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Geothermal Oil and Gas Minerals Hydrology

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Thursday, December 13, 2001

SB GEO, Inc.
1010 Power Plant Drive
P.O. Box 18087
Reno, NV 89511
(775) 852-1444 FAX 852-1807
Attn: Bill Price/Eric Call

RE: Discharge Testing of MTH 24-33

Dear Bill,

SB Geo, Inc. drilled the Meyberg temperature slim hole 24-33 (MTH 24-33) on its Meyberg Property at Steamboat Springs, Nevada. The slim hole was cored to total depth. Funding was through a cost share program with DOE under the "Geopowering the West" program.

The slim hole was completed on 10-Mar-2001 through fractured granodiorite to a total depth of 2000 feet. The slim hole location is shown in Figure 1. The well completion and a geologic description are shown in Figure 2.

MTH 24 –33 was discharge tested on November 30, 2001. The well was discharged into a small diameter atmospheric flash tank. Water rate from the well was measured with a V-notch weir. Total discharge rate during the test was ≈35 gpm. Produced fluids were piped through a temporary 4" diameter injection line to slim hole 12–33 for injection back into the geothermal system. A produced fluid sample was taken during discharge testing for chemical analysis.

Static temperature versus depth data, shown in Figure 3, was obtained prior to discharging the well. Also shown in Figure 3 are static pressure and temperature survey data obtained on 1-May-01. The static water level is 315 feet. Maximum measured temperature, in the open hole section of the well, is ≈324°F.

The temperature and spinner tool (the spinner tool did not operate correctly and no pressure tool was available) were then set at 730 feet (inside 3 1/2" casing) to monitor downhole flowing temperatures after initiating flow. The data obtained (after initiating flow) at 730 feet are shown in Figure 4. The temperature spikes as a function of time are due to fluids located at depth moving up the well bore. The temperature spikes correspond to measured temperatures encountered at depth during static surveys (see Figure 4). Stabilized flowing temperature was ≈307°F at 730 feet. The available data indicate that all of the well flow was coming from below 1,700 feet.

Temperature and spinner survey data were then obtained during discharge. The data are shown in Figure 5. The increase in temperature as fluids move up the hole from >1,700 feet (current maximum depth of the well is ≈1,750 feet) is probably due to conductive heating, however, no spinner data are available to make this determination.

The flowing temperature data indicate that the flash point was at approximately 425 feet. This data, along with the static pressure data obtained on 1-May-01, indicates that the well has high permeability, similar to other wells drilled in the area.

The fluids coming from below 1,700 feet mask the possible production zones located between depths of 1,100 feet to 1,400 feet. This behavior also occurred in slim hole GTH 87-29 drilled on the Giusti Lease (see Figure 1 for well location). This well, GTH 87-29, also allowed deeper cooler fluids to flow up the well bore.

The test data for MTH 24-33, combined with other data for the area, indicates that there is a large producible resource with temperatures of ≈305°F. However, the resource of current interest is in the 315°F to 325°F range that lies between 1,100 feet to 1,400 feet. In order to investigate this zone, MTH 24-33 needs to be plugged-back to

≈ 1,400 feet. This can (probably) be accomplished by placing sand in the lower portion of the well up to a depth of ≈1,400 feet and discharge testing the well. If the sand does not remain in the well, a 5-foot cement plug may be required on top of the sand. The total volume of sand required should probably be based on the original 2,000-foot depth of the well. Although the well seems to be bridged-off to survey tools at the 1,771-foot depth, the core drilling equipment never encountered any bridge at this depth.

