TEC-5

VALE AND NORTH VALE, OREGON

Thermal conductivity measurements were made on 8 samples, 7 from the Vale series of holes, numbers 12-19 and one from a north Vale hole, number 17. To supplement this small amount of thermal conductivity information there is a great deal of thermal conductivity information on the Oregon DOGAMI holes which have been drilled in the general vicinity. In general the porosities we have found for the Idaho group sedimentary rocks have been about .3. The average value for thermal conductivity for siltstone south of Vale is on the order of 3.0 ± 0.3 mcal/cmsec^{o}C. For the holes north of Vale we find slightly lower values from measurements on samples from a deep oil well test (2.8 mcal/cmsec^{o}C) and on the core samples from the state holes drilled in the spring of 1975 along an east-west transect (2.5 mcal/cmsec^{o}C). It appears likely that these values are to be compared to values from the Harney Basin in that the sandstones and siltstones tend to have slightly higher values than the clays. Most of the measurements made here are consistent with these numbers although the siltstones from the V series of holes seem to have slightly higher conductivity values than those measured previously. The exceptions to this general statement are the measurements from holes VN-12, 15, and 17. These holes are in terrace gravels sitting on top of the Idaho Group rocks. These conductivity values are distinctly higher than anything else I've seen in the western Snake River Basin and the rocks must be more quartz-rich than anything else occurring in the area. The higher quartz content implies that there must have been an eastward source area for these gravels. Since these are probably very unconsolidated rocks I've assumed that the best value of porosity might be on the order of 0.4. Again there is at least a 10% uncertainty in the

thermal conductivity measurements. The only lithologic units which might have different conductivities in the sedimentary section are the chert pebble conglomerates. These form fairly prominent benches in the Idaho Group rocks. Bulk values of thermal conductivity for this unit are about 6.0 and in situ values are 4.2. These units appear to have highest thermal conductivity of any unit in the Idaho Group sediments. Most of the"sandstones"as described on lithologic logs appear to be basically graywackes and have little quartz content. Most of the grains are feldspar, glass fragments, chert or opal fragments, etc. The rhyolite welded tuffs in the area have thermal conductivity values on the order of 4.5 to 5.5 mcal/cmsec^{o}C, the pumices and glasses have conductivities of 3 or less depending on porosity, and the basalts have bulk conductivities in the range of 3.5 to 5.0 mcal/cmsec^{o}C with the in situ values depending on the actual porosity in the basalt section.

VALE AND NORTH VALE, OREGON

Cutting Thermal Conductivity Measurements

Hole Number	Depth meters	Porosity (assumed)	Bulk and In Situ* Thermal Conductivity mcal/cmsec°C		Lithology
V-12	24.4	0.4	6.27	3.4	Sandy Clay
V-13	15.2	0.3	4.84	3.3	Siltstone
V-14	12.2	0.3	4.83	3.3	Siltstone
V-15	24.4	0.4	7.71	3.9	Gravel
V-16	18.3	0.3	4.81	3.3	Siltstone
V-17	24.4	0.4	7.87	3.9	Sandy Tuff
V-19	18.3	0.3	5.02	3.4	Blue Gray Clay
NV-17	24.4	0.3	3.01	2.4	Siltstone

* $K_{IS} = (K_B)^{1-\varphi} (1.4)^{\varphi}$

SMU Geothermal Laboratory
March 5, 1976