

JUNE 1991 MONTHLY REPORT

Scientific Observation Hole (SOH) Program

Geothermal Resource Permit: GRP 89-1

Lilewa, Kapoho, and Halekamahina, Hawaii

TMK: 1-2-10:01; 1-4-01:02; and 1-4-02:32

Hawaii Natural Energy Institute

University of Hawaii

July 1991

SUMMARY

The SOH-2 hole was completed to the total depth of 6,802 feet at 1 am on May 29, 1991. After removing the Blow Out Preventor equipment, the hole was prepared for logging surveys. On June 4, 1991, the Tonto U-5000 drilling rig was moved to the HGP-A well for work unrelated to the SOH project. On June 6, 1991, the United States Geological Survey (USGS) truck was set up at SOH-2 in preparation for down hole logging. The following day a temperature log survey was run using the USGS truck and Pruett wireline and Kuster equipment. On June 8, 1991, a tripod leg used in the logging of the SOH-2 well fell on the leg of one of the loggers, resulting in an injury which required treatment at the Hilo Medical Group.

An injection test was run using Halliburton Services to pump water and Pruett Industries to run the temperature/pressure survey. Following the completion of the surveys, the equipment was rigged down and work was terminated at SOH-2 on June 9, 1991. On June 21, 1991, a fence was erected around the completion wellhead and pad.

The sump material at SOH-1 and SOH-2 has been analyzed to determine if it is suitable for disposal at the County landfill or if it should be buried on site. A grading permit was issued for the SOH-3 site on June 10, 1991. Work will proceed on the SOH-3 site and access upon notification of approval from Governor John Waihee.

I. INTRODUCTION

This document presents a monthly report to the County of Hawaii Planning Department to support the Scientific Observation Hole (SOH) program in the Kilauea Middle and Lower East Rift Zones. The SOHs are for scientific observation purposes only. The information to be gained from the SOHs will provide an assessment of subsurface geological conditions, groundwater level and composition, temperature, drilling conditions, an inventory of possible mineral and geothermal resources, and an eruptive history of the island to the depth drilled.

This report addresses: occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility; performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed; and emission measurements.

II. BACKGROUND

The County of Hawaii Planning Commission approved, on August 8, 1989, a geothermal resource permit application (GRP 89-1) to drill Scientific Observation Holes (SOHs) in the Kilauea Middle and Lower East Rift Zone. This document presents a monthly report, as required in Condition 6:

"The petitioner shall maintain a record in a permanent form suitable for inspection and five (5) copies shall be filed with the Planning Department on a monthly basis during drilling and for six (6) months after the completion of drilling to establish a hole specific baseline and such record shall be available to the community. The record shall include:

- a. Occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility.
- b. Performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed.
- c. Emission measurements reported in units compatible with applicable standards/guidelines."

As designated, four holes are planned to be drilled along the Kilauea East Rift Zone on the Big Island of Hawaii. Three of the Big Island holes (SOHs 1, 2, and 4) are on agriculture land and have been permitted by the County of Hawaii Planning Commission. The fourth hole, designated SOH-3, is on

conservation land. SOH activities under Conservation District Use Permit (HA 12/20/85 - 1830) issued to the Estate of James Campbell have been approved.

III. SOH-1 SITE

Drilling Activity

Drilling is complete. The sump material has been analyzed to determine if it is suitable for disposal at the County landfill or if it should be buried on-site. The site will be reclaimed to its original state after testing and monitoring are completed.

Monitoring Program -

Air Quality, Meteorological, Noise and Emissions are not monitored, as drilling has been completed at this site.

