Table S5: Thermal History Modeling Input Data

Apatite Fission track data

Boettcher and Milliken (1994)

Sample No.	pd(Nd)	Ps (Ns)	pi	FT age	error	U (ppm)	avg track length	error	std dev (microns)
KY49	1.585 (7420)	1.631 (1125)	4.479 (3089)	98.3	7.4	44	12.37	1.6	2.05
VA26	1.585	1.563	4.034	104	8	40	12.55	0.92	1.58
KY112	1.612	1.596	3.497	125	10	34	12.09	1.06	1.82
VA24	1.612	1.806	5.384	92.1	7	52	12.34	0.86	1.76
KY115	1.612	1.521	3.483	120	10	34	12.46	0.9	1.55
VA4	1.585	1.933	4.354	123	8	43	12.13	0.84	1.54
VA6	1.612	1.336	3.764	97.5	8.4	36	12.23	0.8	1.48
VA19	1.585	2.787	5.455	137	8	54	12.86	0.72	1.27
KY46	1.585	2.3	4.861	127	8	48	12.47	0.84	1.65
KY109	1.585	2.222	4.572	131	8	44	12.87	0.88	1.7

Vitrinite Reflectance data

From O'Hara et. al. (1989)

Fire Clay Coal – 310 Ma – Hyden Fm.

Pre-orogenic maturation: Ro = 0.85% (Temperature ~128 $^{\circ}$C)

Following thrust emplacement: Ro = 1.0%*

Burial to depth = 1.9 to 2.2 Km

Burial to depth after overthrust emplacement = ~5 km*

*Thermal equilibrium not reached after overthrust due to rapid uplift immediately (1 Ma) after emplacement.

From Hower and Rimmer, 1990:

Fire Clay Coal:

Perry County

Rmax = 0.93%, 0.86%, and 0.79%

Pike County

Rmax = 0.87% and 0.84%

Effective heating times = 25 – 35 m.y.

Pond Creek Coal - ~ 250 m below Fire Clay Coal in **Pikeville Fm.**

Rmax = 1.01%

Paleogeothermal Gradient = 40 – 45 $^{\circ}$C/Km

From Boettcher and Milliken, 1994:

Fire Clay Coal
Pike County
Rmax = between 0.80% and 0.90%
Pond Creek Coal
Pike County
Rmax = between 1.0% and 1.1%
Post-depositional Temperatures = 110 to 150 ^{o}C
Effective heating times = 50 to 75 m.y.

Minimum T for Breathitt Fm. From Apatite Fission Track = 110 ^{o}C
Geothermal gradient = 25 +- 5 ^{o}C/Km

Average Rmax=	0.91
Rmean=	0