Appendix F: Geochronology data, in Fehlmann, R.H., and Amoco Oil Co., Data compilation 1970 Amoco field party, western and central Brooks Range, Alaska

Fehlmann, R.H., and Amoco Oil Co.

GMC DATA REPORT 463F

This GMC data report from the Amoco Heritage collection has been made available through funding from the FY2018 USGS National Geological and Geophysical Data Preservation Program, Grant Number G18AP00054. This project report is presented in its original format and has not been reviewed for technical content or for conformity to the editorial standards of DGGS. It should not be used or cited as reviewed data.

2019
State of Alaska
Department of Natural Resources
Division of Geological & Geophysical Surveys
GEOLOGIC MATERIALS CENTER

APPENDIX F

APPENDIX F

Geochron References:

Brosgé, W. P. and Tailler, I. L., 1970 Depositional History of of Northern Alaska, in Preceedings of the Geological Seminar on the North Slope of Alaska, Pacific Section AAPG, 1970, pp. D1 - D18.

Churkin, M. Jr., 1970, Fold Belts of Alaska and Siberia and Drift Between North America and Asia, in Proceedings of the Geological Seminar on the North Slope of Alaska, Pacific Section AAPG, 1970, pp. G1 - G17.

Reiser, H. N., 1970, Northeastern Brooks Range - A Surface Expression of the Prudhoe Bay Section, in Proceedings of the Geological Seminar on the North Slope of Alaska, Pacific Section AAPG, 1970, pp. K1 - K14.

Tailleur, I. L. 1970, Lead-Zinc- and Barium-Bearing Samples from the Western Brooks Range, Alaska, USGS Open File Report No. 445.

Tailleur, I. L. and Brosgé, W. P., 1970, Tectonic History of Northern Alaska, in Proceedings of the Geological Seminar on the North Slope of Alaska, Pacific Section AAPG, 1970, pp. E1 - E20.

Brooks Geochem File
A61

W D Kruff

Amoco Production Company

Tulsa, Oklahoma
April 27, 1971

Re: Density and magnetic susceptibility determinations

File: Technical Service 5823SQ
Job 5980

Mr. C. J. Long
Denver Division Office

Attention: Mr. D. H. Reno

Dear Sir:

We have completed density and magnetic susceptibility determinations on the samples from Brooks Range and Seward Peninsula. The determinations are shown on the attached sheet.

Very truly yours,

WILLIAM R. WALTON

By Robert W. Duschatko
Robert W. Duschatko

RWD:cme
att.

cc: W. R. Walton
C. J. Hall

BROOKS RANGE

Sample No.	Density	KX10^{-6}
1046	2.933	4,787.08
1050	2.649	5.67
1051	2.877	52.48
1053	2.931	1,332.79
1056	2.663	8.62
1068	2.924	7,457.20
1106	3.042	71,296.40 *
2060	2.758	6.22

SEWARD PENINSULA

1	2.645	11.46
2	2.713	20.35

SEDIMENTS FROM THE BROOKS RANGE, DENSITY ONLY

KS 1A	2.657
KS 2A	2.685
KS 8A	2.634

*Above the capability of the instrument, 1/2 vile of sample used.

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

26 February 1971

Mr. Duane Reno
Security Life Building
Pan American Petroleum Corp.
Denver, Colorado

Dear Mr. Reno:

We have now completed the potassium-argon age determinations on the nine samples which you sent to us under the cover of your letter of December 30th. You will find the complete analytical reports enclosed.

Several of these samples had quite low potassium contents, therefore, the error limits on the ages of these samples are rather large.

These samples gave a wide variety of ages, ranging from mid-Tertiary to Precambrian. I trust that these ages will prove useful to you and that you will contact me should you have any questions regarding the analyses or their interpretations.

In the meantime, I am enclosing our invoice for this work. I hope that we shall have the pleasure of serving you again in the near future.

Sincerely,
GEOCHRON LABORATORIES DIV.

