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ADDITIONAL COMMENTS ON THE GEOTHERMAL DIRECT USE DRAFT FEASIBILITY STUDY (Kapoho/Pohoiki Area, Hawaii)

These comments are based on a visit to Hilo, Hawaii and adjacent area on 24-25 October 2006 by Geo-Heat Center staff members John Lund and Andrew Chiasson. Previous comments on the draft feasibility study were made by Andrew Chiasson.

Chapter 3 – Geothermal Heat Resources

Pages 3-13: 3.4.2 Geothermal Resources – Drilling New Wells

The author estimates that drilling shallow geothermal wells in the Pahoa area would cost around \$750,000 each – we assume these to be around 700 feet deep. We understand that this estimated is based on a quote by Water Resources International.

Based on phone calls to local drillers, I was given the following estimates for shallow wells.

Water Resources International at \$200 to \$300 per foot – however, they do not drill shallow wells, as they are only interested in deeper well drilling. Thus, their estimate is probably not reliable, as this gives a total cost for a 700-foot deep well of only \$140,000 to \$210,000.

Beylik Drilling, Inc. (Oahu). Mr. Dwight Ho, their drilling engineer, estimated \$400,000 for an 8-inch well, and \$650,000 for a 12-inch well, including a pump test.

Fred Page Drilling (Pahoa). Mr. Page has had many years of experience drilling wells in the Pahoa area, and thus probably provides the most reliable estimate. He estimates that for a 12-inch well (for 8-inch casing) drilled and cased, would cost \$300,000 to \$400,000. He has one cable and two rotary rigs available for drilling wells.

Thus, we feel that around \$400,000 would be a better estimate for a 700-foot deep well in the Pahoa area. This will alter the cost/payback analyses significantly

Chapter 2 – Geothermal Direct Use Enterprises

Page 2-22: 2.4.1 – Aquaculture – Tilapia

We feel that in addition to selling fish killed and cleaned, that the live market should be considered – as we have found that the Chinese population prefers the fish delivered live to the market, and thus will pay a premium price for live.

Page 2-24: 2.4.2 – Fruit/vegetable drying. Concern is expressed over the profitability of drying fruit; however, small scale (“mom and pop”) enterprises should be considered to help with local employment.. A similar recommendation is made related to 2.4.7 (page 2-29) concerning papaya disinfection.

Page 2-31: 2.4.9 – Drying concrete blocks. It should be noted that what is meant is curing, not drying, concrete blocks in order to increase the strength. This requires a moist and warm room temperature, suitable for using geothermal energy.

Chapter 5 – Engineering Analysis

Page 5-16: 5.6 – Proposed Geothermal Direct Use Enterprise Park. Even though an ice-making/cold storage plant was not considered economical, a pilot plant should be considered for the Enterprise Park to demonstrate if it is feasible.

Cost Estimate Analysis

Page 1 – item #1 – heat exchangers. The total cost of \$23,209.30 seems quite high – along with the 133 man-hours to install the units.

Page 1 – items #16-18 – the cost for the FRP pipe is high and the individual items should not be calculated separately, as FRP pipe is usually purchased pre-insulated, thus saving costs.