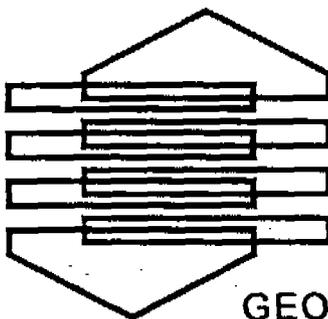


Thermal Conductivity Test Report

Thermal Test



Ewbank
and associates

GEO SYSTEMS PROFESSIONALS

*Cleveland High School
Cleveland, Tennessee*

Thermal Test

Earth Energy

Ewbank and Associates
P.O. Box 148
Fairview, Oklahoma 73737
580-227-3352



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**Thermal Conductivity Test Results
Cleveland High School
Cleveland, Tennessee**

Earth Energy Engineering performed a thermal conductivity test at the Cleveland High School in Cleveland, Tennessee on October 15, 2001. Testing was done by Fred Allison with a Ewbank portable test unit.

The test borehole was 300 feet in depth and 4" in diameter. A 1" inch loop was installed and the borehole was backfilled with #8 stone. Static water level was reported not reported. The formation encountered was reported primarily limestone.

The thermal conductivity (k) value for this borehole is **1.4 btu/degree F-hr-foot**. This is an average conductivity per foot for the borehole. This value represents the rate at which the borehole and rock will transfer heat.

All test equipment, methods, procedures, calculations, and interpretation is done in accordance with the recommendations and guidelines of the International Ground Source Heat Pump Association.

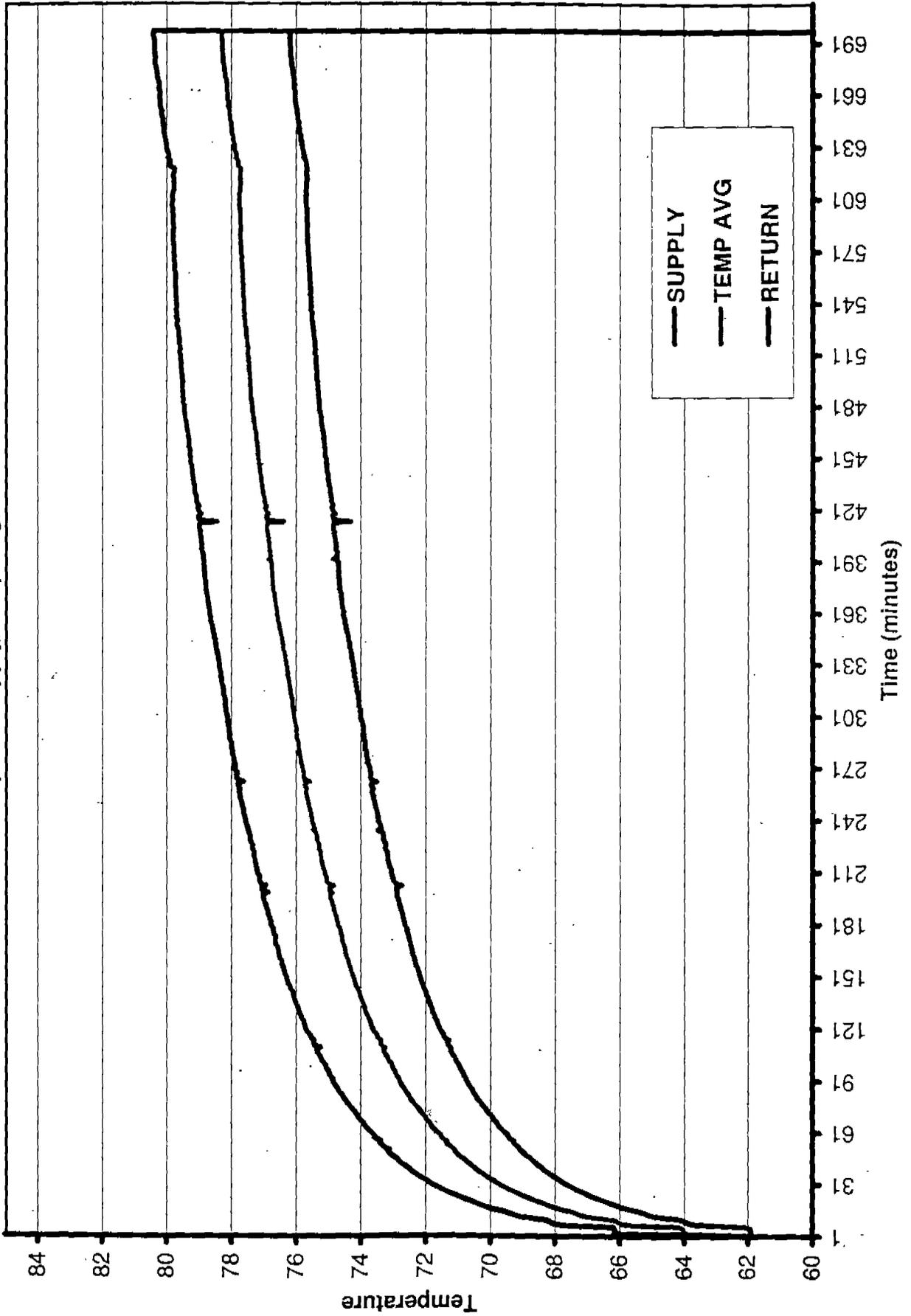
Drill Log for Cleveland High School

Hole # 1
 Front of school
 September 13, 2001
 No casing used

Hole # 2
 Near ball field
 September 13, 2001
 No casing used

From ft	To ft	Material	GPM	From ft	To ft	Material	GPM
0	3	Red clay		0	20	Red clay & cobble	
3	7	Void with red wet mud		20	30	Broken rock & water	
7	300	Hard limestone		30	170	Broken layers of limestone	
				170	300	Limestone & blue shale	
		Loop loaded to 300'				Loop loaded to 170'	

Cleveland High School
Thermal Test
Graph of Supply, Temp Avg, Return



Cleveland High School
Thermal Test
Graph of Log Time of Temp Avg