IV. SOH-2 SITE

Drilling Activity

SOH-2 was completed to the total depth of 6,802 feet at 1 am on May 29, 1991. After removing the Blow Out Preventor the hole was prepared for down hole logging. On June 4, 1991, the Tonto U-5000 drilling rig was moved to the HGP-A well for work unrelated to the SOH project. On June 6, 1991, the United States Geological Survey (USGS) truck was set up at SOH-2 in preparation for down hole logging. The following day a temperature log survey was run using the USGS truck and Pruett wireline and

Kuster equipment. On June 8, 1991, a tripod leg used in the logging of SOH-2 fell on the leg of one of the loggers resulting in an injury which required treatment at the Hilo Medical Group.

An injection test was run using Halliburton Services to pump water and Pruett Industries to run the temperature/pressure survey. Following the completion of the surveys, the equipment was rigged down and work was terminated at SOH-2 on June 9, 1991. On June 21, 1991, a fence was erected around the completion wellhead and pad.

Monitoring Program - Air Quality

The air quality monitoring station provides a continuous record of atmospheric H₂S concentrations when interfaced with a data logger or chart recorder. The unit is located in a utility container on-site and power is provided by the drill rig system.

The last data collected at this station was approximately 2:00 pm, May 30, 1991, when the rig was shut down in preparation for its move off-site. On June 3, 1991, the instruments at this station were disassembled, removed, and serviced in preparation for use at the next SOH site (see appendix for details).

Monitoring Program - Meteorological

Continuous wind speed and directional measurements are being made with a recording wind speed/direction sensor system. A data logger and back-up pressure-sensitive recorder is being used to

record the wind speed and direction data. The unit is located in a utility container on-site and power is provided by the drill rig system.

The last data collected at this station was approximately 2:00 pm, May 30, 1991, when the rig was shut down in preparation for its move off-site. On June 3, 1991, the instruments at this station were disassembled and the sensors, sound meter and chart recorder were removed and serviced in preparation for use at the next SOH site (see appendix for details).

Monitoring Program - Noise

One noise monitoring station is located at the SOH-2 site during drilling and is operated by power provided by the drill rig system. The last data collected at this station was approximately 2:00 pm, May 30, 1991, when the rig was shut down in preparation for its move off-site. On June 3, 1991, the instruments at this station were disassembled and the sensors, sound meter and chart recorder were removed and serviced in preparation for use at the next SOH site (see appendix for details).

A second noise station is located at the Perry residence, about a third of a mile north of the SOH-2 drill site. The instrument at this station is powered by solar charged batteries. On June 28, 1991, the instruments at this station were removed and the instrument shelter was removed the following day (see appendix for details).

A third noise monitoring station is located at the Hedtke residence, about 0.4 of a mile east of the SOH-2 site. This monitor is also powered by solar charged batteries. Chart jams, which are indicative of this type of monitoring equipment, continue to be a problem. On June 28, 1991, the instruments at this station were removed and the instrument shelter was removed the following day (see appendix for details).

Emissions Reports

An H₂S monitor is located on-site. The average H₂S level measured is about 1 ppb due to natural causes resulting from the decay of vegetation. Colortek sensor canisters are located around the perimeter of the SOH-2 drill site and are checked weekly as a matter of routine. The sensors showed no indication of emissions from the well for this reporting period. On July 1, 1991, the canisters were removed and stored in preparation for use at the next SOH site.

V. SOH-3 SITE

Drilling Activity

No drilling activity has been initiated. Access to the SOH-3 site has not been constructed, nor has the site been cleared or graded. SOH-3 is scheduled to be located at the True/Mid-Pacific alternate drill site 2 (approximately 3,000 feet north-north-west of the present drill site). On June 10, 1991, a grading permit was issued by the Planning Department for the

proposed SOH-3 site. Work on the SOH-3 site and access will proceed upon notification from Governor John Waihee.

VI. SOH-4 SITE

Drilling Activity

Drilling is completed. No activity was performed during this period.

Monitoring Program -

Air Quality, Meteorological, Noise and Emissions are not monitored, as drilling has been completed at this site.

