RAMACO

Ramaco Resources Announces Substantial Expansion of Brook Mine Rare Earth Elements Exploration Target, Board Approval for Initial Mining in Q4 2023, and new Carbon Product Technologies

LEXINGTON, Ky., Aug. 7, 2023 /PRNewswire/ -- Ramaco Resources, Inc. (NASDAQ: METC, METCB, "Ramaco" or the "Company"), is a leading producer of high-quality, low-cost metallurgical coal in Appalachia. In May, Ramaco announced that its Brook Mine property in Sheridan, Wyoming contains perhaps the largest unconventional deposit of rare earth elements ("REE") discovered in the United States, in association with researchers from the Department of Energy's National Energy Technology Laboratory ("NETL") and analysts at mining consultancy Weir International ("Weir"). In particular, the Brook Mine is rich in magnetic REEs, which are used in applications that include advanced military technology, electric vehicles, and more.

Today the Company announced that Weir has determined based upon chemical analysis from additional drilling the level of unconventional REE deposits has increased by almost 50% compared to its initial target disclosed in May. Furthermore, the Company announced that its Board of Directors has approved the commencement of initial mine development to begin this Fall. This would make the Brook Mine the first new rare earth mine in the United States since the Mountain Pass Rare Earth Mine in California in 1952, currently the United States' only operating mine for these critical elements and minerals.

Finally, the Company announced that working with the Department of Energy's Oak Ridge National Laboratory ("Oak Ridge" or "ORNL"), it has jointly developed and patented technologies to commercialize two potentially disruptive high-value carbon products using use coal as their primary feedstock. These technologies were developed as part of a multi-year research partnership, and are subject to issued and pending patents. One involves the use of coal (also called "carbon ore") to develop a form of activated carbon fiber as a solid adsorbent to be used in large scale direct air capture of CO2, methane or other noxious gases. The second involves the use of coal to make a form of low-cost synthetic graphite, a major component in electric vehicle batteries and other energy-storage products.

BROOK MINE RARE EARTH ELEMENT UPDATE: INITIAL MINING TO BEGIN IN Q4 2023

Ramaco's Board of Directors late last month approved commencing rare earth and coal mining development at its Brook Mine in the fourth quarter of 2023. This will be the first new rare earth mine in the United States since the Mountain Pass Rare Earth Mine in California, and will target mining unconventional REE deposits found in coal and adjacent clays and carbonaceous material. Ramaco anticipates spending roughly $2.5 million over two quarters for initial development for both rare earth and carbon ore/coal mining.

Based on additional coring and chemical analysis, Weir International has also determined that the size of the Company's REE Exploration Target has increased almost 50% to 0.9 - 1.2 million tons of total rare earth oxides ("TREOs") from its initial Target in May of 0.6 - 0.8 million tons. As perspective, the United States has an average domestic consumption of roughly 10,000 tons per year of REEs over the last ten years.

The deposit is estimated to contain approximately 29% of primary magnetic rare earth oxides ("REOs") Neodymium, Praseodymium, Dysprosium, and Terbium as well as secondary magnetic REOs. As previously reported, this current assessment has only been conducted on one third of the area of the Brook Mine.

A month ago, China announced new export controls on gallium and germanium, two critical minerals with wide use in semiconductors, communications and defense. Early cores at the Brook Mine suggest that in addition to large percentages of magnetic REOs, the Brook deposit also contains meaningful amounts of each of these banned metals. Further drilling and chemical assessments are ongoing to more precisely determine the size of deposits of these two minerals.

In conjunction with the development, the Company has recently retained a wide group of leading rare earth mining, metallurgy, mineralogy and economic experts, including leading rare earth mining consultancy SRK Consulting. These firms will work both with the Company and alongside NETL researchers to prepare mineral and metallurgical assessments, as well as initial economic assessment and pre-feasibility studies. This analysis will also inform the appropriate forms and techniques of processing, separation and recovery of the rare earths and carbon ore. Ramaco expects to also work with other Department of Energy national laboratories, including NETL in assessing the deposit and its potential vertical development to magnet production.

"As with all our development projects, we will take a thorough and disciplined approach to assessing the feasibility of the Brook Mine. We are however, very encouraged by the Board's decision to greenlight the initial mine development of the country's first carbon ore and rare earth mine," said Randall Atkins, Chairman and CEO of Ramaco. "Based on our recent findings, we are more optimistic today than in May when we first announced this unconventional rare earth deposit. We have now increased the exploration target by 50% relative to our initial findings, enlisted a group of world class third-party experts to assist in our overall evaluation and will soon actually start mining for rare earths. We will continue to pursue our measured approach, as we embark on this potentially transformational opportunity."

RAMACO ANNOUNCES WORK WITH OAK RIDGE ON TECHNOLOGICAL DEVELOPMENT OF DISRUPTIVE NEW CARBON **ORE PRODUCTS**

Ramaco's Board has also authorized the Company's continued development with ORNL of two ground-breaking technology innovations. These both offer the potential to use coal in both an improved economic and environmental manner under our thesis that "coal is too valuable to burn".

The first innovation is a newly patented technique for converting coal to a form of synthetic graphite, which can be used in the production of electric vehicle (EV) batteries and long-term grid storage battery anodes. The technique is both lower cost and uses less energy than other conventional methods. Currently, synthetic graphite is produced using an energy intensive and CO2-producing technique. Ramaco's new low-severity synthetic graphite (LSSG) production technique, developed with ORNL, uses comparatively low-cost coal/carbon ore and a much less energy intensive and

environmentally friendly molten salt process to produce synthetic graphite.

