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2012 Davenport Newberry Shallow Temperature Logs

Brief Comments on the results

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July 2012

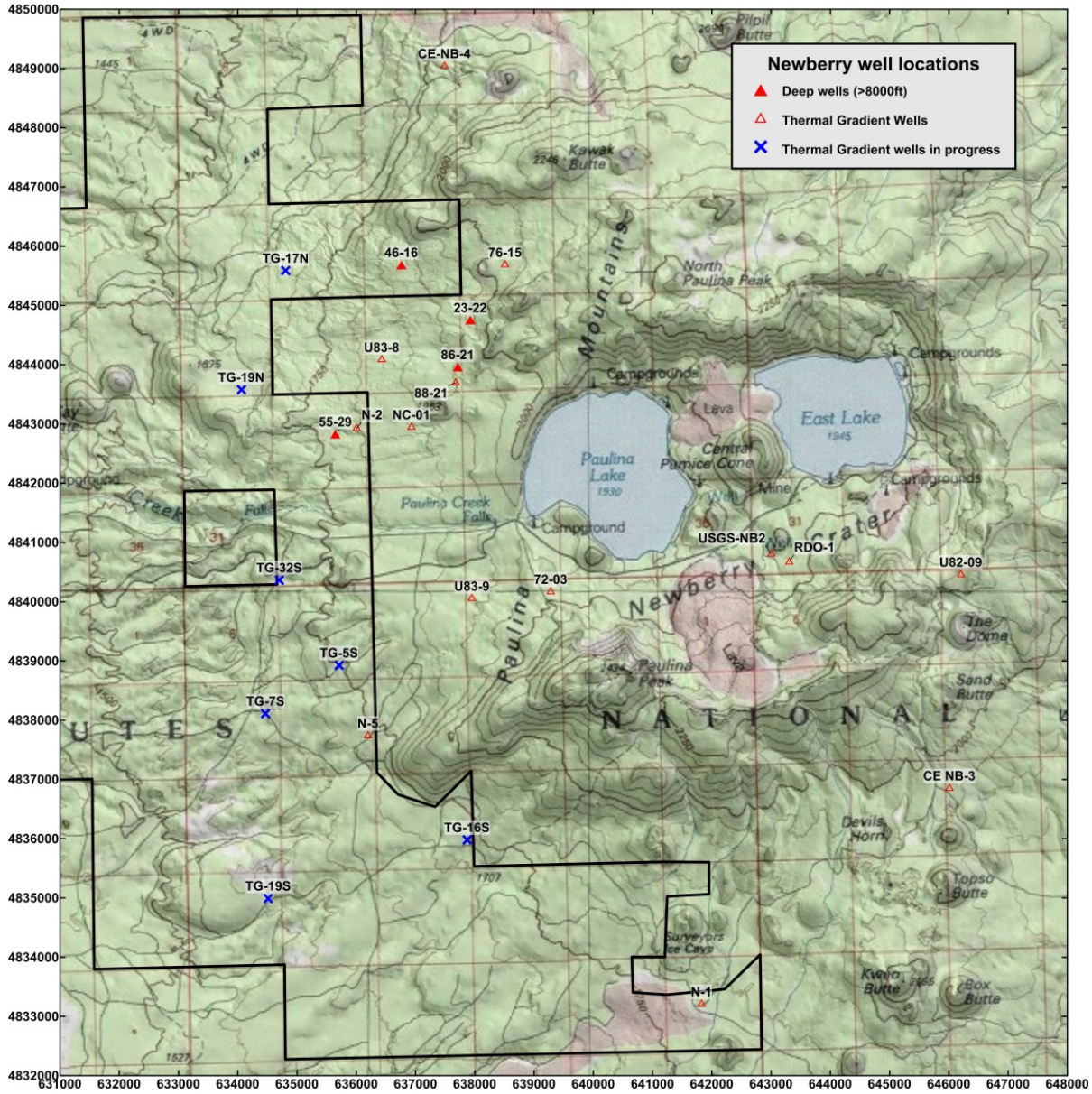

Figure 1: Overview map

Wells are described from North to South

TG-17N

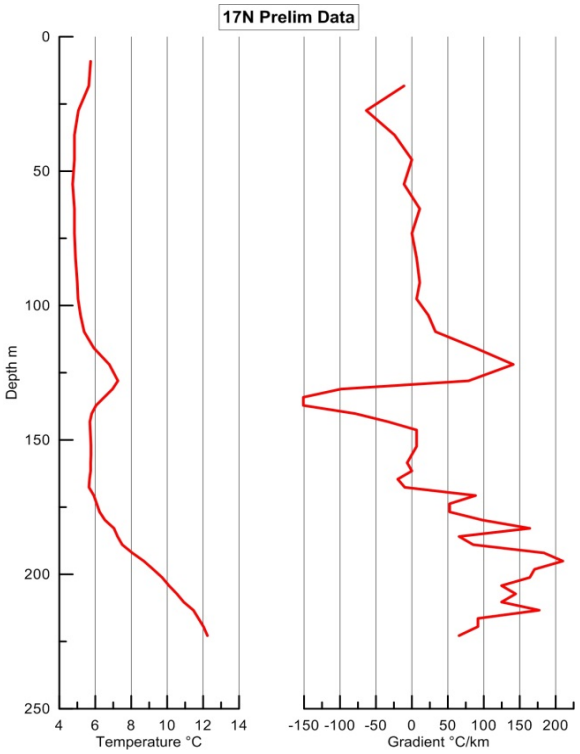

Figure 2: 17N Temperature in °C and gradient in °C/km

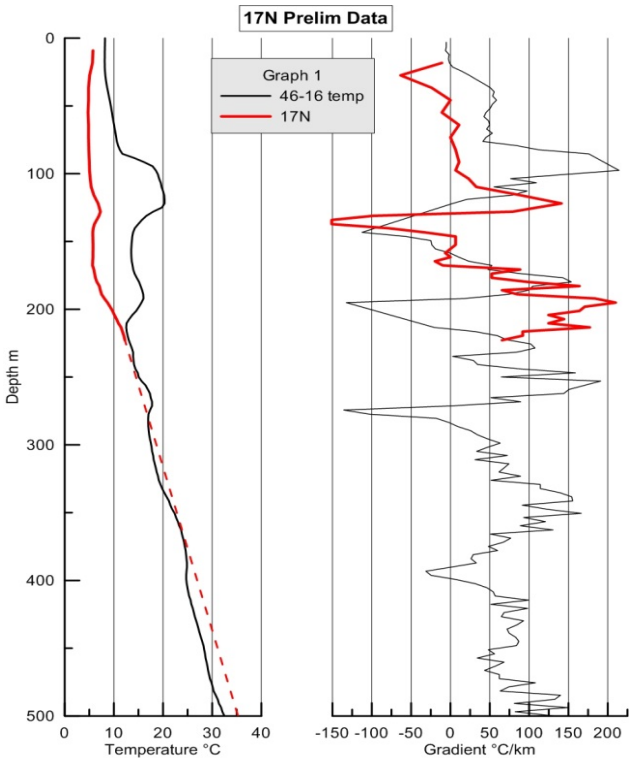

Figure 3: Upper 500m of 46-16 and 17N extrapolated to 500m

17N is located ~2km west of 46-16. The well is relatively isothermal for the first 110m with a temperature of 5-6°C (Figure 2). At 110-135m, there is a positive thermal perturbation of ~2°C. Below this, the temperature returns to an isothermal state to ~170m depth. At 170m the temperature begins to increase with an average conductive gradient of ~120°C/km (6.6°F/100ft.). The last 10m of the well show a decrease in gradient to 83°C/km ((4.6°F/100ft.). The bottom hole temperature (BHT) is 12.2°C. Figure 3 shows 17N (with an extrapolated gradient of 83°C/km) plotted with the upper 500m of 46-16. The two wells are within 2°C of each other at a depth of ~225m (TD of 17N). 46-16 has a similar gradient to the extrapolated gradient (83°C/km) shown for 17N.