APPENDIX
MAINTENANCE REPORTS

SUPPLEMENTARY BILLING

		HOURS	PARTS
J-154	Monday 6-3-91 SOH-2 H2S--MET--SOUND Prepared instruments for movement to HGP-A Plant. Disassembled Met tower and instrument shelter, removed Met sensors, sound meter and chart recorder for repair. PERRY SOUND Operating normally now, but previous jams caused loss of some data. Chart, pen and batteries O.K. HEDTKE SOUND Operating normally. Chart, pen and batteries O.K.	3.00	
J-156	Wednesday, 6-5-91 PERRY SOUND Operating normally, Chart, pen and batteries O.K. HEDTKE SOUND Operating normally, Chart, pen and batteries O.K.	2.00	
J-158	Friday, 6-7-91 PERRY SOUND Operating normally. Only minor calibration due to heavy rain. HEDTKE SOUND Operating normally. Only minor calibration due to heavy rain.	2.00	
J-161	Monday, 6-10-91 PERRY SOUND Pen ran dry, lost some data. Replaced pen, replaced meter batteries. Full calibration...No adjustment required for meter, 1 db down for recorder. HEDTKE SOUND Several jams during past 72 hours caused some data loss. Replaced meter batteries. Full calibration No meter adjustment necessary. Recorder 1 db down.	2.00	
J-163	Wednesday, 6-12-91 PERRY SOUND Operating normally. Chart, pen and Batteries O.K. HEDTKE SOUND Chart jammed. Lost 44 out of 48 hours data. Cleared jam and tested. Replaced main battery.	2.00	
J-164	Thursday, 6-13-91 SHOP Cleaned, overhauled, tested and calibrated the chart recorder, sound meter and Met sensors from SOH-2.	2.00	
J-165	Friday, 6-14-91 PERRY SOUND Operating normally. Chart and Pen O.K. Replaced meter batteries. HEDTKE SOUND Chart jams caused 44 hours data loss. Adjusted chart drive. Batteries O.K.	2.00	

J-168	Monday, 6-17-91	2.00
	PERRY SOUND	
	Operating normally. Replaced chart and pen. Batteries O.K. No meter or recorder adjustment required on full calibration.	
	HEDTKE SOUND	
	Chart recorder problems. Lost 56 out of 72 hours data. Will replace recorder and meter Wednesday. Replaced main and meter batteries. Full calibration, Meter right on, recorder was 2 db low.	
J-170	Wednesday, 6-19-91	2.00
	PERRY SOUND	
	Chart jams. Collected only 11 of 48 hours data. Chart, pen and batteries O.K.	
	HEDTKE SOUND	
	Chart jams. Collected only 10 of 48 hours data. Replaced both Meter and Recorder with overhauled units from SOH-2 station. Fully calibrated... chart, pen and batteries O.K.	
J-172	Friday, 6-21-91	2.00
	PERRY SOUND	
	Inoperative. Chart recorder jammed. Disassembled and tightened drive in hopes that this will help. Will replace this instrument Monday. Replaced meter batteries. Other batteries, chart & pen O.K.	
	HEDTKE SOUND	
	Operating normally. No jams. Batteries & chart O.K.	
J-173	Saturday, 6-22-91	2.00
	SHOP	
	Overhauled, cleaned and calibrated the sound meter and chart recorder that was removed from HEDTKE's on Wednesday.	
J-175	Monday, 6-24-91	2.00
	PERRY SOUND	
	Inoperative. Collected only 1 of 72 hours. Replaced instruments with overhauled calibrated instruments. Batteries, chart and pen O.K.	
	HEDTKE SOUND	
	Operating normally but chart ran out so lost 7 hours data. Replaced chart. Ran full calibration. Adjusted meter to 110.0 from 110.6. Adj. recorder down 4 db.	
J-176	Tuesday, 6-25-91	2.00
	SHOP	
	Overhauled, cleaned and calibrated sound meter and chart recorder that was removed from PERRY. Hopefully all recorders and sound meters are now fully on line.	
J-177	Wednesday, 6-26-91	2.00
	PERRY SOUND	
	Operating normally. No data loss. Chart, pen and batteries O.K.	
	HEDTKE SOUND	
	Operating normally. No data loss. I accidentally left chart speed at 10 cm/hr instead of 5 cm/hr	

on Monday. Chart, pen and batteries O.K.

