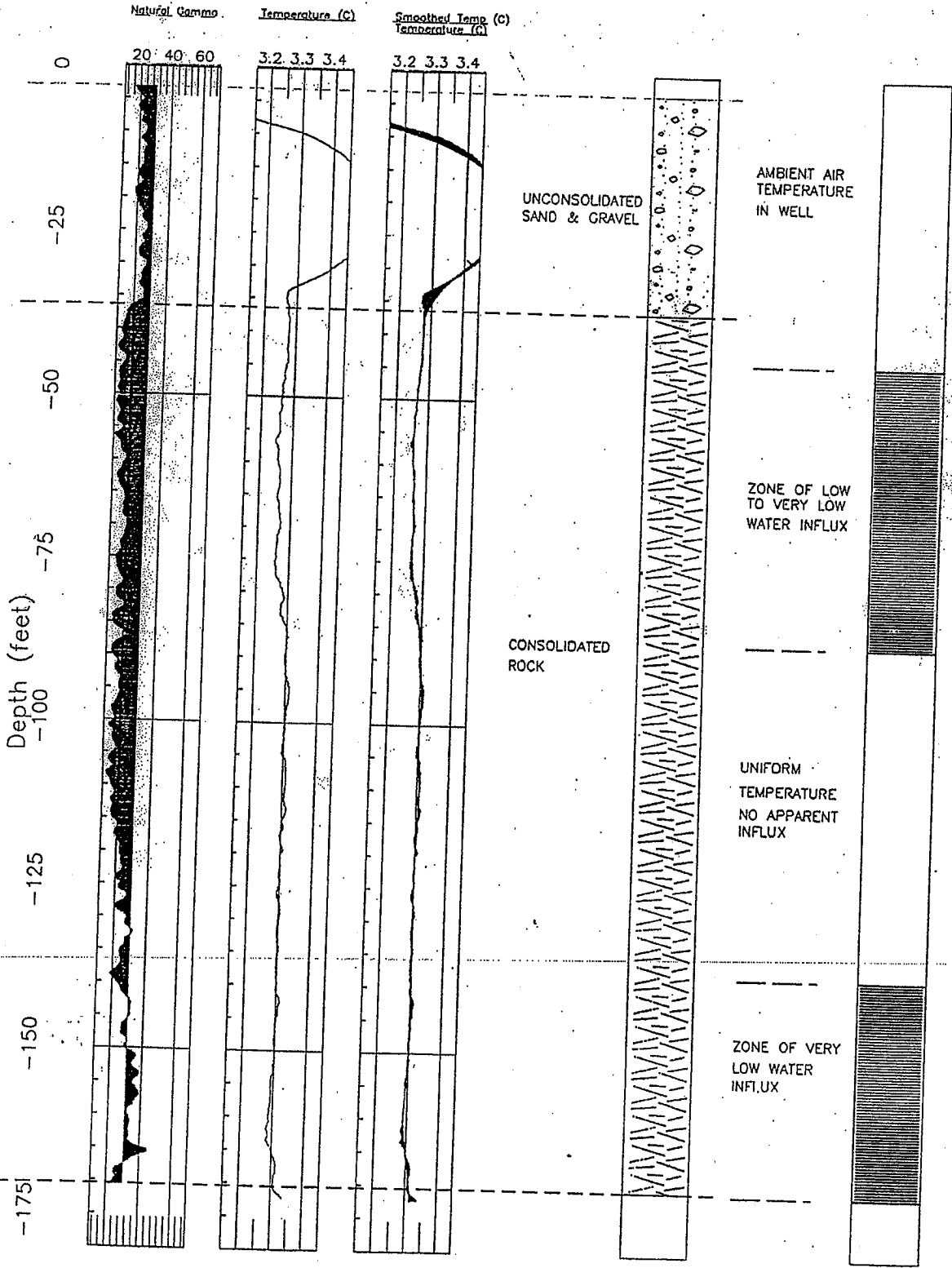


Well Name: Abandoned Hillside Well
File Name: GAMMAD
Location: Manokotak, Alaska
Elevation: 0 Reference: Ground Surface



to have a significant gravel component. These zones are denoted by gamma values at or below 20 counts per second. The interval also contains a single 7 foot (2.1 meter) thick silty sand bed at a depth of 148 - 155 feet (45.1 - 47.2 meters). We believe that this bed represents an earlier river over-bank or mudflat deposit, only this bed is older than the overlying silt layer. This means that this bed may also be a good marker horizon in the subsurface stratigraphy around Manokotak.

