TECHNICAL REPORT SUMMARY

BROOK MINE PROPERTY

RARE EARTH ELEMENT EXPLORATION TARGET

PREPARED FOR

RAMACO RESOURCES, INC.

MARCH 2025

PROJECT NO. 6371

Weir International, Inc.
Mining, Geology and Energy Consultants

Notice

Weir International, Inc. (WEIR) was retained by Ramaco Resources, Inc. (Ramaco, NASDAQ: METC) to prepare a Technical Report Summary (TRS) related to Ramaco's Rare Earth Element (REE) Exploration Target for the Brook Mine permit located near Sheridan, Wyoming. This report provides a statement of Ramaco's REE Exploration Target located within its mineral holdings at the planned Brook Mine near Sheridan, Wyoming. This TRS has been prepared in accordance with the United States Securities and Exchange Commission (SEC), Regulation S-K 1300 for Mining Property Disclosure (S-K 1300) and 17 Code of Federal Regulations (CFR) § 229.601(b)(96)(iii)(B) reporting requirements. This report was prepared for the sole use of Ramaco, and its affiliates, and is effective as of March 31, 2025. WEIR previously prepared TRS's issued in May 2023 (May 2023 Report) and March 2024 (March 2024 Report), in which WEIR provided statements of Ramaco's REE Exploration Target as of April 30, 2023 and March 21, 2024, respectively.

This report was prepared by WEIR personnel who meet the SEC's definition of Qualified Persons (QPs), with sufficient experience in the relevant type of mineralization and deposit under consideration in this report.

In preparing this report, WEIR relied upon data, written reports and statements provided by Ramaco. WEIR has taken all appropriate steps, in its professional opinion, to ensure the information provided by Ramaco is reasonable and reliable for use in this report.

The accuracy of Exploration Target estimates is, in part, a function of the quality and quantity of available data at the time this report was prepared. Estimates presented herein are considered reasonable, however, the estimates should be accepted with the understanding that with additional data and analysis subsequent to the date of this report, the estimates may necessitate revision, which may be material. Certain information to be set forth in this report may contain "forward-looking information". These statements are not guarantees of future performance and undue reliance should not be placed on these estimates. The assumptions used to develop forward-looking information and the risks that could cause the actual results to differ materially are detailed in the body of this report.

WEIR and its personnel are not affiliates of Ramaco or any other entity with ownership, royalty or other interest in the subject property of this report.

WEIR hereby consents to the use of Ramaco's REE Exploration Target estimates, as of March 31, 2025.

Qualified Person: /s/ Weir International

Date: March 31, 2025

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1.0 EXECUTIVE SUMMARY

WEIR was retained by Ramaco Resources, Inc. (Ramaco) to prepare a Technical Report Summary (TRS), as of March 31, 2025, related to Ramaco's Rare Earth Element (REE) Exploration Target near Sheridan, Wyoming. This report has been prepared in accordance with the United States Securities and Exchange Commission (SEC), *Regulation S-K 1300 for Mining Property Disclosure* (S-K 1300) and 17 Code of Federal Regulations (CFR) § 229.601(b)(96)(iii)(B) reporting requirements.

WEIR previously prepared a TRSs issued in May 2023 (May 2023 Report) and March 2024 (March 2024 Report), in which WEIR provided a statement of Ramaco's REE Exploration Target as of April 30, 2023 and March 21, 2024, respectively.

Since the issuance of the March 2024 Report, Ramaco has completed an two additional deep core drillholes intended to evaluate Rare Earth Element (REE) concentrations to depths of approximately 850 feet, and nine drill holes that were used for bulk sampling, increasing the number of REE specific drillholes to 125. Ramaco has also recovered historical drillhole data from 23 coal exploration drillholes that were completed in 2012 and 2013, which increases the amount of known data relative to geological structure. Additionally, refinements and enhancements were made to sampling and analysis methods and protocols. Ultimately, as a result of these advancements, Ramaco retained WEIR to provide a statement of Ramaco's REE exploration target, as of March 31, 2025.

