Analytical results of K-Ar geochronology studies on biotite concentrates from the following two NPRA core tuff samples:

U.S. Navy Umiat Test No. 1 (510.5'), and
U.S. Navy Umiat Test No. 11 (488').

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DATE: 19 November 1989

SUBJECT: NPRA core X-ray and K-Ar data

It was good to visit with you last week. First, please accept my sincere apologies for not getting these results to you sooner. This memo provides a summary of analytical results of x-ray diffraction and $^{40}Ar/^{39}Ar$ geochronology studies on tuff beds from several NPRA cores from the Simpson, North Simpson, Fish Creek, and Umiat wells. Enclosed please find x-ray diffraction spectra on the <2 micron fraction of 10 samples of the bentonitic tuffs. The spectra are for air dried (designated NARSA...) and ethylene glycol solvated (designated NARSG...) samples and were generated with a SINTAG PAD V X-ray diffractometer (Mike Kelton, analyst) with the following operating conditions: 45 kV, 40 mA, Cu Ka radiation, solid state crystal detector, 1 degree/min=scan rate, 0.03 degree=step size. The sample names give the well name (eg. SIMP), core number (eg. 27), and depth or depth range (eg. 167).

Also enclosed are K-Ar analytical results (Tom Bills, analyst) on biotite concentrates from two tuff samples (Umiat-#1-510.5' and Umiat-#11-488'). These two samples were the only two for which we were able to separate enough sufficiently pure and unaltered biotite for conventional K-Ar work.

I thank you for your cooperation in permitting these analyses and we look forward to future cooperative endeavors.

Sincerely Yours,

Steve

Steven C. Bergman
Principal Research Geologist

Sample Description & Locality: Sample #UMIAT-1/510.5, biotite tuff.

Material Analyzed: Biotite concentrate, -80/+200 mesh.

$^{40*}Ar/^{40}K$ = .005538 AGE = 92.9 +/- 3.5 M.Y.

Argon Analyses:

$^{40*}Ar$, ppm	$^{40*}Ar/Total\ ^{40}Ar$	Ave. $^{40*}Ar$, ppm
.03930	.689	.03985
.04040	.660	

Potassium Analyses:

% K	Ave. % K	^{40}K, ppm
6.010	6.032	7.196
6.053		

Constants Used:

$\lambda_\beta = 4.962 \times 10^{-10}$/year

$(\lambda_e + \lambda_e') = 0.581 \times 10^{-10}$/year

$^{40}K/K = 1.193 \times 10^{-4}$ g/g

$$AGE = \frac{1}{\lambda_\beta + (\lambda_e + \lambda_e')} \ln \left[\frac{\lambda_\beta + (\lambda_e + \lambda_e')}{(\lambda_e + \lambda_e')} \times \frac{^{40*}Ar}{^{40}K} + 1 \right]$$

Note: $^{40*}Ar$ refers to radiogenic ^{40}Ar.

M.Y. refers to millions of years.

Sample Description & Locality: Sample #UMIAT-11/488, biotite tuff core.

Material Analyzed: Biotite concentrate, -200 mesh.

$^{40*}Ar/^{40}K$ = .006103 AGE = 102 +/- 4 M.Y.

Argon Analyses:

$^{40*}Ar$, ppm	$^{40*}Ar$/Total ^{40}Ar	Ave. $^{40*}Ar$, ppm
.03524	.500	.03507
.03490	.599	

Potassium Analyses:

% K	Ave. % K	^{40}K, ppm
4.816	4.817	5.747
4.818		

Constants Used:

$\lambda_\beta = 4.962 \times 10^{-10}$/year

$(\lambda_e + \lambda'_e) = 0.581 \times 10^{-10}$/year

$^{40}K/K = 1.193 \times 10^{-4}$ g/g

$$AGE = \frac{1}{\lambda_\beta + (\lambda_e + \lambda'_e)} \ln \left[\frac{\lambda_\beta + (\lambda_e + \lambda'_e)}{(\lambda_e + \lambda'_e)} \times \frac{^{40*}Ar}{^{40}K} + 1 \right]$$

Note: $^{40*}Ar$ refers to radiogenic ^{40}Ar.
M.Y. refers to millions of years.