Richard H. Reesman

Richard H. Reesman
General Manager

RHR/bp

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

Union,

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1812

Your Reference: 1035 "B"

Submitted by:

Mr. Duane Reno
Pan American Petroleum Co.
Security Life Building
Denver, Colorado 80202

Date Received: 4 February 1971

Date Reported: 2/26/71

Sample Description & Locality:

Altered amygdaloidal basalt

Material Analyzed: Whole rock, crushed to -40/+ 60 mesh

Ar^{40*}/K^{40} = 0.00329

AGE = 55.4 (± 2.9) x 106 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00628	0.637	0.00636
0.00644	0.512	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
1.579	1.586	1.935
1.593		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R -1785

Your Reference: 2054

Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Date Received: 1/11/71

Date Reported: 2/26/71

Sample Description & Locality:

Altered andesite (?)

Material Analyzed: Whole rock, crushed to -60/+100 mesh.

Ar^{40*}/K^{40} = 0.0143

AGE = 230 (±20) x 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00151	0.139	0.00146
0.00140	0.229	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
0.086	0.084	0.102
0.083		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. B-1784

Your Reference: 1024

Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Date Received: 1/11/71

Date Reported: 2/26/71

Sample Description & Locality: Quartzose schist
Horace Mtn.

Material Analyzed: Biotite concentrate
Composition: 90% biotite, 10% quartz.

Ar^{40*}/K^{40} = 0.00703

AGE = 121 (± 4) x 10^6 years

Argon Analyses:

Ar^{40*} ppm.	$Ar^{40*}/Total\ Ar^{40}$	Ave. Ar^{40*} ppm.
0.0527	0.577	0.0520
0.0513	0.642	

Potassium Analyses:

% K	Ave. %K	K^{40} ppm
6.156	6.060	7.393
5.946		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1783
Your Reference: 1099
Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Date Received: 1/11/71
Date Reported: 2/26/71

Sample Description & Locality:
Andesite

Material Analyzed: Whole rock, crushed to -40/+60 mesh.

$Ar^{40*}/K^{40} = 0.0135$

AGE = 218 (± 14) x 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00559	0.610	0.00554
0.00548	0.592	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
0.326		
0.332	0.336	0.410
0.349		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1782
Your Reference: 1083
Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Date Received: 1/11/71
Date Reported: 2/26/71

Sample Description & Locality:
Andesite

Material Analyzed: Whole rock, crushed to -40/+60 mesh.

Ar^{40*}/K^{40} = 0.0297

AGE = 450 (± 60) x 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00117	0.233	0.00110
0.00103	0.271	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
0.036	0.030	0.037
0.024		

Constants Used:

$\lambda\beta = 4.72 \times 10^{-10}$/ year

$\lambda e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

$$AGE = \frac{1}{\lambda e + \lambda\beta} \ln\left[\frac{\lambda\beta + \lambda e}{\lambda e} \times \frac{Ar^{40*}}{K^{40}} + 1\right]$$

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

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1781
Your Reference: 1072
Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Date Received: 1/11/71
Date Reported: 2/26/71

Sample Description & Locality:
Altered volcanic (?)

Material Analyzed: Whole rock, crushed to -40/+60 mesh.

$Ar^{40*}/K^{40} = 0.044$ AGE = 630 (±100) x 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00023	0.059	0.00022
0.00021	0.094	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
0.004	0.004	0.005
0.003		

Constants Used:

$\lambda\beta = 4.72 \times 10^{-10}$/ year
$\lambda e = 0.585 \times 10^{-10}$/ year
$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. A-1780

Your Reference: 2034

Date Received: 1/11/71

Date Reported: 2/26/71

Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Sample Description & Locality:
Diorite

Material Analyzed: Amphibole concentrate. Composition: 85% amphibole, 15% plagioclase.

Ar^{40*}/K^{40} = 0.0183

AGE = 290 (±5) X 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00081	0.075	0.00084
0.00088	0.100	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
0.039	0.038	0.046
0.038		

Constants Used:

$\lambda\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. B -1779
Your Reference: 1023
Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Date Received: 1/11/71
Date Reported: 2/26/71

Sample Description & Locality:

Arriegetch Peaks
Gneiss

Material Analyzed: Biotite concentrate; -40/+100 mesh.
Composition: 85% biotite, 15% adhering quartz and feldspar.