The key developments that have occurred are detailed in the sections that follow, and summarized as follows:

- As a result of significant price increases for Scandium, Ramaco has resumed the inclusion of analyses for this mineral in its Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) testing schema. Limited analyses for Scandium had previously been performed but were discontinued due to relatively low concentrations encountered and a relatively low price at the time.
- Ramaco has increased the amount of drillhole data and associated analyses which have:
  - Provided better understanding of locations of elevated REE concentration occurrence both spatially and geologically.
  - Led to improved protocols for both REE sample selection and analysis.
  - Provided higher confidence in REE levels and potential quantities.

  - Shown increased REE concentrations and potential quantities.
- Since the March 2024 Report was issued, the indicated high range Total Rare Earth Oxide (TREO) tonnage, when including Gallium oxide (GaO) and Germanium oxide (GeO) has increased by 0.4 percent, to approximately 1,530 thousand short tons at the high side of the range.
- The newly reported mineral, Scandium oxide (ScO), provides an additional 128 thousand short tons of Critical Mineral Oxides (CMO) which results in an overall CMO tonnage of 1,658 thousand short tons at the high end of the range, an overall increase of approximately 9.0 percent over the previous March 2024 report. Table 1.0-1 below shows the current tonnage and grade range estimate for the Exploration Target.
- CMOs at this stage include TREO + GaO + GeO + ScO for the Brook Mine.
- Ramaco has found that REE occurrences can generally be predicted through a simplified lithology description along with observation of host rock texture and color rather than through detailed lithology analyses which was implemented in the previous reports. This is work in progress and a transition to these new descriptors will be presented in the next report update.

Table 1.0-1 Current Brook Mine In-Place CMO Exploration Target Tonnage and Grade Estimates, Ash-Basis

	Total CMOs		Primary Magnetic REOs		Secondary Magnetic REOs		Heavy REOs		Light REOs		TREOs		Ga and Ge Oxides		Sc Oxide			
Range	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Total Model Volume (M CY)	Total Model Mass (M Tons)
Low	1,326	455	258	89	71	25	39	13	846	288	1,097	375	127	44	102	35	2,054	3,999
High	1,658	569	322	111	89	31	49	17	1058	360	1372	469	159	54	128	44	2,054	3,999

Notes:

- Tonnage estimates reported above are not Mineral Resources or Mineral Reserves and do not meet the threshold for reserve modifying factors, such as estimated economic viability, that would allow for conversion to mineral reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.
- The Exploration Target tonnage estimates are based on actual exploration results from 610 drill holes and 4,875 ICP samples.
- No CMO cut-off grade was applied.
- The ranges of tonnage and grade of the Exploration Target could change as future exploration activities are completed.
- Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