J-179	Friday, 6-28-91	2.00
	PERRY SOUND	
	Everything operating normally. No data loss. Closed this station down. Removed instruments, sensors and batteries. Will remove shelter tomorrow.	
	HEDTKE SOUND	
	Everything operating normally. No data loss. Closed this station down. Removed instruments, sensors and batteries. Will remove shelter tomorrow.	
J-182	Monday, 7-1-91	2.00
	Removed instrument shelters from PERRY & HEDTKE residences. Stored the shelters with the Drill-rig crew at the HGP-A plant site.	

J-154 Monday 6-3-91

SON-2 - H₂S - Met - Sound

Disconnected and Prepared Instrument for movement to New location - Disassembled Met Tower + Instr.

Shelter - Removed Met sensors sound Meter + Recorder

for overhaul + Recalibration - Removed Caltech Canisters.

Perry Sound 0810 ~~0755~~ clouds 100%, Calm

Operating Normally now, but previous jams caused loss of some data - Main Batt 1250, Meter Batt 1197-1216 - Spans exchange

Hedthe Sound 0755 clouds 100%, Calm

Operating Normally - Chart + Pen OK - Main Batt 12.07

Meter Batt 1228-1218 - spans 1254-1245.

J-156 Wednesday 6-5-91

Perry Sound 0805 clouds 35%, WS + DIR 15° @ 3-4

Operating Normally - Chart + Pen OK - Main Batt 12.63

Meter Batt 1194-1211 - spans 1251-1244

Hedthe Sound 0820 clouds 40% WS + DIR 15° @ 3-4

Operating Normally - Chart + Pen OK - Main Batt 12.23

Meter Batt 1212-1210, spans 1257-1253

J-158 Friday 6-7-91

Perry Sound 0815 clouds 100% - Rain - Calm

Operating Normally - Chart + Pen OK - Main Batt 12.26

Meter Batt 1171-1186 - spans 1241-1241 - No Fall Calib due to heavy rain.

Hedthe Sound 0850 clouds 100% Rain - Calm

Operating Normally - Chart + Pen OK - Main Batt 11.94

Meter Batt 1197-1198 - spans 1251-1244 - No Fall Calib due to heavy rain.

J-161 Monday 6-10-91

Perry Sound 0828 clouds 10% Calm

Pen Pen Dry - some data lost - Replaced Pen - Main Batt 12.80

Meter Batt 1151-1166, Replaced w/ spans 1236-1233

Calibration - No Meter Adj - Adj Recorder down 1 dlt

Hedthe Sound 0810 clouds 10% Calm

Operating Normally but previous jams caused some data loss.

Main Batt 11.95 - Meter Batt 1172-1180 Replaced with

spans 1250-1235 - Calibration - No Meter Adj

Adjusted Recorder down 1 dlt.

J-163 Wednesday 6-12-91

Perry Sound 0828 Clouds 40% WS & DIR 90° @ 5-7

Operating Normally - Chart & Pen OK - Main Batt 1270.

