Coal and Coal Byproducts with Elevated Rare Concentrations

Background Information and Useful Places to Look
Coal Basin REE Assessments


• https://edx.netl.doe.gov/dataset/netl-ree-technical-reports
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Assessment of Rare Earth Elemental Contents in Select United States Coal Basins

Figure 1.2 Possible Source Mechanisms for Introducing REEs into Coal Basins
Assessment of Rare Earth Elemental Contents in Select United States Coal Basins
Assessment of Rare Earth Elemental Contents in Select United States Coal Basins
Whole Seam REE Contents

- USGS CoalQual Database
- By State
- By County
- By Formation
- By Bed
## USGS CoalQual Database

- 5200+ Trace Elements Analyses (Including REE’s)
- Channel, Drill Core, Weathered Channel

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<th>B</th>
<th>C</th>
<th>N</th>
<th>Y</th>
<th>EI</th>
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</table>
Stratigraphic REE Distributions from Public Domain Publications

Stratigraphic REE Distributions from Public Domain Publications

- May not Report all REE’s for a Stratigraphic Interval.
- Crossplots can Be Generated from USGS Database (Example: La Vs Total REE):

![Graph showing the correlation between PPMW La and PPMW REE with the equation y = 6.3353x]
Uncle Sam (Deep Mine)  
Fergus County, Montana  
Morrison Formation, Unnamed Bed

East Belt (Deep Mine)
Cascade County, Montana
Morrison Formation, Unnamed Bed

Baukol Noonan (Strip Mine)  
Divide County, North Dakota  
Fort Union Formation, Noonan Bed

Deep Mine
Perry County, Kentucky
Breathitt Formation, Hazard #9 Bed

X-Axis Scale: 0-250 ppm

<20% Ash
>20% Ash

Deep Mine
Garrett County, Maryland
Allegheny Formation, Lower Kittanning Bed

X-Axis Scale: 0-250 ppm

Clay Pit (Strip Mine)
Hot Spring County, Arkansas
Wilcox Formation, Unnamed Bed

X-Axis Scale: 0-2000 ppm
- <20% Ash
- >20% Ash

Gibbons Mine
Grimes County, Texas
Claiborne Group, 4500 Bed

Gibbons Mine
Grimes County, Texas
Claiborne Group, 3500 Bed

X-Axis Scale: 0-800 ppm  
<20% Ash  >20% Ash

Calvert Mine
Robertson County, Texas
Wilcox Group, A1 Bed

Data from Gluskoter et al., EPA-600/7-77-064, 1977
Strip Mine
Lawrence County, Pennsylvania
Lower Kittanning Bed

X-Axis Scale: 0-350 ppm  

Strip Mine
Somerset County, Pennsylvania
Lower Kittanning Bed

X-Axis Scale: 0-350 ppm  
<20% Ash  
>20% Ash

Strip Mine
Clarion County, Pennsylvania
Lower Kittanning Bed

X-Axis Scale: 0-700 ppm
<20% Ash >20% Ash

Float Sink Data

• Numerous Float Sink Tests Run in FY 2014
• [https://edx.netl.doe.gov/dataset/netl-ree-technical-reports](https://edx.netl.doe.gov/dataset/netl-ree-technical-reports)

• Additional Float Sink Data for Lanthanum:
  – EPA-600/7-78-028a
  – Need Crossplot Data to Convert to TREE
Example Float Sink Data from
https://edx.netl.doe.gov/dataset/netl-ree-technical-reports
Example Float Sink Data from https://edx.netl.doe.gov/dataset/netl-ree-technical-reports

Kentucky - See Reports for Details
Possible REE Indications from Well Logs

- Plenty of Log Data Available
- Thorium Spectral Gamma Ray Data can Indicate the Presence of an REE-Rich Zone
- Formation Tops or Coal Zones from Completion Reports
- Thorium to REE Conversions from Th/REE Crossplots Using USGS Database
Using Well Logs to Look for Rare Earths

- Thorium Associates with Some REE Ores
- Spectralog Th Converted to REE Content
  Using Crossplots from USGS Database
- LAS and TIFF Files from State Web Sites
- Example here from Powder River Basin (Wyoming)
Example Prospects from Well Logs

Russell County, Va

Letcher County, Ky
Supplemental Information- Useful References

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