1.1 PROPERTY DESCRIPTION

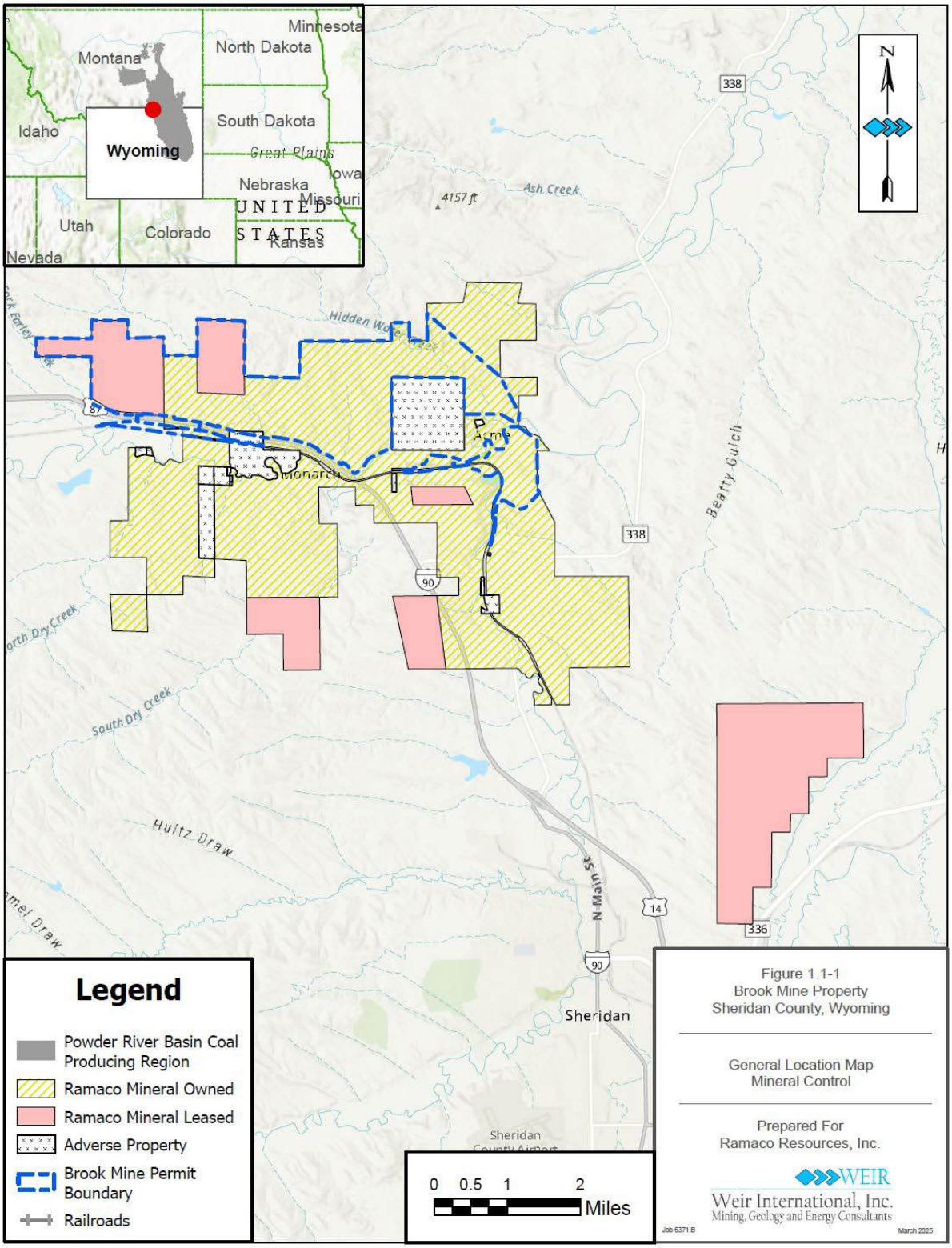
The REE Exploration Target is located within Ramaco's mineral holdings at its Brook Mine Property located approximately seven miles north of Sheridan, Wyoming in Sheridan County. The Burlington Northern Railroad and Interstate 90 are located along the southern boundary of the current Brook Mine permit area.

The Brook Mine Property is situated in the Sheridan Coal Field in the northwestern portion of the Powder River Basin (PRB) coal producing region of the of the United States (see Figure 1.1-1). The United States Geological Survey (USGS) 7.5-minute quadrangle maps are Acme, Hultz Draw, Monarch, and Sheridan.

The Brook Mine Property consists of approximately 15,800 acres of Ramaco owned and leased mineral holdings located in Sheridan County, Wyoming. Ramaco acquired the Brook Mine Property in 2011 from the Sheridan-Wyoming Coal Company. When Ramaco began development of the Brook Mine Property in 2012, Ramaco originally permitted approximately 4,600 acres that it regarded as the optimal area for a new surface mine. As Ramaco began further core drilling exploration in 2021 and 2022 relative to REE exploration, Ramaco decided to continue to drill in areas within the original permit boundary in order to leverage the existing drilling core available for sampling.