Cordially,

Colin Goranson
cgoranson@california.net

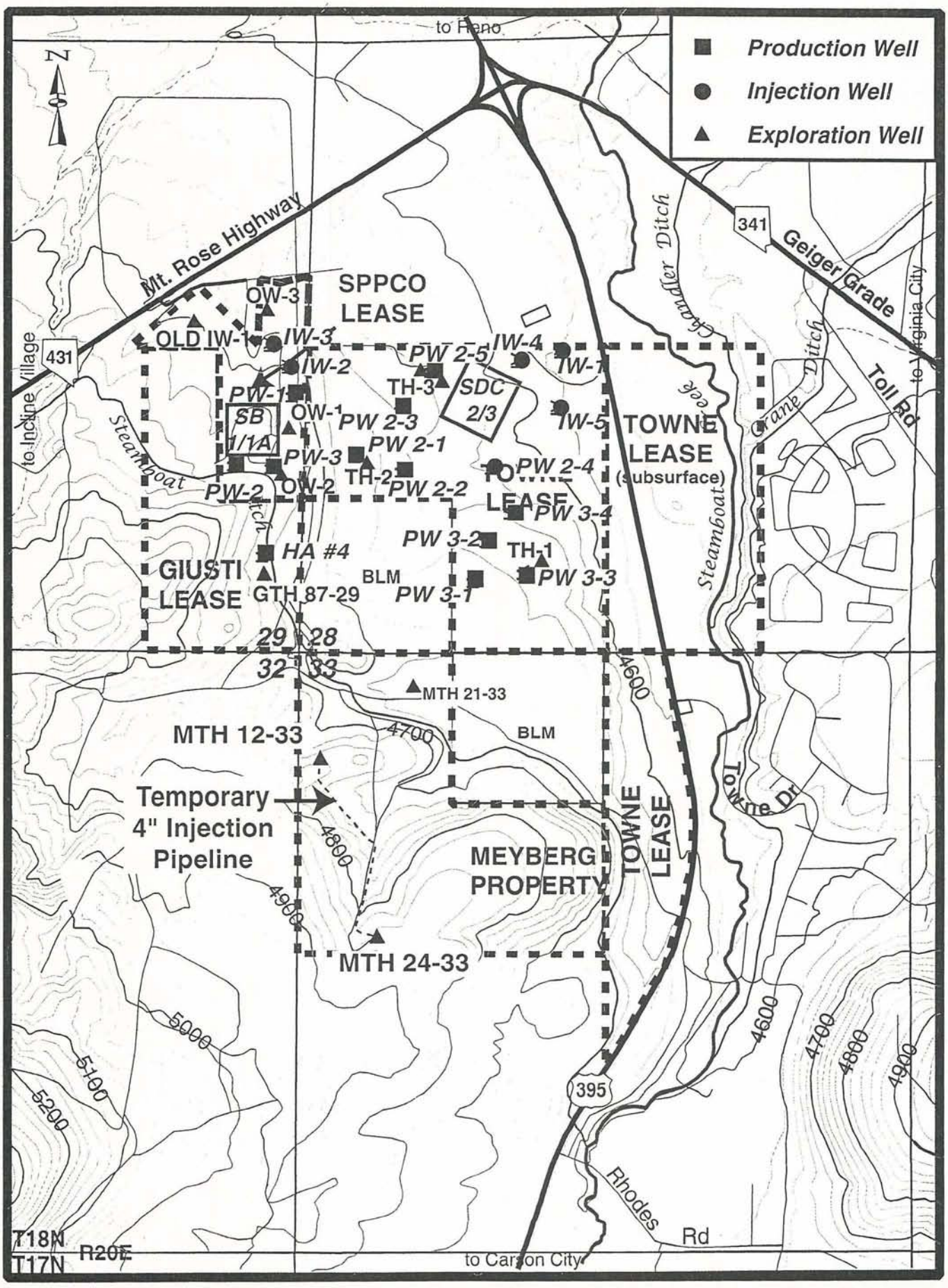

Figure 1) Location of Meyberg Stratigraphic Slim Hole MTH 24-33

