EXECUTIVE SUMMARY

A PRELIMINARY ANALYSIS OF THE SHALLOW RESERVOIR CHARACTERISTICS OF THE LIGHTNING DOCK GEOTHERMAL SYSTEM AS DETERMINED FROM PUMP TEST OF AMERICULTURE PRODUCTION WELL

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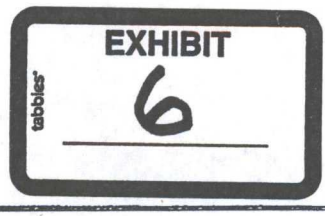

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This report provides the first analysis of the productivity of the shallow Lighting Dock Geothermal System reservoir. The results of this study should be considered as preliminary. However, several important constraints and properties of the reservoir are identified. A description of the shallow reservoir geology of the Lightning Dock Geothermal system, and an analysis of a pump test of the Americulture well, and estimates of reservoir transmissivity and storativity are presented. Estimated Theis model drawdown for a conservative confined reservoir are presented and discussed for a production of 1,000 gpm over a twenty year period at various distances from the production well. Recommendations for production and injection wells and a program of reservoir monitoring are also included in this report.

The Lightning Dock geothermal system is contained in an intrabasin or rift accommodation zone horst block on or adjacent to the intersection of a probable major WNW basement structure, the ring fracture zone of a large Tertiary caldera and at the southern fault tip of an incipient Pleistocene normal fault on the eastern border of the lower Animas graben. The upflow zone plumbing is not possible to detail with confidence. An unmapped fault zone or a buried mid-Tertiary ring fracture rhyolite dike or dome may play a role. Temperature logs and well lithology logs indicate that a shallow outflow plume extends across the area of this report. The outflow plume is contained in a shallow fractured reservoir of Tertiary rhyolite. Overall, the total energy output as inferred from heat flow studies indicates a total flux no greater than 10 MWt. As a result, an ultimate sustained electrical power generation capability in excess of 5 Mwe is probably not feasible.

The approach taken in this study is a very conservative interpretation and analysis of drawdown data from the Americulture and Burgett 'A' wells. The reservoir is assumed to be a confined reservoir which is the most conservative class of aquifer models. In reality, the reservoir is probably a semi-confined and leaky reservoir. There is a complete range of "leakiness" between a confined