As such, the REE Exploration Target is limited to the current permit boundary of the Brook Mine Property. Ramaco has indicated its intention to proceed with additional drilling and assessment of additional areas of the Brook Mine Property to assess the potential for expanding its REE Exploration Target.

Figure 1.1-1 General Location Map



1.2 GEOLOGICAL SETTING AND MINERALIZATION

The Sheridan Coal Field is within the northwestern portion of the PRB. The regional geology of this area is characterized by a sequence of sedimentary rocks that formed during the Late Cretaceous to early Paleocene Period. The stratigraphic sequence consists of interbedded sandstones, mudstones, and coal seams that were deposited in fluvial, deltaic, and lacustrine environments.

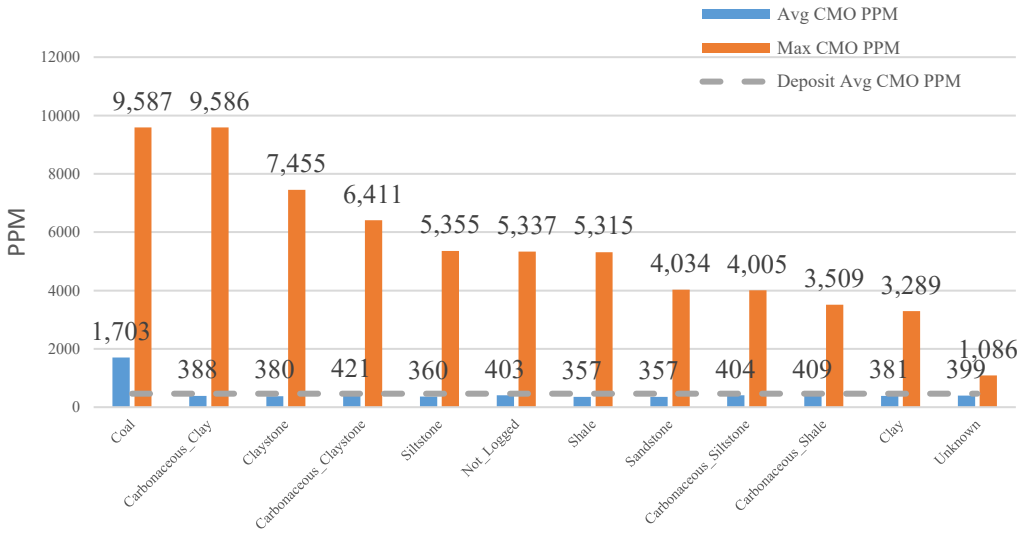
The primary coal seams that may be associated with REEs on the Brook Mine Property, in descending stratigraphic order, are the Dietz 1, Dietz 2, Dietz 3, Monarch, Upper Carney, Lower Carney, and Masters. There are also seven unnamed minor coal seams below the Masters Seam.

The REEs are believed to have been incorporated into the coal during its formation and are found in association with clay minerals and organic matter in the coal seams. The interburdens, specifically the strata directly above and below the seams, also contain elevated levels of REEs, primarily in clays, carbonaceous clays, shales, and siltstones

The U.S. Department of Energy, National Energy Technology Laboratory (NETL) has suggested that formationally, REEs may have migrated upwards from depth. Specifically, as heated fluids circulated and migrated upwards through faults and fractures, they interacted with the surrounding rock layers, leaching out REEs from primary REE minerals. The higher temperatures of these fluids could have facilitated the dissolution and transport of REEs, allowing them to be mobilized over considerable distances. Upon encountering geochemical barriers such as the transition from coal to clay, or shifts in pH and temperature, these fluids may have undergone changes that promoted the precipitation and concentration of REEs at these transition boundaries.