TG-19N

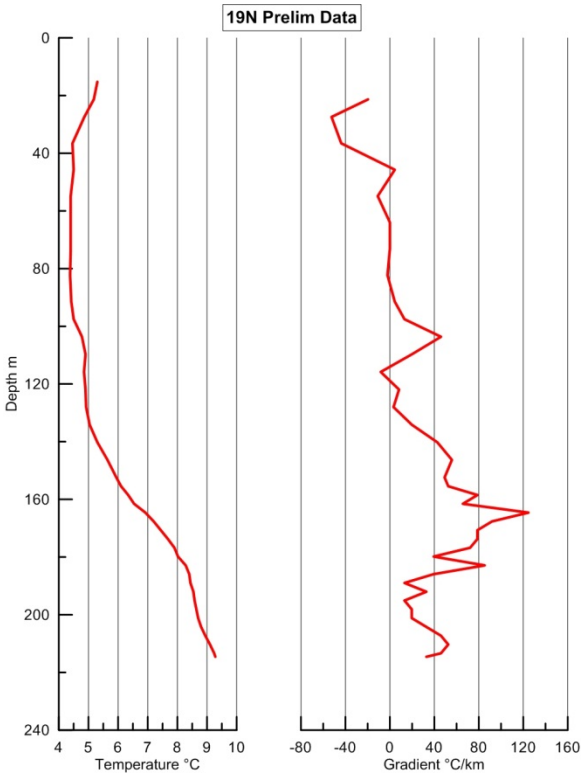

Figure 4: 19N Temperature in °C, gradient in °C/km

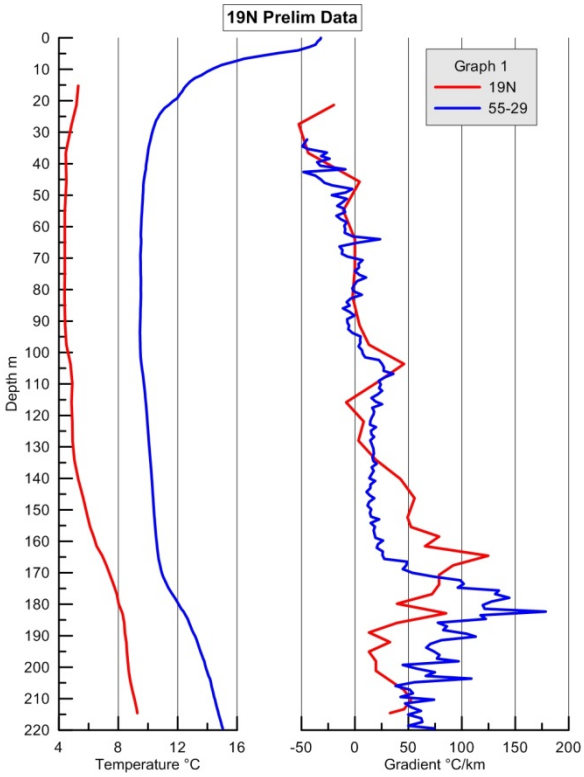

Figure 5: 19N and 55-29

19N is ~1.75km West Northwest from 55-29 and ~2km South Southwest of 17N. The well is isothermal for the first 130m with a temperature increase of 4-5°C. Below 130m there are two distinct gradient sections. The first section is from 130-185m with an average gradient of 67°C/km (3.7°F/100ft.). The second is from 185-214m with an average gradient of 32°C/km (1.8°F/100ft.). The BHT is 9.3°C. Figure 5 shows 19N plotted with the first 220m of 55-29. There is a similar pattern with an increase in gradient below the isothermal zone followed by a lower gradient.