Ar^{40*}/K^{40} = 0.00553 AGE = 92.2 (± 3.3) x 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.0233	0.648	0.0232
0.0231	0.669	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
3.425	3.439	4.196
3.453		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R -1778 Date Received: 1/11/71

Your Reference: 1035 ~~(A & B)~~ A Date Reported: 2/26/71

Submitted by: Mr. Duane Reno
Pan American Petroleum Corporation
Denver, Colorado 80202

Sample Description & Locality:
Flood Creek "A"
Diorite (?)

Material Analyzed: Whole rock, crushed to -60/+100 mesh.

$Ar^{40*}/K^{40} = 0.00378$ AGE = 63.6 (±3.2) x 10^6 years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.00739	0.553	0.00734
0.00728	0.489	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
1.544	1.590	1.940
1.636		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

5 May 1971

Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Dear Mr. Reno:

We have now completed the K-Ar age determinations on your samples RRR190 (granite) and RRR 190 (felsite) which you sent to us under the cover of your letter of 5 March. You will find the complete analytical reports enclosed.

Sample RRR190 (granite) yielded an age of 148 million years, which is Jurassic, and sample RRR190 (felsite) yielded an age of 65 million years, which is early Tertiary. We had some problems of reproducibility with the potassium analyses of the latter sample, but this biotite concentrate was rather small and a little impure so we may have had a splitting problem.

We will not analyze sample RRR194.

If you should have any questions about either of the above age analyses or their interpretations please do not hesitate to contact me. In the meantime, I am enclosing our invoice for this work.

Sincerely,
GEOCHRON LABORATORIES DIV.

Richard H. Reesman

Richard H. Reesman
General Manager

RHR/bp

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. B1851

Your Reference: RRR 190 (granite)

Submitted by:

Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Date Received: 15 March 1971

Date Reported: 5 May 1971

Sample Description & Locality: Granite - Northeastern Alaska

Material Analyzed: Biotite concentrate, -40/+100 mesh.
Composition: 96% biotite, 4% adhering quartz

Ar^{40*}/K^{40} = 0.00905 AGE = $148(\pm 7)\times 10^6$ years

---

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.0671	0.889	0.0665
0.0659	0.886	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
6.005	6.026	7.351
6.050		
6.022		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. B 1852

Your Reference: RRR 190 (felsite)

Submitted by: Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Date Received: 15 March 1971

Date Reported: 5 May 1971

Sample Description & Locality: Felsite

Material Analyzed: Biotite concentrate
Composition: Approx. 90% biotite, 10% adhering groundmass

Ar^{40*}/K^{40} = 0.00385

AGE = $64.7(\pm 2.2) \times 10^6$ years

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
0.0233	0.505	0.0239
0.0245	0.476	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
5.346	5.089	6.209
5.028		
5.054		
4.928		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

16 June 1971

Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Dear Mr. Reno:

Enclosed are the complete anlalytical reports for the six (6) samples that were suitable for dating out of the group of seven (7) samples that you sent to us under the cover of your letter of 20 April. Enclosed also is the analytical report for your sample 1053 from an earlier group of samples.

Your sample 1053 gave a late Jurassic age. This concentrate was obviously rather impure as is evidenced by the low potassium content. The impurity in this sample is most likely a whitish chlorite. Separation of the two minerals from each other at these very fine grain sizes is almost impossible.

Your samples 1054 and 1110 both gave mid-Cretaceous ages of 107 million years and 95 million years, respectively.

Two of the four samples of well cuttings gave ages in the Mid-Tertiary and two gave ages in the early Cretaceous.

If you should have any questions about these age determinations please do not hesitate to contact me. In the meantime, I am enclosing our invoices for these analyses. I hope that we may serve you again in the near future.

Sincerely,
GEOCHRON LABORATORIES DIV.

Richard H. Reesman

Richard H. Reesman
General Manager

RHR/bp

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. M-1887

Your Reference: 1053

Submitted by:

Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado

Date Received: 4 May 1971

Date Reported: 15 June 1971

Sample Description & Locality:

Schist

Material Analyzed: Muscovite concentrate, -100/+200 mesh.

