire Department is on scene with HAZMAT continuously monitoring the air quality at the site, the perimeter, and the surrounding community. Based on all available data, there is no threat to the public and no evacuation is necessary.

Civil Defense is monitoring the situation and we will keep the public advised of any changes in the situation. If you have any questions, you may call 935-0031.

Thank you for listening; this is your Hawaii County Civil Defense Agency.

Advisory Level Civil Defense Message

THIS IS A CIVIL DEFENSE MESSAGE FOR

\_\_\_\_\_ (day of week)

\_\_\_\_\_ (date)

\_\_\_\_\_ (time)

A Geothermal Advisory is now in effect for the following areas due to a release of geothermal steam containing hydrogen sulfide at the Puna Geothermal Venture Plant near Pahoa:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

A Geothermal Advisory means that a release of hydrogen sulfide release persists and is not controlled. Residents are advised to shelter-in-place or to voluntarily evacuate the area. An Evacuation Shelter located at \_\_\_\_\_ will open at \_\_\_\_\_ am/pm.  
(location) (time)

I say again.

A Geothermal Advisory is now in effect for the following areas due to a release of geothermal steam containing hydrogen sulfide at the Puna Geothermal Venture Plant near Pahoa:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

A Geothermal Advisory means that a release of hydrogen sulfide release persists and is not controlled. Residents are advised to shelter-in-place or to voluntarily evacuate the area. An Evacuation Shelter located at \_\_\_\_\_ will open at \_\_\_\_\_ am/pm.  
(location) (time)

Hawaii Fire Department is monitoring the situation and we will keep the public advised of any changes in the situation. If you have any questions, you may call 935-0031.

Thank you for listening; this is your Hawaii County Civil Defense Agency.

Watch Level Civil Defense Message

THIS IS A CIVIL DEFENSE MESSAGE FOR

\_\_\_\_\_ (day of week) \_\_\_\_\_ (date) \_\_\_\_\_ (time)

A Geothermal Watch is now in effect for the following areas due to an uncontrolled release of hydrogen sulfide at the Puna Geothermal Venture Plant near Pahoa:

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

A Geothermal Watch means that the plant staff is unable to manage the release of hydrogen sulfide. Airborne concentration of hydrogen sulfide is sufficient for the general population to experience irreversible or other serious, long-lasting, adverse health effects or an impaired ability to escape. Residents are advised to shelter-in-place or to voluntarily evacuate the area. An Evacuation Shelter located at \_\_\_\_\_ will open at \_\_\_\_\_ am/pm.  
(location) (time)

I say again.

A Geothermal Watch is now in effect for the following areas due to an uncontrolled release of hydrogen sulfide at the Puna Geothermal Venture Plant near Pahoa:

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

A Geothermal Watch means that the plant staff is unable to manage the release of hydrogen sulfide. Airborne concentration of hydrogen sulfide is sufficient for the general population to experience irreversible or other serious, long-lasting, adverse health effects or an impaired ability to escape. Residents are advised to shelter-in-place or to voluntarily evacuate the area. An Evacuation Shelter located at \_\_\_\_\_ will open at \_\_\_\_\_ am/pm.  
(location) (time)

Hawaii Fire Department is monitoring the situation and we will keep the public advised of any changes in the situation. If you have any questions, you may call 935-0031.

Thank you for listening; this is your Hawaii County Civil Defense Agency.

Warning Level Civil Defense Message

THIS IS A CIVIL DEFENSE MESSAGE FOR

\_\_\_\_\_ (day of week)

\_\_\_\_\_ (date)

\_\_\_\_\_ (time)

A Geothermal Warning is now in effect for the following areas due to an uncontrolled release of hydrogen sulfide at the Puna Geothermal Venture Plant near Pahoa:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

A Geothermal Warning means that the plant staff is unable to manage the release. Airborne concentration of hydrogen sulfide is sufficient for the general population to experience life-threatening adverse health effects or death. Residents are advised to evacuate the area. Evacuation Shelters at the following locations will be opened at \_\_\_\_\_ am/pm.

(time)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

I say again.