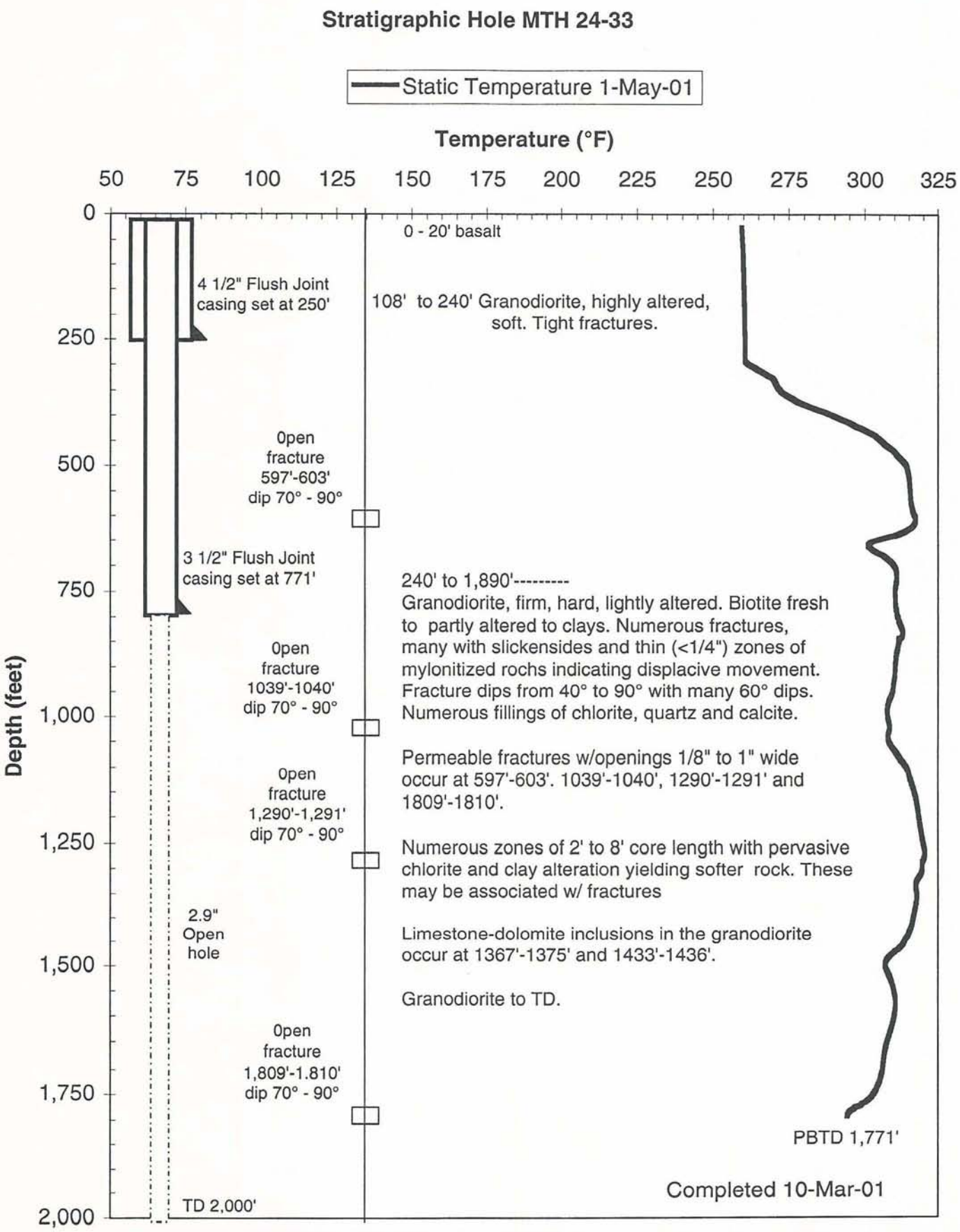

Figure 2) Well Completion, Geologic Description and Static Temperature Data for Slim Hole MTH 24-33

