

Identification and Characterization of Illinois Basin Coal and Coal-related Materials Containing High Rare Earth Element Concentrations



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OVERVIEW

- Analyze Illinois Coal Basin cores and channel samples by geologic intervals to identify layers enriched in Rare Earth Elements including Scandium and Yttrium (REScY).
- Once enriched layers are identified, trace seam to prep plant where it is cleaned and sample process streams enriched in RESeY (e.g. middlings or refuse) for further evaluation of concentration methods

SAMPLING APPROACH

- Focus on economic coal beds in Illinois Basin for elevated RESeY content
 - Current mining and/or exploration activity
 - Sufficient reserves to sustain commercial development
- Characterize individual layers in each seam
 - Coal
 - Partings
 - Roof
 - Floor

Subsequent sampling

- Channel Samples
- Prep Plant Samples
 - Clean Coal
 - Middlings
 - Refuse



Core Locations

List of Core Samples and Core Intervals to be Evaluated

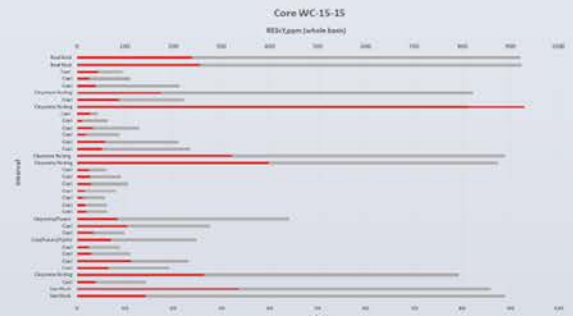
Seam	No. of Cores	No. of Sample Intervals
WKY #4	1	1
WKY #5	1	1
WKY #6	2	3
WKY #7	1	2
WKY #8	5	>8
WKY #9	13	>77
WKY #10	3	4
WKY #11	5	>39
WKY #13	10	>88
Colechester	1	1
Total	42	>224

ANALYSES

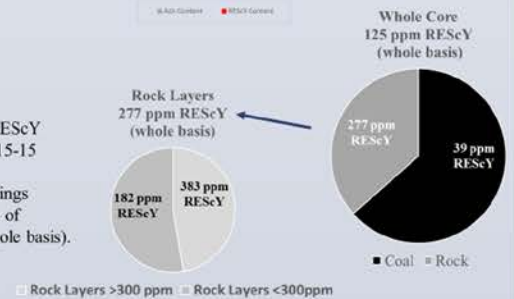
- RESeY by ICP-OES,
- proximate
- ultimate
- forms of sulfur,
- major and minor oxides by XRF
- microscopy by SEM/EDX/FIB

Core WC-15-15

Interval	Thickness (inches)	Ash (%)	RESeY (ppm)		H/L Ratio
			Whole Basis	Ash Basis	
Roof	7.2	92.24	247	268	0.24
Coal	10.2	13.94	36	288	0.50
Parting	1.2	82.13	174	212	0.29
Coal	1.0	22.24	87	390	0.19
Parting	0.7	81.20	929	1144	0.20
Coal	22.6	12.31	34	310	0.67
Parting	10.8	88.10	360	409	0.19
Coal	26.5	7.47	21	289	0.39
Parting	1.7	44.07	84	190	0.18
Coal	23.9	16.23	58	337	0.32
Parting	0.8	79.21	265	335	0.21
Coal	0.7	14.39	39	271	0.33
Floor 1	3.6	85.87	335	390	0.49
Floor 2	2.4	88.93	143	161	0.24
Total	113.3		125		



- 53% of the RESeY in Core WC-15-15 is contained in 15" of partings with an assay of 383 ppm (whole basis).



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