A Geothermal Warning is now in effect for the following areas due to an uncontrolled release of hydrogen sulfide at the Puna Geothermal Venture Plant near Pahoa:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

A Geothermal Warning means that the plant staff is unable to manage the release. Airborne concentration of hydrogen sulfide is sufficient for the general population to experience life-threatening adverse health effects or death. Residents are advised to evacuate the area. Evacuation Shelters at the following locations will be opened at \_\_\_\_\_ am/pm.

(time)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Hawaii Fire Department is monitoring the situation and we will keep the public advised of any changes in the situation. If you have any questions, you may call 935-0031.

Thank you for listening; this is your Hawaii County Civil Defense Agency.



All Clear Civil Defense Message

THIS IS A CIVIL DEFENSE MESSAGE FOR

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(day of week)

(date)

(time)

The Geothermal release has ended. Air samples taken around the PGV Plant have readings below Emergency Response Guideline. It is safe for all affected residents to return to their homes at this time. If you experience any symptoms of H<sub>2</sub>S exposure such as nausea, headaches, delirium, disturbed equilibrium, tremors, convulsions, and skin and eye irritation you should call 911.

I say again.

The Geothermal release has ended. Air samples taken around the PGV Plant have readings below Emergency Response Guideline. It is safe for all affected residents to return to their homes at this time. If you experience any symptoms of H<sub>2</sub>S exposure such as nausea, headaches, delirium, disturbed equilibrium, tremors, convulsions, and skin and eye irritation you should call 911.

This is the last Civil Defense message for this incident. If you have any questions, you may call 935-0031.

Thank you for listening; this is your Hawaii County Civil Defense Agency.

## Small Spill Protective Action Distance Day



Figure 1

The small spill immediate isolation distance of 100 feet is within the PGV boundary.

The small spill protective action distance downwind of the release is 0.1 mile which is still within the boundary of the PGV Plant.

## Small Spill Protective Action Distance Night



Figure 2

The small spill protective action distance at night is 0.3 miles downwind of the release location. There are currently seven (7) residential properties that could be affected.

At risk areas include:

1. Kahoho Gardens
2. Lanipuna Gardens

## Large Spill Initial Isolation Distance



Figure 3

The large spill initial isolation distance is 1250 feet. This does cross over the PGV boundary and will affect one residence on Pahoa-Pohoiki Road and two residences on Hinalo Street. Residents should not travel North (mauka) on Pahoa-Pohoiki Road or attempt to leave the area through Leilani Estates. Residents should head South (Makai) to Isaac Hale Beach Park until advised to take other action.

At risk areas include:

1. Kahoho Gardens
2. Lanipuna Gardens

## Large Spill Protective Action Distance Day



Figure 4

The large spill protective action distance downwind during the day is 1.3 miles which has the potential to affect Leilani Estates east of Kupono Street, Lanipuna Gardens, and sections of Pohiki Road. The plume model is critical in determining which areas are at risk during the day.

At risk areas include:

1. Kahoho Gardens
2. Lanipuna Gardens
3. Leilani Estates
4. Pohiki Bay Estates
5. Lava Tree State Monument

## Large Spill Protective Action Distance Night



Figure 5

The large protective action distance at night is 3.4 miles down wind of the release point. A large spill at night has the potential to affect Leilani Estates, Nanawale Estates, Kaulani Village, Kaniahiku House lots, Lanipuna Gardens, the entire Pohoiki Road, and the Noni Farm Road area.

At risk areas include:

1. Lanipuna Gardens
2. Leilani Estates
3. Kapoho Estates
4. Pohiki Bay Estates
5. Malama Homesteads
6. Noni Farm Road
7. Opihikao Homesteads and all residences along Opihikao (Kamaili) Road
8. Kaulani Village
9. Nanawale Estates

## Route to the Pahoia Community Center Evacuation Center

Pahoia Community Center 15-2910 Puna Road, Pāhoia, HI 96778

(NOTE: Evacuation routes are subject to change based on wind direction readings provided from the field by HFD.)

### From Lanipuna Gardens

1. Head Makai (toward Isaac Hale Beach Park) on Pohoiki Rd.
2. At stop sign turn left onto Kalapana-Kapoho Rd. (Red Road).
3. At four-way stop sign turn left onto Highway 132 (Kapoho Road).
4. At the Highway 130, Highway 132 intersection continue straight through the traffic light onto Pahoia Village Road.
5. At the Pahoia YBA Kaikan turn left onto Kau Hale Street.
6. Turn left into the community center parking lot.