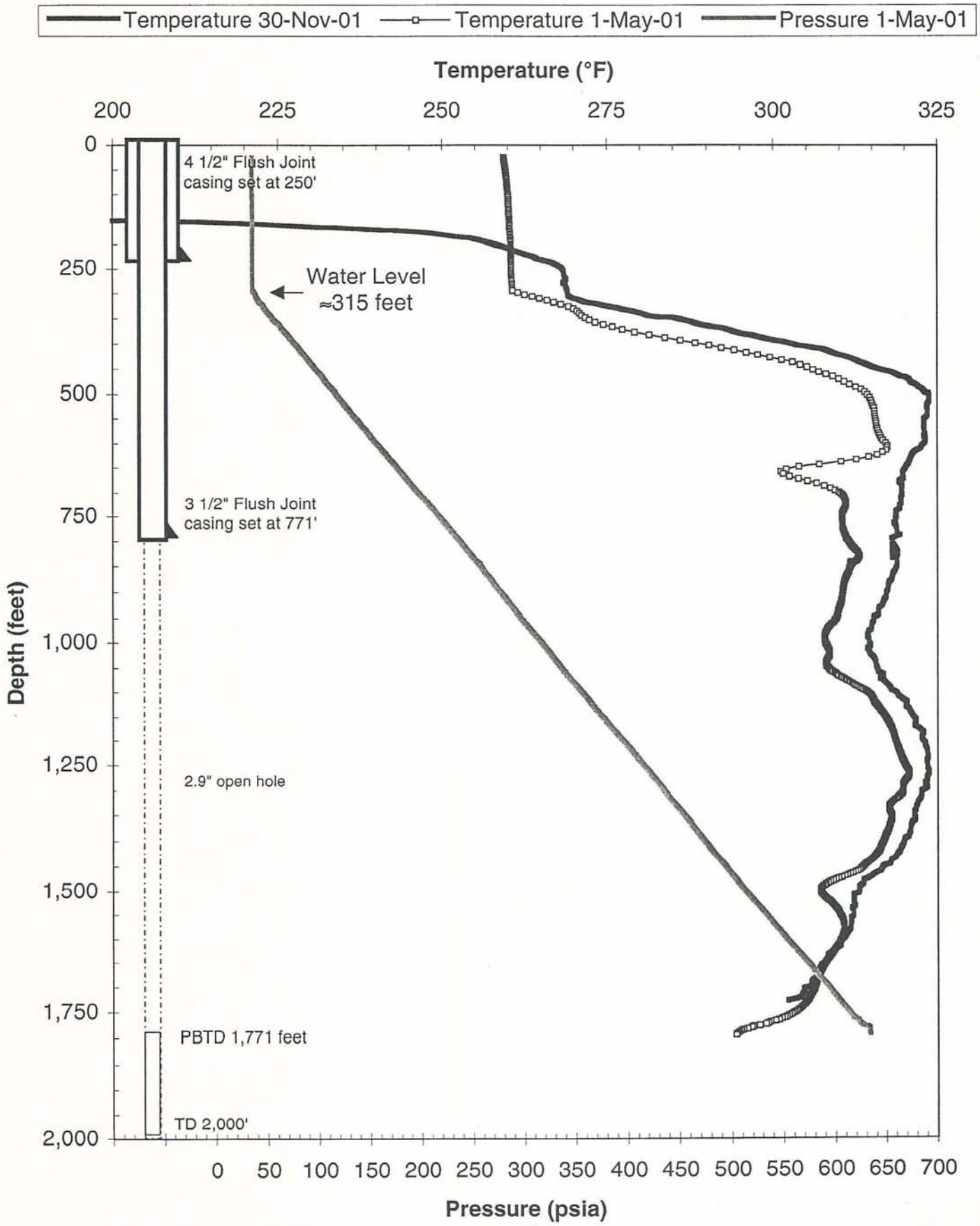

Figure 3) Static Pressure and Temperature Data versus Depth for Slim Hole MTH 24-33