TG-32S

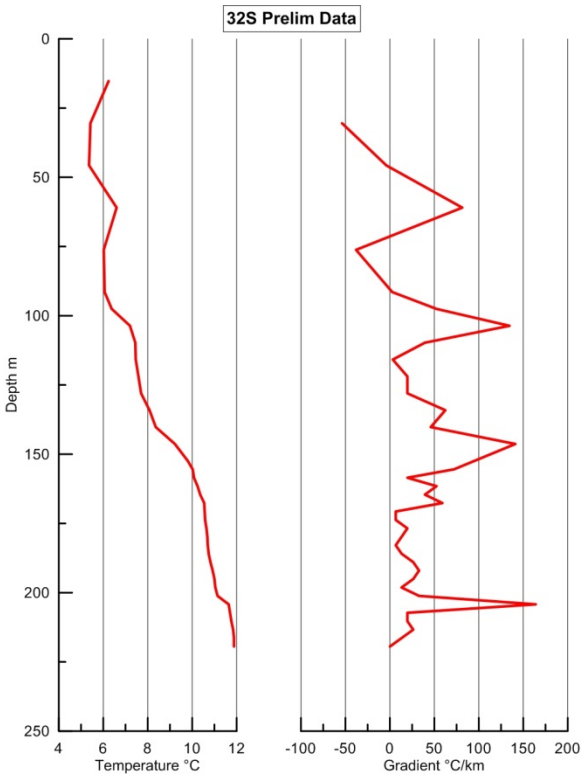

Figure 6: 32S Temperature in °C, gradient in °C/km

32S is located ~2.5km South Southwest of 55-29, just south of the main road into the caldera. The temperature profile shows evidence of water up flow. It is near isothermal to ~100m. Below 100m the temperature increases stepwise to a BHT of 11.9°C. The BHT is significantly higher than the ground water temperature typical in the active flow regions (4 to 6 °C).

TG-5S

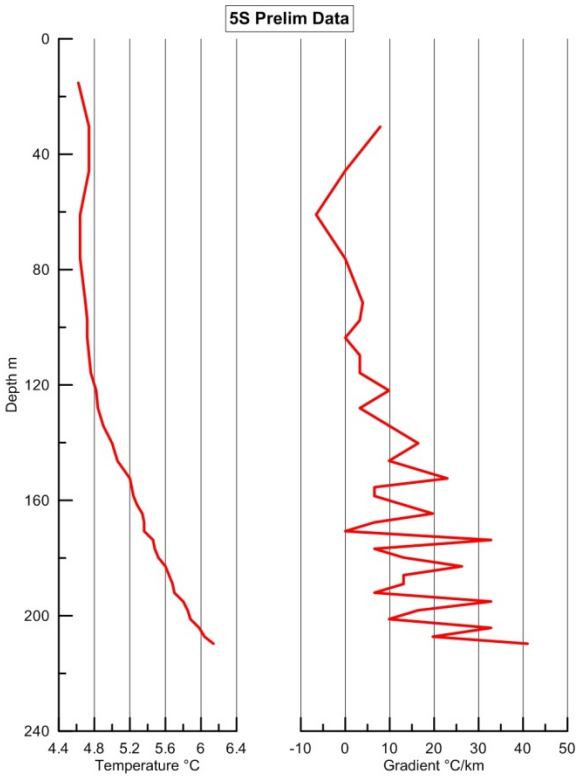

Figure 7: 5S Temperature in °C, gradient in °C/km

5S is located ~1.25km North Northwest of GEO-N5. The temperature profile shows a change of only 1.5°C over 210m. Below 130m ,the average gradient is ~17°C/km (0.9°F/100ft), which is likely not reflecting deeper gradient character. GEO-N5 is isothermal to a ~550m before showing a conductive gradient.

TG-7S

Limited data recorded.