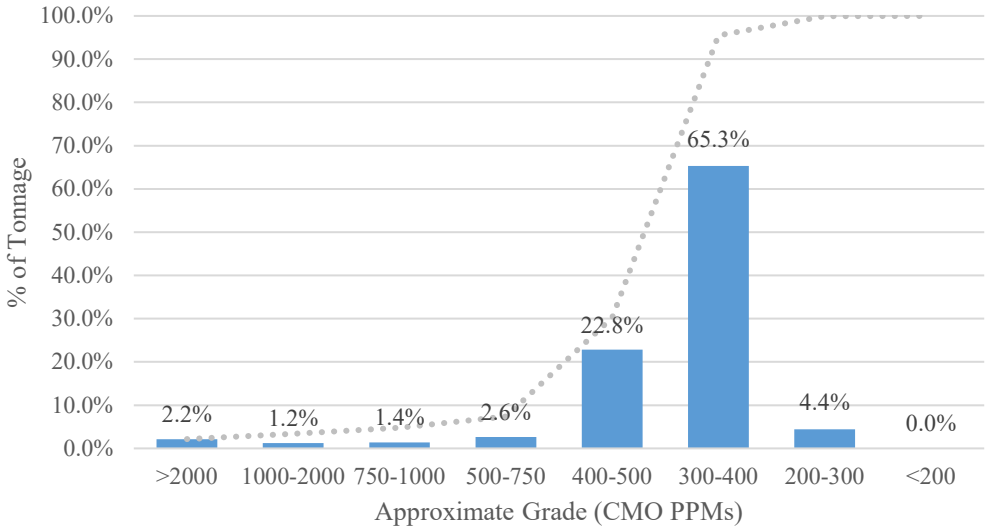
Figure 1.2-1 describes the average ash-basis CMO concentration for each major lithology (all rock types including coal), as well as the single point maximum. Coal has the highest average and single point maximum concentration of all lithologies. For example, the Lower 7 coal seam has average ash-basis concentrations of 5,000 ppm. While the CMO tonnage is not high relative to other lithologies in the deposit, the concentration and tonnage are expected to increase as Ramaco re-samples and increases the number of ICP-MS data points in coal zones.

Figure 1.2-1 Average and Maximum CMO Concentration by Major Lithology Group, Ash-Basis



It is estimated that on an ash-basis, slightly over 95 percent of the deposit exceeds 300 ppm CMO concentrations with an average CMO concentration of 455 ppm, as can be seen in Figure 1.2-2:

Figure 1.2-2 Estimated CMO Grade Distribution, Ash-Basis



1.3 DEVELOPMENT AND OPERATIONS

The REE Exploration Target is currently in an exploration stage.

Ramaco anticipates that it will continue drilling within the current permit area, and other areas of the Brook Mine Property, beyond the area defined in this Exploration Target. Additional exploration plans have yet to be determined and are pending, contingent on analysis of existing data.

Ramaco is pursuing potential pilot production and commercialization at its Brook Mine Deposit which entails several critical steps as follows:

1) Extraction testing through sequential extraction methodologies, to further understand the mineralogical associations of REEs within the ore and identify optimal leaching methods. Additionally, they are in the process of exploring optimal impurity removal steps. This approach will provide valuable insights into the complex geological composition of the coal zones, aiding in the optimization of processing strategies for enhanced efficiency and cost-effectiveness. This flowsheet development work was conducted by SGS Lakefield and ongoing at Hazen Research in Colorado.

2) Ramaco has engaged Fluor Corporation (Fluor) to guide the process development and engineering design criteria for pilot operations.

3) Continued core logging and mineralogical analysis to understand geological variables driving ore concentrations.

4) Physical concentration testing to inform design of process flowsheet for pilot processing, which is also being conducted with Hazen Research.

5) Preparation of an internal techno-economic model to guide decision-making processes which incorporates economic and operational factors such as operational expenses, capital expenditures, geological attributes, processing parameters, scale, grade, and market pricing to determine cutoff grades. Ramaco's model will also be used to conduct economic and financial simulations, and to identify key variables impacting Net Present Value (NPV).