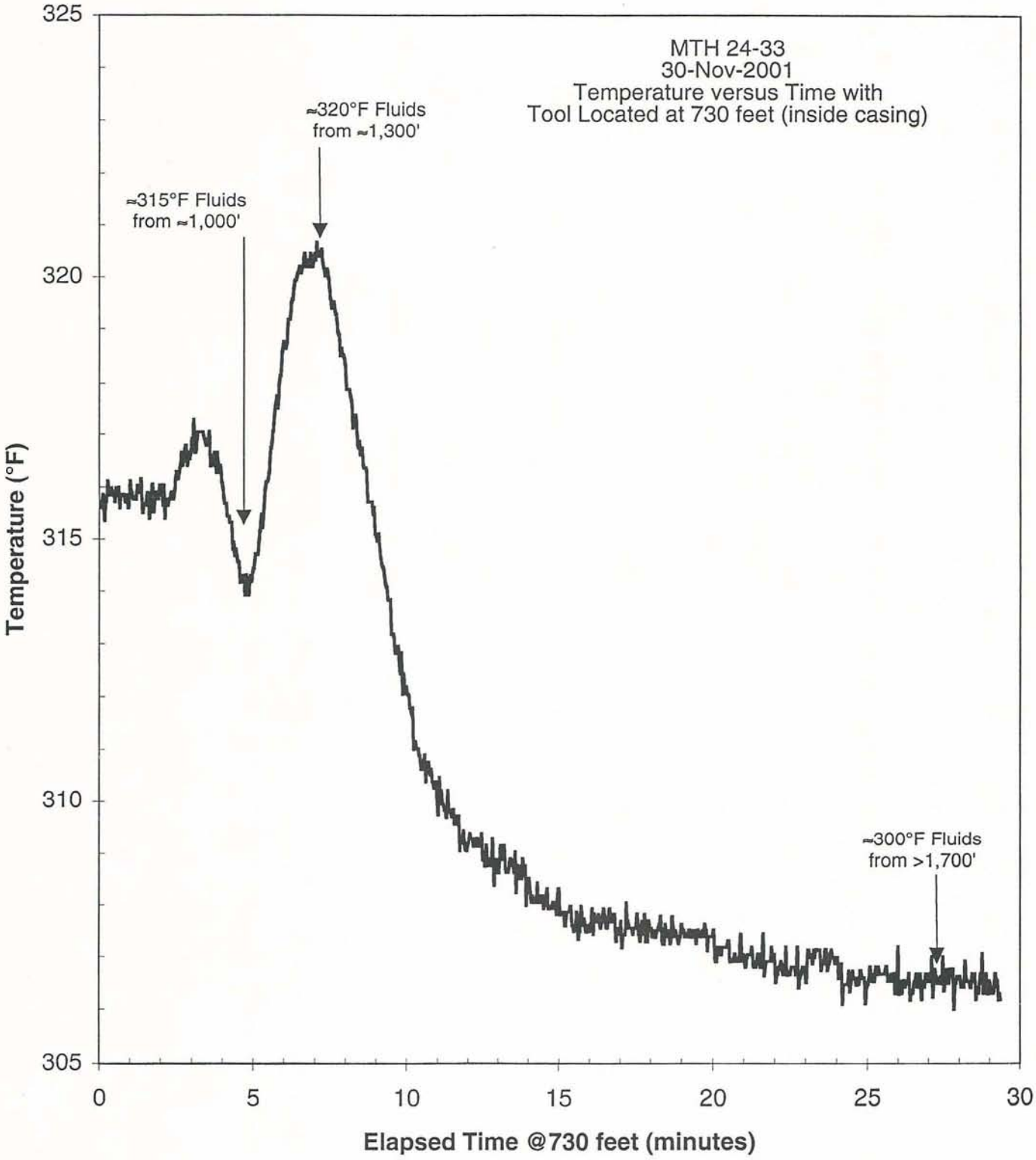

Figure 4) Temperature versus Time at 730 feet During Discharge Testing of Slim Hole MTH 24-33

