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Rb-Sr AGES OF CLAY MINERALS ASSOCIATED WITH URANIUM MINERALIZATION AT THE DORIS AND SILVER SPUR MINES, GRANTS MINERAL BELT, NEW MEXICO

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Geologic control at both the Doris and Silver Spur Mines, Grants Mineral Belt, New Mexico, argues for a Laramide age of uranium mineralization (Della Valle, 1980). The ores at the Doris Mine occur in Morrison Formation (Late Jurassic) rocks while those at the Silver Spur Mine occur in Dakota Formation (Cretaceous) rocks. We present our Rb-Sr results for dating the clay minerals from both mines since these clay minerals appear to be penecontemporaneous with the uranium mineralization. Elsewhere in the Grants Mineral Belt, ages of approximately 140 Ma (Ambrosia Lake ores) and 115 Ma (Laguna District) have been reported (Lee and Brookins, 1978; Brookins, 1980).

The Doris Mine samples are from the approximate location—latitude N35°20′05″, and longitude W107°48′51″. The Silver Spur Mine samples are from the approximate location 35°23′26″, 107°57′08″. The samples were collected by R. S. Della Valle (1980). Standard methods were used for clay mineral separation and identification, and for Rb and Sr analyses (Lee and Brookins, 1978; Della Valle, 1980). The decay constant for $^{87}Rb = 1.42 \times 10^{-11}$ was chosen for the age calculations. The isochrons shown in figures 1 and 2 were constructed using the York (1969) model three method.

The clay minerals from the Doris Mine consist predominantly of mixed layer 1Md illite/smectite, kaolinite and chlorite. The kaolinite is, in this case, either co-genetic with the mixed layer illite/smectite or formed immediately afterwards (table 1, figure 1). The apparent initial $^{87}Sr/^{86}Sr$ ratio is 0.7245 ± 0.0010, which is much higher than initial ratios for any Late Jurassic ores or unmineralized rocks (Lee and Brookins, 1978; Brookins, 1976). The isochron age of 44 ± 7 Ma is consistent with the field observations (Della Valle, 1980).

At the Silver Spur Mine, the host Cretaceous Dakota Sandstone has been subjected to Laramide tectonism. The uranium mineralization is accompanied by several clay minerals: kaolinite, chlorite and/or mixed layer 1Md illite/smectite, and occasional 1Md illite (table 2, figure 2). The initial $^{87}Sr/^{86}Sr$ ratio of 0.715 is higher than those for Late Jurassic rocks from the area (Lee and Brookins, 1978). The isochron age of 41 ± 9 Ma is consistent with field observations (Della Valle, 1980).

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TABLE 1. Rb-Sr data for Doris Mine samples.

Sample	Rb(ppm)	Sr(ppm)	$^{87}Sr/^{86}Sr$	$^{87}Rb/^{86}Sr$	Clay mineralogy	Rock description
minus two fraction						
D-2	95.37	96.11	0.7255	2.88	k, s/i	sandstone, ore zone
D-5A	165.40	32.74	0.7337	14.66	s/i, k	sandstone, ore zone
D-6	61.96	32.69	0.7291	5.50	k, s/i	sandstone, ore zone
D-7	154.80	38.85	0.7308	11.56	s/i, i, ch	sandstone, ore zone
D-8B	175.00	41.86	0.7322	12.13	k, s/i	sandstone, ore zone

Notes: k = kaolinite; s/i = mixed layer smectite/illite; i = illite; ch = chlorite.
Data from Della Valle (1980).

TABLE 2. Rb-Sr data for Silver Spur Mine samples.

Sample	Rock	Rb(ppm)	Sr(ppm)	$^{87}Sr/^{86}Sr$	$^{87}Rb/^{86}Sr$	Clay mineralogy
SS10	black shale	92.57	88.18	0.7170	3.04	k, s/i
SS20	oxidized sandstone	40.42	10.10	0.7213	11.60	k, ch
SS30	oxidized sandstone	81.00	666.80	0.7141	0.35	k, ch, i, s/i
SS40	oxidized sandstone	61.25	61.89	0.7176	2.87	k, ch

Notes: k = kaolinite; s/i = mixed layer smectite/illite; i = illite; ch = chlorite.
Data from Della Valle (1980).