The temperature trace shows a second significant deflection in this interval at a depth of 137 feet (41.7 meters). This change occurs in the upper portion of the interval and we believe this marks the most important water bearing gravelly sand beds. We interpret this depth to mark a shift from highest water recharge, above, to low or no water recharge below. This suggests that most of the water entering this well enters between the depths of 100 - 137 feet (30.5 - 41.7 meters). Although there is a considerable thickness of normally porous sand and gravelly sand below this level, 59 feet (18 meters) thick, little or no water contribution is derived from them. We interpret this to suggest that either the casing has not been sufficiently perforated in this interval or these beds are barren of water.

We interpret the last interval, 196 - 357 feet (59.7 - 108.8 meters) as consolidated rock. This interval exhibits a uniform natural gamma log pattern consistent with the pattern seen below 150 feet (45.7 meters) in the "Out-Of-Service Hillside Well" (Figure 7). The temperature log for this interval exhibits a gentle warming trend from 3.6 to 3.8 °C, but we observed no significant deflections. We believe that little to no water is entering the well in this interval. We further believe, that there is little evidence for the existence of formational water outside the casing that these depths, thus the significant water resource occurs between 100 - 196 feet (30.5 - 57.7 meters) and is maximized between 115 - 137 feet (35 - 41.7 meters).

Out-Of-Service Hillside Well

The stratigraphy of the "Out-Of-Service Hillside Well" consists of 37 feet (11.2 meters) of colluvium, sand with gravel, followed by 141 feet (43 meters) of consolidated bedrock, probably metamorphosed basalts (Figure 7). This well was not put into service because it did not produce water. Although we found water starting at a depth of 35 feet (10.7 meters), the logging results suggests the influx of water is very low. We found only a couple of minor deflections at 42, 75, 85 and 160 feet (12.8, 22.9, 25.9 and 48.8 meters) and they are not indicative of a significant source of water.

Fluid Temperature trace on top a 10 point smoothed High Resolution Fluid Temperature trace to emphasize abrupt temperature shifts. These abrupt shifts generally correlate to the influx of water.)

- Figure 8. - Interpretive Apparent Resistivity Model shown in terms of a Pseudo-Stratigraphic columns for the background measurements taken near the "Out-Of-Service Hillside Well" and the "School Well".
- Figure 9. - Interpretive Apparent Resistivity Model shown in terms of a Pseudo-Stratigraphic columns for the six soundings taken in profile north of the runway.
- Figure 10. - Interpretive cross-section illustrating relative depths to the colluvium / bedrock boundary along the profile RW-1 to RW-6. The colluvium / bedrock boundary is drawn for our best model, the error bars are used to illustrate the amount of variance in the modeled thicknesses.
- Figure 11. - Interpretive Apparent Resistivity Model shown in terms of a Pseudo-Stratigraphic columns for the two soundings taken in profile across the creek found 1 mile (1.6 kilometers) east of Manokotak.
- Figure 12. - Interpretive cross-section illustrating relative depths to the colluvium / bedrock boundary. The colluvium / bedrock boundary is drawn for our best model, the error bars are used to illustrate the amount of variance in the modeled thicknesses.
- Figure 13. - Sketch of our proposed well reconstruction for the main city well designed to isolate and illuminate contributions from the silt layer.