TG-16S

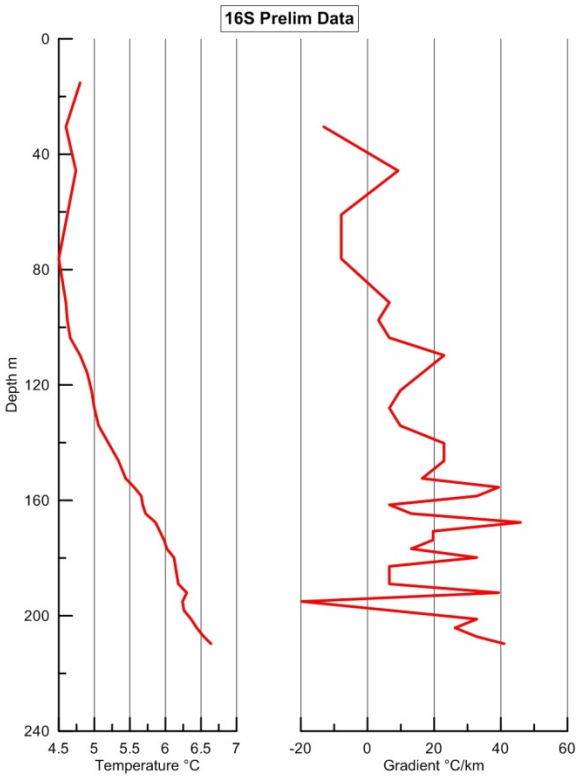

Figure 8: 16S Temperature in °C, gradient in °C/km

16S is located ~2.4km Southeast of GEO-N5. The temperature profile is similar to 5S with an upper isothermal section followed by a gradient of ~20°C/km(1.1^{o}F/100ft) .

TG-19S

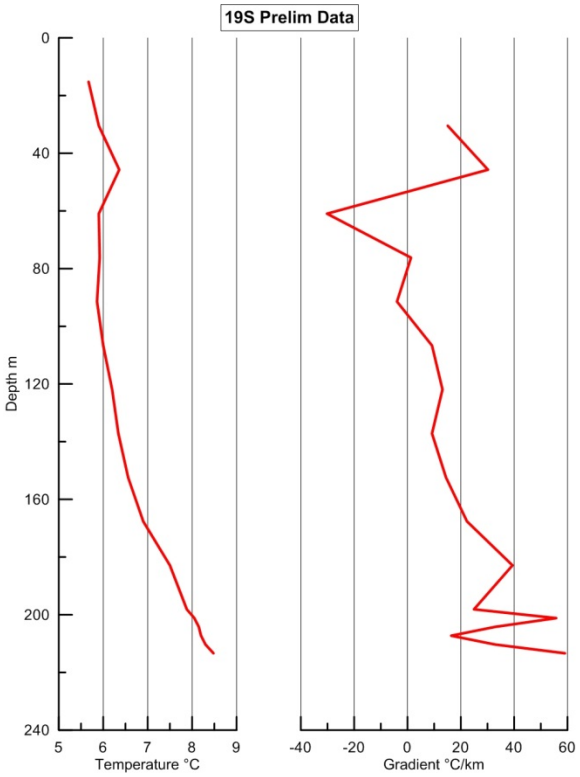

Figure 9: 19S Temperature in °C, gradient in °C/km

19S is located ~3.25km Southwest of GEO-N5. The temperature profile is similar to 5S and 16S. There is minimal (2.8°C) temperature change in the well.

