BURNS, OREGON

Measurements were made on 13 cuttings samples from holes BN-8, 9, 10, 11 and 12. No samples were available for other wells although the lithologies are known. In addition to these data we have a large number of thermal conductivity measurements made on other samples in the Harney Basin area where wells were drilled for the Oregon DOGAMI heat flow studies. In general, based on a large number of measurements, fairly consistent in situ thermal conductivity values (allowing for porosity) of about 2.3 ± 0.3 are found for rocks which are logged as clays and in situ values of about 2.6 ± 0.3 are found for rocks which are logged as siltstone, sandstone, and tuffaceous siltstones (these are water saturated values). The porosity values range from about .3 to .5 for most of these sedimentary rocks. The numbers from the tuffaceous siltstones measured in the BN series of wells are consistent with the numbers obtained from the state holes.

The bulk thermal conductivity values of the basalts measured here are fairly uniform at about 4.2 mcal/cmsec^{o}C although in the state holes in different units we found values which ranged from about 3.5 to 5.0. Bulk values of thermal conductivity for the rhyolites and welded tuffs usually average between 4.5 and 5.0 for crystallized rocks and 2.9 to 3.2 for rocks which are composed predominantly of glass. The problem with estimating in situ conductivities for the basalts and the welded tuffs is that the porosities are unknown. In the basalt the porosity will be controlled largely by the number of interbeds, vesicularity, and so forth which may not be obvious from the cuttings. Similarly with the rhyolites the porosities may be large without a great deal of evidence in the cuttings samples. Therefore, there is some uncertainty in the thermal conductivity values to use for these materials although ranges

can be estimated. For calculating the in situ thermal conductivity I have assumed that in general the porosities are going to be fairly low, but the conductivity values could be much lower if the porosity is higher.

The units of lowest thermal conductivity to be expected in the area are pumaceous tuffs. Based on the experience from the state wells these pumaceous tuffs often seem to have conductivity values as low as 1.7 to 1.9 mcal/cmsec^{o}C.

BURNS, OREGON - CUTTINGS THERMAL CONDUCTIVITY MEASUREMENTS

Hole Number	Depth feet	Depth meters	Porosity (assumed)	Bulk Thermal Conductivity mcal/cmsec°C	In Situ Thermal Conductivity* mcal/cmsec°C	Lithology
BN-8	60	18.3	.1(?)	4.38	3.91	Rhyolite
	100	30.5	.1(?)	3.41	3.12	Rhyolite (glass)
	120	36.6	.35	3.20	2.40	Tuffaceous Siltstone
BN-9	100	30.5	.1	4.38	3.91	Basalt
	150	45.7	.1	4.12	3.70	Basalt
BN-10	130	39.6	.1	4.23	3.79	Basalt
	140	42.7	.1	4.24	3.80	Basalt
	150	45.7	.35	3.64	2.61	Tuffaceous Siltstone
	160	48.8	.35	3.21	2.40	Tuffaceous Siltstone
BN-11	50	15.2	.35	3.74	2.65	Tuffaceous Siltstone
	140	42.7	.35	3.48	2.53	Tuffaceous Siltstone
BN-12	120	36.6	.35	4.72	3.08	Tuffaceous Siltstone
	145	44.2	.35	3.54	2.56	Tuffaceous Siltstone

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

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