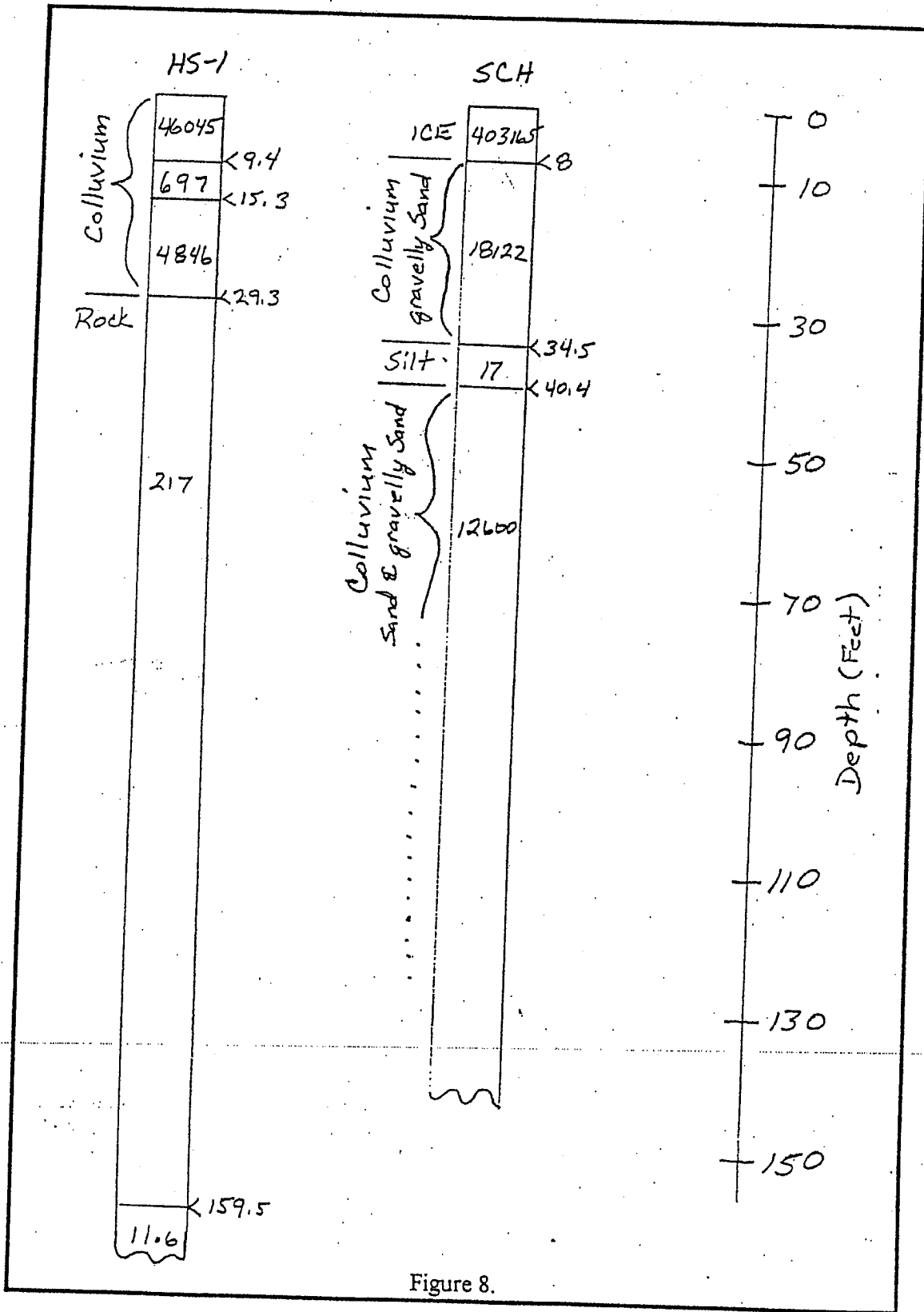


Figure 8.

Manokotak,

Alaska

C.I.R.

Approx. Scale:

1"=24,000'

Figure 3.