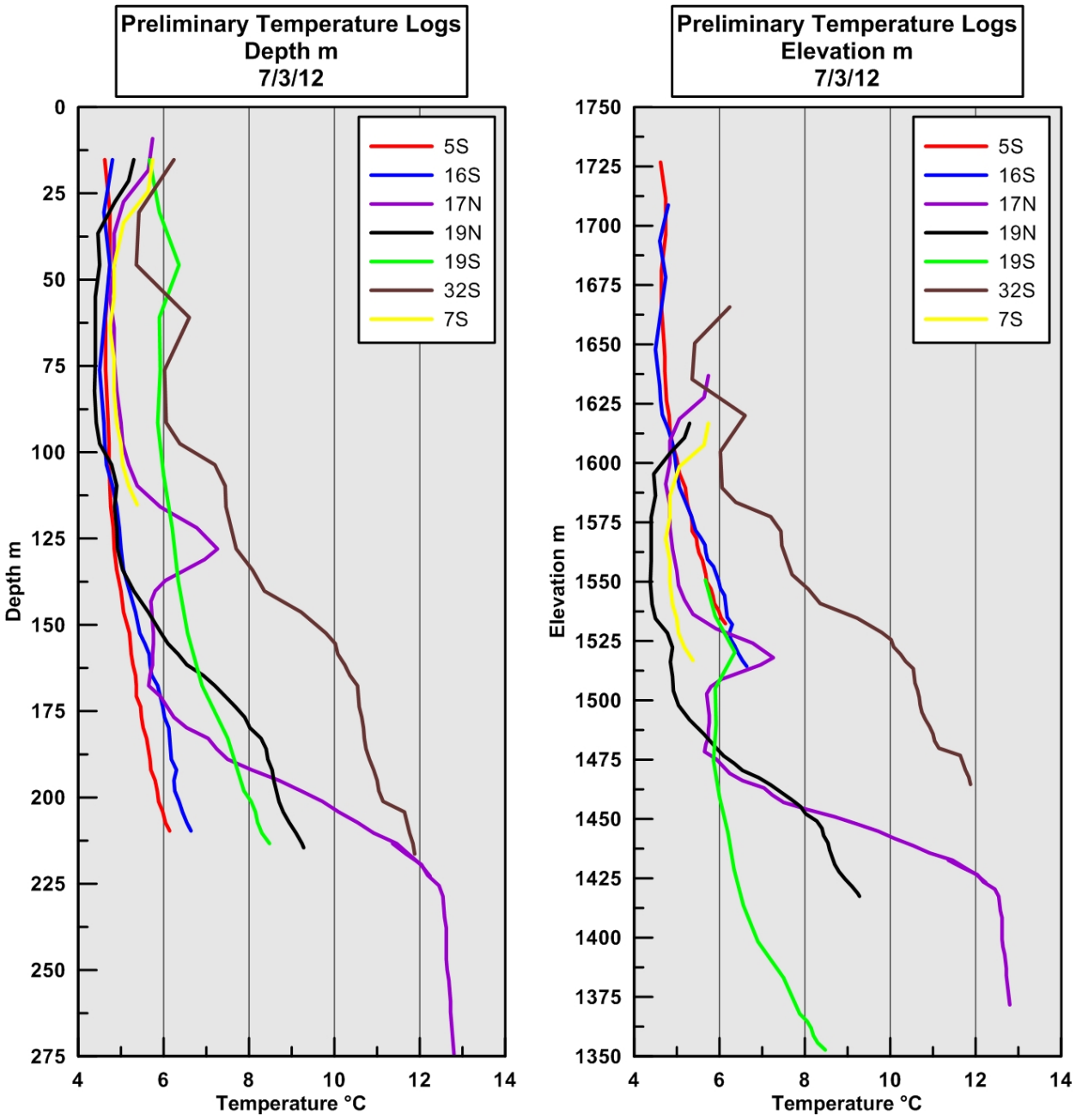

Figure 10: All new thermal gradient wells

The wells to the south of the caldera road are very similar to each other, with the exception of 32S, showing isothermal temperatures to a low (<20°C/km (1.1°F/100ft)) gradient. The wells to the north (17N and 19N) show conductive gradients in the bottom 50-100m and appear similar to the gradients seen in nearby deep wells. The temperature increases in the two northern wells are large enough that it seems very likely that the wells are at or just below the boundary between the convective ground water regime and the deep conductive regime. Hence, modest deepening could give positive results and extend the known high gradient at depth regime significantly, plus provide additional constraints on the correlation of the electrical and thermal exploration data.