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Strontium isotopic analysis of core material from the ERDA White Mountain 1 well

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FROM: Jeff Pietras

RE: Strontium isotopic analysis of core material from the ERDA White Mountain 1 well

Attached please find the results of strontium isotopic analysis of carbonate material from the ERDA White Mountain 1 well. Sample names refer to depth in feet.

Samples were powdered via microdrilling along fresh surfaces to isolate individual lithologies, and avoid collecting fracture fills. 10-20 mg whole rock aliquots were then leached 3 times for 8-12 hours with 1ml of 1M ammonia acetate followed by 3 rinses with 1ml doubly distilled H_2O. Samples were centrifuged, and the leachate discarded between each step. The samples were left uncapped to dry overnight. Carbonate was extracted with 1ml of 1M glacial acetic acid at ~25°C for 1-2 hours followed by one wash with 1ml doubly distilled H_2O. The H_2O wash was combined with the acetic acid leach. The remaining residue was dried to completeness, and re-weighted to calculate the amount of carbonate material removed. Typical carbonate yields ranged from 10-60%.

Following initial processing, each sample was spiked with a mixed ^{87}Rb-^{84}Sr spike to determine rubidium and strontium concentrations by isotope dilution. Cations were isolated with ion-exchange resin. Mass analysis was determined by thermal-ionization mass spectrometry using a multi-collector dynamic analysis with exponential normalization to $^{86}Sr/^{88}Sr = 0.1194$. 397 analysis of strontium standard NBS-987 were run over the analytical period, and produced $^{87}Sr/^{86}Sr = 0.710263$ ($2\sigma = 0.000017$). Total procedural blank average 95 pg for strontium and 20 pg for rubidium. The average reproducibility of $^{87}Sr/^{86}Sr = 0.00002$ based on duplicate analysis of four samples.

Sample Name	Rb ppm	Sr ppm	$^{87}Rb/^{86}Sr$	$^{87}Sr/^{86}Sr$ measured
WM-357'9"	1.60	709	0.0065	0.71441
WM-358'10"	4.83	119	0.1172	0.71302
WM-358'10"	4.39	128	0.0993	0.71304
WM-358'10"	5.34	502	0.0308	0.71297
WM-359'3"	0.63	1434	0.0013	0.71267
WM-362'	2.31	938	0.0071	0.71202
WM-387'10"	1.42	1450	0.0028	0.71195
WM-413'2'	7.79	153	0.1479	0.71199
WM-449'5"	1.01	956	0.0031	0.71288
WM-482'8"	2.89	730	0.0115	0.71216
WM-539'4"	2.76	830	0.0096	0.71320
WM-598'1"	1.53	850	0.0052	0.71345
WM-630'11"	1.97	941	0.0061	0.71244
WM-640'	1.27	576	0.0064	0.71218
WM-688'4'	1.36	1122	0.0035	0.71298
WM-745'1"	1.04	976	0.0031	0.71281
WM-767'9"	0.94	1160	0.0024	0.71294
WM-813'	1.29	1243	0.0030	0.71387
WM-904'5"	2.24	1026	0.0063	0.71476
WM-932'	2.53	1027	0.0071	0.71235
WM-933'	2.59	830	0.0090	0.71225
WM-934'	6.48	424	0.0442	0.71200
WM-935'	3.04	945	0.0093	0.71260
WM-936'	3.30	1021	0.0093	0.71263
WM-937'	18.2	1066	0.0495	0.71270
WM-937'	1.45	1132	0.0037	0.71270
WM-940'	2.08	1093	0.0055	0.71240
WM-941'6"	1.90	1214	0.0045	0.71213
WM-942'	1.29	1208	0.0031	0.71201
WM-943'	3.61	839	0.0125	0.71199
WM-943'	4.27	659	0.0188	0.71200
WM-945	3.28	637	0.0149	0.71244
WM-945'	1.89	742	0.0074	0.71246
WM-946'	0.45	941	0.0014	0.71283
WM-988'6"	5.02	615	0.0237	0.71278
WM-1026'6"	3.59	1003	0.0104	0.71425
WM-1043'10"	1.85	1509	0.0036	0.71283
WM-1071'	7.20	935	0.0223	0.71301
WM-1112'	6.68	757	0.0255	0.71524
WM-1149'8"	1.45	1517	0.0028	0.71231
WM-1172'	9.05	623	0.0421	0.71414
WM-1203'7"	4.34	1060	0.0119	0.71377
WM-1226'4"	5.42	984	0.0159	0.71457
WM-1242'7"	3.93	898	0.0127	0.71410
WM-1244'9"	6.09	848	0.0208	0.71468
WM-1259'	2.39	722	0.0096	0.71468