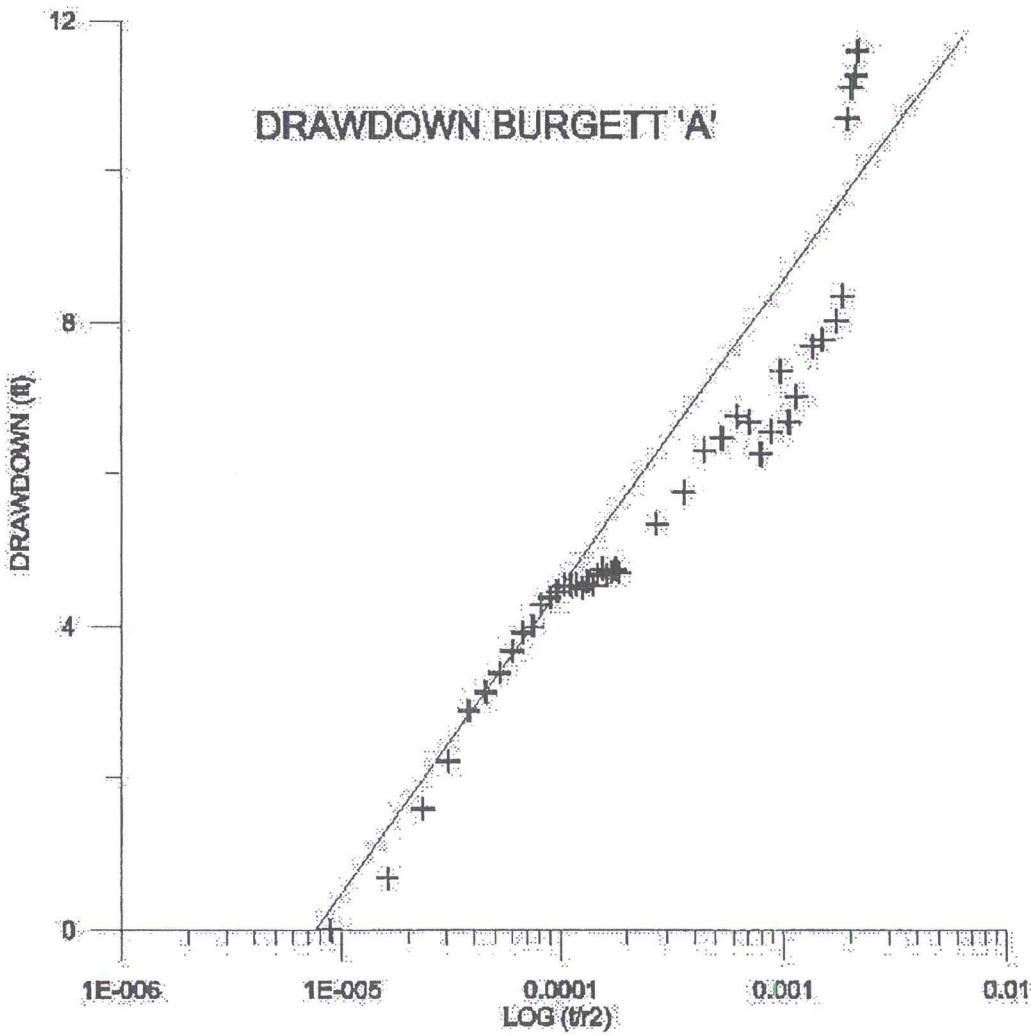
and an unconfined reservoirs in the real world for a semi-confined and leaky reservoir. The project time frame, a lack of previous detailed long-term water level information, and no previous well pump tests requires that a conservative approach be taken to evaluate the shallow Lightning Dock reservoir.

The Cooper and Jacob (straight-line) method is used to evaluate well drawdown information. This method is a practical variation of the standard Theis method to analyze confined reservoirs. Because the data collection methods have significant built in errors, the Cooper and Jacob method is very appropriate as opposed to computer or graphical curve-matching methods that are commonly applied with many other reservoir or aquifer analysis methods.

In order to predict drawdown or water-level declines in the shallow Lightning Dock Reservoir over a long period of production, the Theis model is used. This approach is also very conservative. This analysis assumes that the only production is from the Americulture well and that no injection wells are being used.

The most appropriate value for the reservoir transmissivity is calculated with the Cooper Jacob method as 62,392 gpd/ft, using drawdown data from the Burgett 'A' well. A storativity of 1.17 x 10-4 is also calculated. If the Americulture production well is produced at 1000 gpm over a period of twenty years without injection and no other production in the area, the total differential Theis drawdown in the Burgett 'A' well will be 26. 4 feet.

This study indicates that the reservoir should sustain a long-term production of fluid at 1,000 gpm with minimal drawdown and a temperature between 108 and 112 °C. However, a program of shallow reservoir monitoring should be started. Water levels, basic chemistry, and temperature should be recorded on a regular and sustained basis. Also, the Americulture 1 State well should also be modified to better sustain production. This could include deepening the well.



Twenty-Four hour drawdown for the Burgett 'A' well 825 feet from the pumping Americulture 1 State well. Pump rate was steady at 1, 000 gpm in the Americulture production well. The graphed line is the drawdown slope that was used to calculate reservoir transmissivity and storativity with the Cooper and Jacob method. The axis labeled $\log(t/r^2)$ is the log of the ratio of time (in minutes) and radial distance (in feet) from the pumping well.