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ANALYSIS OF WELL TEST DATA FROM THE HIGH-TEMPERATURE GEOTHERMAL SYSTEM OF AMATITLAN, GUATEMALA

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ABSTRACT

Two of the four production-diameter wells at Amatitlan have been flow tested for about four weeks each. Wellhead pressures were kept fairly constant at approximately 10 kscg for most of the test to determine behavior under commercial operating conditions. Discharge parameters were estimated using the James method for two-phase flow; steam flow rates and power potential were then estimated using a separator pressure of 7 ksca and a steam consumption rate of 7.7 tones per hour per MW. The wells were also throttled for short time periods to obtain relationships between total flow rate, enthalpy, power potential and wellhead pressure. The total mass flow rate in well AMF-1 increased from 105 to 170 tones per hour during the test, yielding a power potential of 4.5 to 6 MW. Enthalpy was relatively constant at 300 kcal/kg during the test, under both full open and throttled conditions. Multiple feed zones were indicated by pressure cycling under throttled conditions. The well had an unusually low maximum discharging pressure of 16 -17 kscg, which is attributed to a low static water level and the presence of an upper “thief ” zone just below the casing shoe at 850m. The productivity index was estimated to be 6.8 tones per hour per ksc. The output of well AMF-2 also increased from 5.5 to more than 7 MW during its four-week test period, with the total flow rate remaining constant at approximately 80 tones per hour and discharge enthalpy increasing due to flashing in the reservoir. The well produces from a natural two-phase zone. The maximum discharge pressure was more than 37 kscg, but the productivity index was relatively low (about 1.5 tons per hour per ksc). The pressure build-up time after shut-in was insufficient to allow a direct calculation of transmissivity; however, based on the measured static pressure at the well's assumed feed zone, a transmissivity of 1,200 md-m is estimated.