Memorandum

11-7-79

To : George Gryc
Chief, NPRA

From : Bill Silberman
Jo Bentz
Branch of Alaskan Geology

Subject : Core from Tunalik test well #1

We have examined the core from tunalik test well # 1 from about 17,860 to 17,888 (base of core). In our opinion this represents a basalt flow. The basalt is metamorphosed or altered with a mineral assemblage characteristic of the greenschist facies or "propylitic" alteration. Chips have been sent in for thin sectioning from seven core samples through the interval. A single thin section cut from the sample we submitted to Teledyne for dating shows the rock to have plagioclase laths, chlorite and epidote in random orientation with occasional patches of chlorite that may represent amygdule fillings or relicts of mafic minerals, now recrystallized. Opaques are present, but unidentified at this date. This thin section comes from an interval in which the rock is fairly massive.

According to the core logs and our visual observations, from about 860 to 872 the core is quite vesicular, with vesicles and amygdules filled with chlorite (confirmed by x-ray) and calcite. From 872 to about 887 the rocks is fairly dense and massive looking, with occasional large vesicles near the top of this interval. At about 882 there are laminations, which appear to be composed of chlorite, at an angle of about $30^{o}$ to the vertical. They anastimose and probably represent chlorite replacements along shear planes or fractures in the rock. A similar, but sub-horizontal patch of these occurs at about 884½ feet. From 887 to the end of the core (888) there are large rounded to irregular and flattened vesicles filled largely with calcite, but some have calcite and chlorite or chlorite alone. The morphology of the core suggests that the top (860 to about 870) is a flow top, 870 to 887 represents the middle massive part of the flow, and at 887 the core is approaching the base. I would predict you will come out of this rock below 888 and go into something else - perhaps another flow or perhaps something entirely different.

X-ray diffraction analyses of several samples of the core show major mineral assemblage of quartz, chlorite, plagioclase ± calcite. Petrologic and x-ray results suggest to us this is a basalt flow, metamorphosed at low grade. Hence the K-Ar age which will be coming in shortly from Teledyne will be a minimum.

Depending on how important the interpretation of this age is to your program, I would like to recommend some chemical and stable isotopic analyses of some of the core specimens to fingerprint this stone, and very clearly delineate its conditions of metamorphism or alteration so it can be unambiguously identified should it crop up again in one of your holes. The actual age, which we should get shortly will probably indicate how important this is.

Bill
Jo