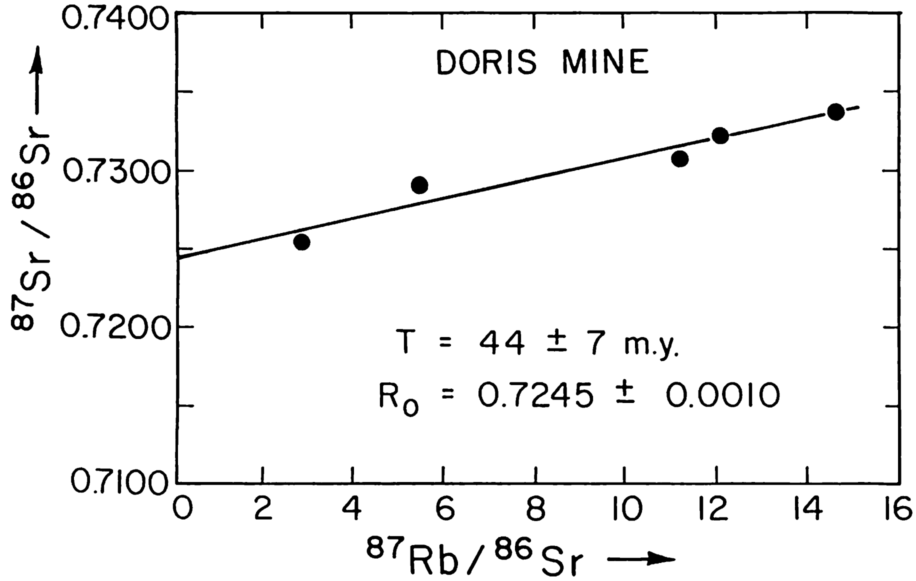

FIGURE 1.

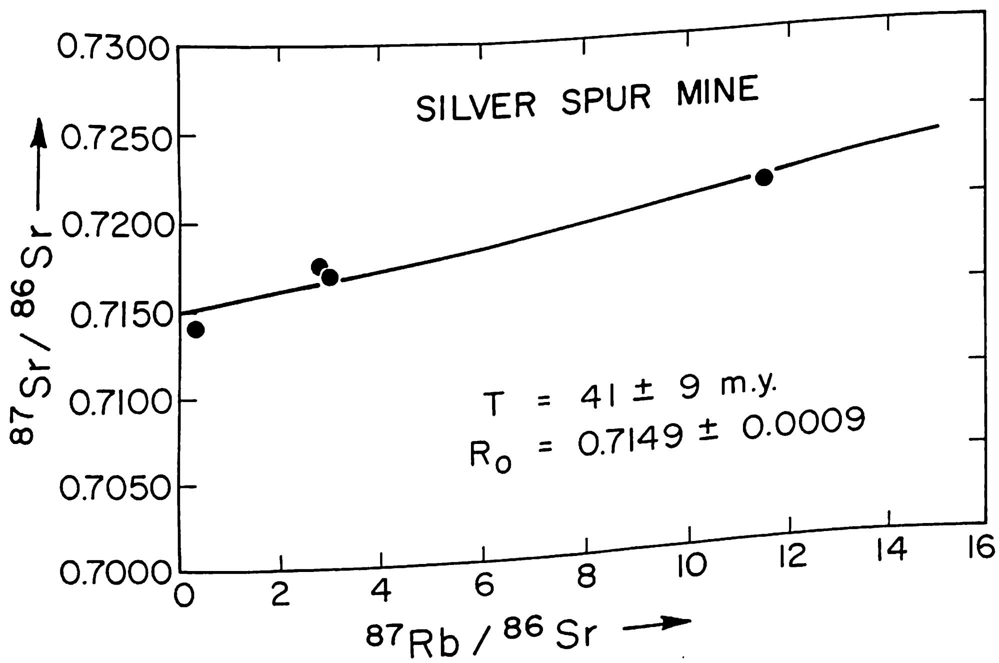

FIGURE 2.