Ar^{40*}/K^{40} = .00845

AGE = 139 (± 4) m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.0186	.489	.0187
.0188	.513	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
1.809	1.815	2.214
1.820		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R- 1889

Your Reference: 1110

Submitted by:

Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado

Date Received: 4 May 1971

Date Reported: 11 June 1971

Sample Description & Locality:

Basalt

Material Analyzed: Whole rock, crushed to -40/+100 mesh.

Ar^{40*}/K^{40} = .00568 AGE = 94.6(± 3.7)m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.00556	.451	.00543
.00530	.411	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
.801	.784	.956
.767		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. B-1888

Your Reference: 1054

Submitted by: Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado

Date Received: 4 May 1971

Date Reported: 15 June 1971

Sample Description & Locality:

Schist

Material Analyzed: Biotite concentrate, -40/+100 mesh.
Composition: approximately 80% biotite, 20% adherigg and intermixed quartz.

Ar^{40*}/K^{40} = .00642 AGE = 107 (± 3) m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.0192	.780	.0190
.0187	.722	

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
2.438	2.418	2.950
2.379		
2.438		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

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REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1882

Your Reference: 1046

Submitted by: Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Date Received: 15 April 1971

Date Reported: 4 June 1971

Sample Description & Locality:
Andesite
Brooks Range, Northern Alaska

Material Analyzed: Whole rock, crushed to -100/+200 mesh.

Ar^{40*}/K^{40} = .0132

AGE = 214 (± 13) m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.00407	.573	
.00401	.521	.00404

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
.249		
.249	.250	.305
.252		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

Telephone [illegible]

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1881

Your Reference: 1068

Submitted by: Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Date Received: 15 April 1971

Date Reported: 4 June 1971

Sample Description & Locality:
Andesite
Brooks Range, Northern Alaska

Material Analyzed: Whole rock, crushed to -40/+200 mesh.

Ar^{40*}/K^{40} = .00643

AGE = 107(± 6)m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.00212	.374	
.00227	.454	.00220

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
.275		
.284	.280	.341
.280		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Geochron Laboratories, Inc.

24 Blackstone Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. A-1880

Your Reference: 1106

Submitted by: Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Date Received: 15 April 1971

Date Reported: 4 June 1971

Sample Description & Locality:
Gabbro
Brooks Range, Northern Alaska

Material Analyzed: Amphibole concentrate, -40/+100 mesh.
Composition: approximately 90% amphibole, 10% adherigg feldspar.

Ar^{40*}/K^{40} = .00956

AGE = 157(± 11)m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.00069	.121	
.00074	.077	.00072

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
.061		
.062	.061	.075
.061		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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

Krochron Laboratories, Inc.

24 Blac[illegible]ne Street, Cambridge, Mass. 02139
Telephone TRowbridge 6-3691

REPORT OF ANALYTICAL WORK

POTASSIUM-ARGON AGE DETERMINATION

Our Sample No. R-1879

Your Reference: 2060

Date Received: 15 April 1971

Date Reported: 4 June 1971

Submitted by: Mr. Duane Reno
Amoco Production Company
Security Life Building
Denver, Colorado 80202

Sample Description & Locality:
Andesite
Brooks Range, Northern Alaska

Material Analyzed: Whole rock, crushed to -40/+200 mesh.

Ar^{40*}/K^{40} = .00657 AGE = 109 (± 12) m.y.

Argon Analyses:

Ar^{40*}, ppm.	Ar^{40*}/ Total Ar^{40}	Ave. Ar^{40*}, ppm.
.00082	.050	
.00103	.133	
		.00093

Potassium Analyses:

% K	Ave. %K	K^{40}, ppm
.113		
.117	.115	.141
.116		

Constants Used:

$\lambda_\beta = 4.72 \times 10^{-10}$/ year

$\lambda_e = 0.585 \times 10^{-10}$/ year

$K^{40}/K = 1.22 \times 10^{-4}$ g./g.

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

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