

Lignite Research Program- Grant Round 83- Application Summaries

Application Number	Application Title	Applicant	Project Duration	Summary of Project	Funding Requested	Total Project Cost
LRC-83-A	Carbon Capture & Utilization Using "VCCS Cycle" Technology	Energy Expansion LLC	16 Weeks	To evaluate the effectiveness of the VCCS carbon capture technology by testing how lignite coal ash absorbs CO ₂ , determining whether valuable rare earth elements (REEs) and metals can be recovered during the process, and analyzing the characteristics of carbonates formed during treatment. The project aims to advance the technology toward pilot-scale demonstration while creating potential new revenue streams from coal ash and reducing CO ₂ emissions from lignite-fired power plants.	\$62,000	\$124,000
LRC-83-B	Development of Low-Cost Rare Earth Element Analysis and Sorting Methods	Microbeam Technologies Inc.	2 Years	To develop a low-cost, field-deployable technology to rapidly identify, separate, and concentrate rare earth element (REE)-rich North Dakota lignite coal and coal byproducts. Because the United States is heavily dependent on imported REEs and coal-related materials have been identified as a potential domestic source, the project focuses on overcoming challenges associated with locating and selectively mining high-REE coal seams. The technology would allow mining operations to quickly identify and	\$224,767	\$449,534

				stockpile REE-rich material for further processing, improving the economic feasibility of recovering critical rare earth elements from North Dakota lignite resources.		
LRC-83-D	Resource Recovery from a Coal-Fired Power Plant to Enhance Agriculture Production in Open Field and Greenhouse	The North American Coal Corporation (The Falkirk Mining Company)	14 Months	To evaluate the use of excess CO ₂ and waste heat from North Dakota lignite-fired power plants to enhance greenhouse and field crop production. Researchers from NDSU and EERC, in partnership with industry, will study how North Dakota crops respond to elevated CO ₂ levels and determine the most economical methods for capturing, cleaning, and delivering CO ₂ from power plant and ethanol plant sources for agricultural use. The project aims to create value-added opportunities for both the energy and agricultural sectors while reducing the carbon footprint of lignite-based energy production. Successful results could lead to a pilot-scale greenhouse and expanded commercial agricultural applications.	\$149,557	\$229,557
LRC-83-E	Investigation of Rare Earth Element Extraction from ND Coa-Related Feedstocks	University of North Dakota – Institute for Energy Studies	18 Months	To advance and scale up a technology developed at the University of North Dakota to extract and concentrate rare earth elements (REEs) from North Dakota Lignite Coal and coal-related byproducts. Building on successful Phase I	\$280,000	\$3,437,500

				results, which identified high-REE feedstocks and achieved 70–90% recovery through a low-cost, environmentally friendly process, the project will conduct pilot-scale testing, optimize extraction performance, produce REE concentrate samples, and evaluate commercial-scale feasibility. The goal is to develop a domestic source of critical rare earth elements, reduce U.S. dependence on foreign imports, and create new value-added opportunities for North Dakota's lignite industry.		
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