The second potential breakthrough product is activated carbon fiber monoliths (ACFMs) to be used for large scale direct air capture of CO2, methane, or other noxious gases, a key priority in combatting the environmental impact of emissions. Using new patented technology, these ACFMs can also be made with comparatively low-cost coal/carbon ore as a precursor material. They offer dramatic energy savings in both the adsorption and desorption of these gases. This technology is aimed at lowering the cost to capture CO2 at large scale for either downhole sequestration, for production of non-contaminating permanent and recyclable carbon materials for building materials and for other purposes.

The Company will provide further periodic information on the commercialization of these two technologies.

The following charts provide an update on the key updated technical highlights of the Brook Mine REE project:

Exhibit 1: Updated Brook Mine Basket

Brook Mine ICP Analysis	
Primary Magnetic REOs	
Neodymium (Nd_2O_3)	15.84 %
Praseodymium (Pr_6O_{11})	4.22 %
Dysprosium (Dy_2O_3)	2.42 %
Terbium (Tb_4O_7)	0.42 %
% of Primary Total	22.90 %
Secondary Magnetic REOs	
Samarium (Sm_2O_3)	3.06 %
Gadolinium (Gd_2O_3)	2.78 %
Holmium (Ho_2O_3)	0.48 %
% of Secondary Total	6.32 %
% of All Magentic Total	29.23 %
Other REOs	70.78 %
Brook REO Basket	100 %

Source: Weir International Inc.

Exhibit 2: Updated Brook Mine Exploration Target

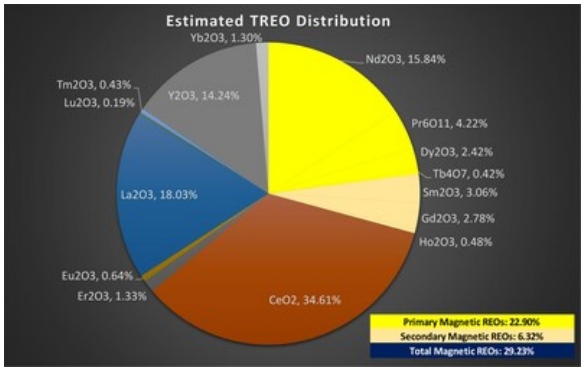
Brook Mine In-Place REO Exploration Target Tonnage and Grade Estimate - New

Range	Total		Primary Magnetics		Secondary Magnetics		Heavy		Light	
	Tons ('000)	Grade (ppm)	Tons ('000)	Grade (ppm)	Tons ('000)	Grade (ppm)	Tons ('000)	Grade (ppm)	Tons ('000)	Grade (ppm)
Low	938	261	219	61	60	17	33	9	728	202
High	1,173	326	274	76	75	21	41	11	910	253

Source: Weir International Inc.

Exhibit 3: Updated Rare Earth Element Distribution

[see accompanying graphic}



Source: Weir International Inc.

ABOUT RAMACO RESOURCES

Ramaco Resources, Inc. is an operator and developer of high-quality, low-cost metallurgical coal in southern West Virginia, southwestern Virginia and southwestern Pennsylvania. Its executive offices are in Lexington, Kentucky, with regional operational offices in Charleston, West Virginia and Sheridan, Wyoming. The Company currently has three active metallurgical coal mining complexes in Central Appalachia and one rare earth and coal

mine near Sheridan, Wyoming in operation, but not yet production. In May 2023, the Company announced that a major rare earth deposit of primary magnetic rare earths Neodymium, Praseodymium, Terbium, and Dysprosium was discovered at its mine near Sheridan, Wyoming. Contiguous to the Wyoming mine, the Company operates a research and pilot facility related to the production of advanced carbon products and materials from coal/carbon ore. In connection with these activities, it holds a body of roughly 50 intellectual property patents, pending applications, exclusive licensing agreements and various trademarks. News and additional information about Ramaco Resources, including filings with the Securities and Exchange Commission, are available at https://www.ramacoresources.com.

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

Certain statements contained in this news release, and in the documents, it may reference, constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements represent Ramaco Resources' expectations or beliefs concerning guidance, future events, anticipated revenue, future demand and production levels, macroeconomic trends, the development of ongoing projects, costs and expectations regarding operating results, and it is possible that the results described in this news release, and the documents it references, will not be achieved. These forward-looking statements are subject to risks, uncertainties and other factors, many of which are outside of Ramaco Resources' control, which could cause actual results to differ materially from the results discussed in the forward-looking statements. These factors include, without limitation, risks related to the timing of the mining discussed in this release, the Company's ability to successfully pursue such mining, the increase in the Company's exploration target, and the Company's estimates of REOs in the deposits. Any forward-looking statement speaks only as of the date on which it is made, and, except as required by law, Ramaco Resources does not undertake any obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise. New factors emerge from time to time, and it is not possible for Ramaco Resources to predict all such factors. When considering these forward-looking statements, you should keep in mind the risk factors and other cautionary statements found in Ramaco Resources' filings with the Securities and Exchange Commission ("SEC"), including its Annual Report on Form 10-K and Quarterly Reports on Form 10-Q. The risk factors and other factors noted in Ramaco Resources' SEC filings could cause its actual results to differ materially from those contained in any forward-looking statement.

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8/7/2023 8:00:00 AM