

University of Alaska DOE/NETL CORE/CM Program
Phase 1 (Planning)

On Site REE/CM Beneficiation in Alaska – An
Opportunity

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Sedimentary deposits are layered

- Annual composition variation from annual climate variations, weathering and erosion – thin layers
- Longer term climate variations create composition variations persisting over larger thicknesses
- Major events, such as volcanic deposition, produce additional interspersed layers.
- Accentuated by biological contributions over the same time frames.
- Effects are accentuated and dramatic in depositional basins.

- The result is often dramatic concentration of specific elements and minerals in specific depositional layers.
- We are learning that this is often the case with REE/CM and their host minerals.
- In thick deposits with average concentrations of target REE/CM in the order of tens ppm, specific thicknesses , on the order of inches to feet, may have concentrations of hundreds of ppm. Specific thinner regions may have concentrations of many hundreds of ppm to a few thousand ppm.
- Host mineralogy for the REE/CM of interest may additionally have concentrations of a few percent to a few tens of percent. This host mineralogy is likely to occur as individual particles/grains surrounded by many other particles of different mineralogy.

- Monetization of this type of deposit in remote regions may depend heavily on the ability to selectively mine the richest layers and then further beneficiate this mined material to enable transportation of 100 to 1000 times less material for a given yield of REE/CM.
- Ideally, this beneficiation would be accomplished without producing any liquid waste stream and would necessarily use on site or closely proximate energy sources.
- Today we will introduce some technology options for selective mining and density-based beneficiation.
- Future potential has been identified for other technology approaches, and for potential on-site technology pathways to substantially pure host mineral separation, with concentrations of REE/CM the order of 10%.

Utah Uinta Basin Oil Shale Outcrop