Meter Batt 1212-1209 - Spares Batt 1266-1256

Hedthe Sound 0810 Clouds 30% WS & DIR 30° @ 4-6

Chart Jammed - Lost 4.4 of 4.8 Hours Data - Main Batt 1286

Meter Batt Replaced w/1249 - Meter Batt 1231-1223 - Spares 1269-1259

J-164 Thursday 6-13-91

SHOP

Cleaned - Overhauled - Tested & Calibrated the Chart Recorder - sound Meter & Met Sensors FROM SHOP

J-165 Friday 6-14-91

Perry Sound 0820 Clouds 20% WS & DIR 10° @ 3-4

Operating Normally - Chart & Pen OK - Main Batt 1276

Meter Batt 1191-1188, Replaced w/spares 1223-1234

Hedthe Sound 0805 Clouds 10% WS & DIR 90° @ 4-5

Chart Jam caused 4.4 Hour Data Loss - Main Batt 1202

Meter Batt 1213-1214 - Spares 1246-1262

J-166 Monday 6-17-91

Perry Sound 0840 Clouds 80% WS & DIR 340 @ 3-4

Operating Normally - Replaced Chart & Pen. Main Batt 1276

Meter Batt 1184-1189, Replaced w/spares @ 1271-1271.

Calibration - No Meter or Recorder adj. Required.

Hedthe Sound 0820 Clouds 90% WS & DIR 360 @ 2-3

Lost 2.6 of 7.2 Hours Data due to chart recorder

problems - Will replace & overhaul Recorder on 6-19-91

Main Batt 1206 - Replaced with 1264, Meter Batt 1188-1196

Replaced w/spares @ 1242-1258 - Full Calibration -

No Meter Adj. - Chart Recorder was 2 ft low. Adj.

J-170 - Wednesday 6-17-91

Perry Sound 0835 Clouds 10% WS & DIR 300° @ 2
Chart Jams - Collected only 11 hours data - Cleared Jams.
Main Batt 12.07 - Meter Batt 1215-1214 - Spares 1265-1255
Heath Sound 0810 Clouds 15% Calm

Chart Jams - Collected only 10 hours data - Replaced Sound
Meter & Chart Recorder with overhauled units - Heath's
instrument brought home for repair - Main Batt 1256 -
Meter Batt 1233-1251

J-172 Friday 6-21-91

Perry Sound 0820 Clouds 95% WS & DIR 350° @ 2.3

Inoperative - Chart Recorder Jammed - Disassembled and
checked - Tightened Drive Belt - Cleaned up CORROSION - Will
replace this instrument Monday - Main Batt 12.45, Meter
Batt 1193-1170 - Replaced with spares 1249-1262

Heath Sound 0800 Clouds 90% WS & DIR - Calm
Operating normally - No data loss - Main Batt 12.26
Meter Batt 1218-1252 - Spares 1264-1267

J-175 Monday 6-24-91

Perry Sound 0835 Clouds 35% Calm

Inoperative - Chart Recorder Jammed - Collected only 1
hour data out of 72. Replaced Recorder & Meter
with overhauled units - Calib. - & Spares Recorder & Meter
Main Batt 1244 - Meter Batt 1202-1239 - Spares 1287-1247

Heath Sound 0805 Clouds 50% WS & DIR 325° @ 2.3
Operating normally - Chart Run out - Lost 7 hours - Replaced
Chart - Full Calib. - Adj. Meter to 10.0 from 110.6 -
Adjusted Recorder down 4 d.f.

J-177 Wednesday 6-26-91

Heath Sound 0800 Clouds 100% - Calm

Operating normally - Chart speed was 10 cm/hr - Reset
to 5 cm/hr - Main Batt 1196 - Meter 1235-1222 - Spares 1253-1261

Perry Sound 0815 Clouds 100% WS & DIR 325° @ 2-3

Operating normally - No data loss - Main Batt 12.19
Meter Batt 1283-1218 - Spares 1223-1225

J-179 Friday 6-28-91

Perry Sound 0800 Clouds 95% - calm.

Operating Normally - Shut station down & removed
all instruments - Will remove shelter Monday.

Heath Sound 0830 Clouds 95% - calm

Operating Normally - Shut station down & removed
all instruments - Will remove shelter Monday.

J-181 Monday 7-1-91

Removed instruments/shelters from Heath & Perry
station - Stowed shelters & microphone stands at
H&P-A with Drill crew & equipment.