### From Leilani Estates

1. Head West (toward Highway 130) on Leilani Avenue.
2. At the stop sign turn right onto Highway 130.
3. At the Highway 130, Highway 132 intersection traffic light turn left onto Pahoia Village Road.
4. At the Pahoia YBA Kaikan turn left onto Kau Hale Street.
5. Turn left into the community center parking lot.



## Route to the Kea'au Community Center Evacuation Center

Keaau Community Center 16-192 Pili Mua St, Keaau, HI 96749

(NOTE: Evacuation routes are subject to change based on wind direction readings provided from the field by HFD.)

### From Lanipuna Gardens

1. Head Makai (toward Isaac Hale Beach Park) on Pohoiki Rd.
2. At stop sign turn left onto Kalapana-Kapoho Rd. (Red Road).
3. At four-way stop sign turn left onto Highway 132 (Kapoho Road).
4. At the traffic light turn right onto Highway 130.
5. At the traffic light turn left onto Keaau-Pahoa Road.
6. At the traffic light turn left onto Old Volcano Road.
7. After Fire Station turn left onto Pii Mau Street.
8. The Community Center is on the left side of the road.

### From Leilani Estates

1. Head West (toward Highway 130) on Leilani Avenue.
2. At the stop sign turn right onto Highway 130.
3. Continue on Highway 130 at the Highway 130, Highway 132 intersection.
4. At the traffic light turn left onto Keaau-Pahoa Road.
5. At the traffic light turn left onto Old Volcano Road.
6. After Fire Station turn left onto Pii Mau Street.
7. The Community Center is on the left side of the road.





## Route to A J Watt Gym Evacuation Center

A J Watt Gym 18-1345 A Volcano Road, Volcano, HI 96771

(NOTE: Evacuation routes are subject to change based on wind direction readings provided from the field by HFD.)

### From Lanipuna Gardens

1. Head Makai (toward Isaac Hale Beach Park) on Pohoiki Rd.
2. At stop sign turn left onto Kalapana-Kapoho Rd. (Red Road).
3. At four-way stop sign turn left onto Highway 132 (Kapoho Road).
4. At the traffic light turn right onto Highway 130.
5. At the traffic light turn left onto Keaau-Pahoa Road.
6. At the traffic light turn left onto Highway 11.
7. At the Mountain View Post Office turn left onto Volcano Road.
8. AJ Watt Gym is on the right side of the road.

### From Leilani Estates

1. Head West (toward Highway 130) on Leilani Avenue.
2. At the stop sign turn right onto Highway 130.
3. Continue on Highway 130 at the Highway 130, Highway 132 intersection.
4. At the traffic light turn left onto Keaau-Pahoa Road.
5. At the traffic light turn left onto Highway 11.
6. At the Mountain View Post Office turn left onto Volcano Road.
7. AJ Watt Gym is on the right side of the road.



## Route to Ho'olulu Complex Evacuation Center

Afook-Chinen Civic-Auditorium at 323 Manono St., Hilo, HI 96720

(NOTE: Evacuation routes are subject to change based on wind direction readings provided from the field by HFD.)

### From Lanipuna Gardens

1. Head Makai (toward Isaac Hale Beach Park) on Pohoiki Rd.
2. At stop sign turn left onto Kalapana-Kapoho Rd. (Red Road).
3. At four-way stop sign turn left onto Highway 132 (Kapoho Road).
4. At traffic light turn right onto Highway 130.
5. At Highway 11 intersection turn right onto Highway 11.
6. After Kekuaaoa Ave. intersection turn left onto Piilani St.
7. At stop sign turn right onto Manono St.
8. Afook-Chinen Civil Auditorium is on the right side of the road.

### From Leilani Estates

1. Head West (toward Highway 130) on Leilani Avenue.
2. At the stop sign turn right onto Highway 130.
3. Continue on Highway 130 at the Highway 130, Highway 132 intersection.
4. At Highway 11 intersection turn right onto Highway 11.
5. After Kekuaaoa Ave. intersection turn left onto Piilani St.
6. At stop sign turn right onto Manono St.
7. Afook-Chinen Civil Auditorium is on the right side of the road.