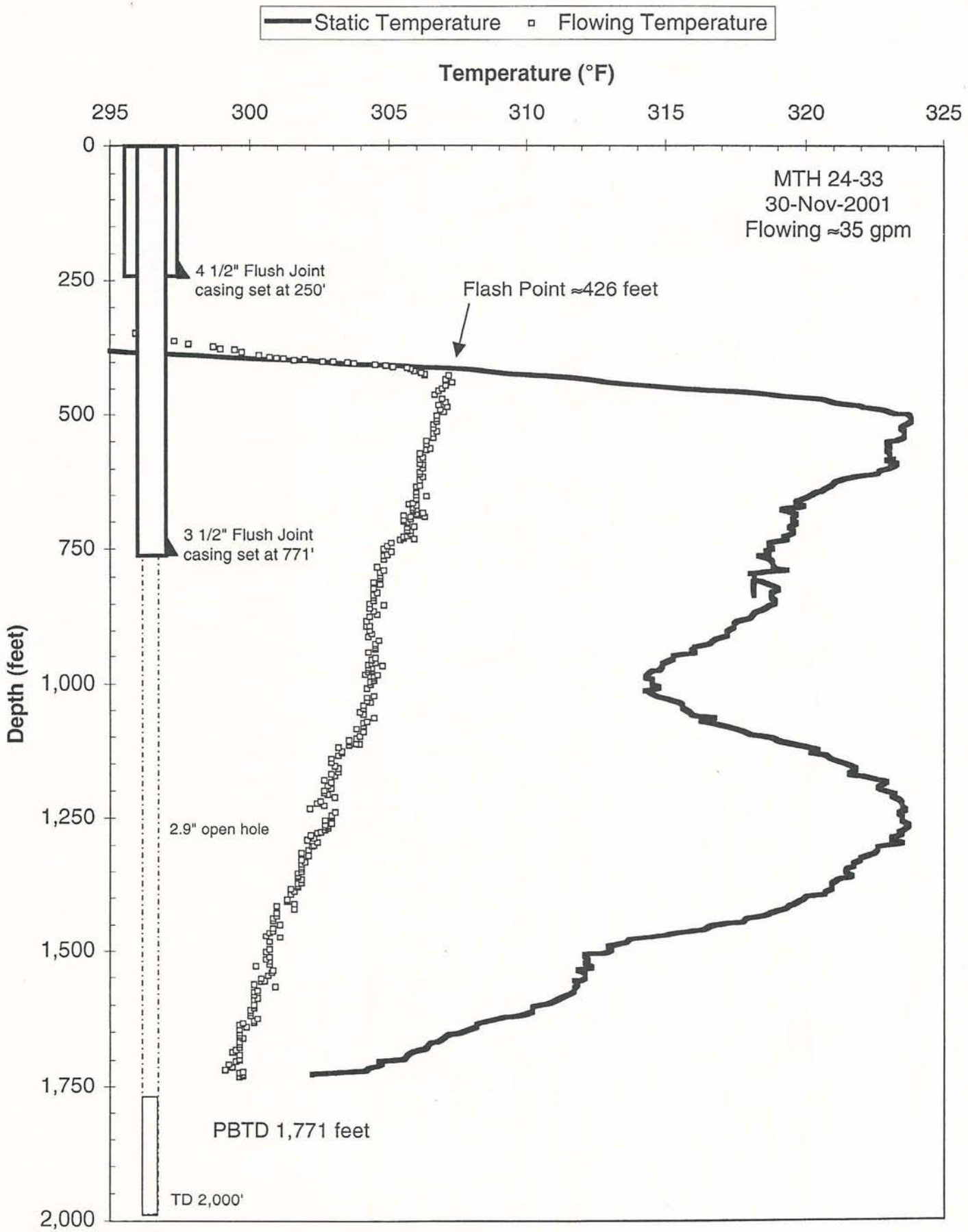

Figure 5) Flowing and Static Temperature versus Depth for Slim Hole MTH 24-33