1.4 EXPLORATION

Drilling has served as the primary form of exploration within the REE Exploration Target area. In 2019, Ramaco provided drill cores from the Brook Mine Property for a battery of qualitative and quantitative analyses conducted by the NETL. Analysis conducted by the NETL included the following:

- High resolution photographic analysis
- Analysis of stratigraphic logs from existing coring
- Lithologic description and analysis
- Elemental analyses, including:
  - REE, trace and major element analysis
  - Thermogravimetric analysis
  - Bulk X-Ray Diffraction/X-Ray Fluorescence analysis
  - Inductively Coupled Plasma Mass Spectrometry
- Microscopy and Microanalysis by:
  - Imaging (small and large area)
  - Elemental analysis
  - Phase Identification

The results of the NETL analysis were summarized in October 2020 by the NETL which indicated high REE concentrations. This initiated the three subsequent REE exploration programs that Ramaco has completed.

Drilling was completed for the 100-hole program in July 2023. Since the March 2024 Report, an additional 11 drill holes targeting REEs have been drilled. Additionally, ICP-MS analyses for the cores from these drill holes were completed by SGS North America, Inc. (SGS) in January 2025.

A total of 124 holes drilled by Ramaco, specifically for REE exploration purposes, have served to define the Exploration Target. The drilling database also includes 476 coal exploration holes drilled by both previous property owners and Ramaco. A geological model was built using all 610 of the available exploration drill holes to define structure in a stratigraphic model. A block model was then built based upon this stratigraphic model to analyze the REE concentrations within the different lithologies.

Based upon the independent analyses performed by SGS and other third parties, including the NETL, estimated REE grade may increase at depths beyond the approximate 200-foot average hole depths that had previously been completed. To investigate this estimated increase in REE grade, Ramaco initiated a deep hole program involving 3 new holes. Two of the holes exceeded 800 feet in depth and were analysed using ICP-MS along their full length. The third hole was not completed to its planned depth and ICP-MS results have not yet been completed for this hole.

In addition to detailed geological logging, drill core obtained by Ramaco was analyzed using both portable X-Ray Fluorescence (pXRF) and ICP-MS laboratory methods.

A summary of the drilling data available to date for the Brook Mine Property is summarized in Table 1.4-1 as follows:

Table 1.4-1 Drilling Programs

					Base Data				Quality Analysis					
	Drill Holes		Hole Type		Drill Hole	Geophysical	Downhole Deviation	Geologist's	XRF Analysis[1]			ICP Analysis[2]		
Exploration Program	Count	Drill Depth (Ft)	Rotary	Core	Header	Logs	Log	Log	Holes	Samples	Feet	Holes	Samples	Feet
Bighorn Coal Drilling	417	81,083	336	81	417	318	-	417	-	-	-	-	-	-
Ramaco Coal Drilling	59	11,306	-	59	36	28	-	8	-	-	-	-	-	-
2019 Drilling	6	1,132	-	6	6	-	-	6	3	125	74	5	115	74
2021-2022 Drilling	14	1,937	-	14	14	14	-	14	14	2,196	549	14	421	270
2022-2023 Drilling	102	21,593	-	102	102	-	-	100	94	26,173	6,661	94	2,437	1,649
2023-2024 Drilling	9	900		9	9	9		9	9	723	186	9	734	192
Deep Drilling	3	2,030	-	3	3	3	-	3	2	1,584	404	2	1,168	791
Total	610	119,981	336	274	587	372	-	557	122	30,801	7,874	124	4,875	2,976

[1] As of Dec-31-2024
[2] As of Jan-31-2025

As pXRF devices do not provide measurements for all REE concentrations as accurately as ICP-MS analyses, the pXRF data is only used procedurally to assist in identifying zones to be sent for ICP-MS independent third-party analysis by SGS and is not incorporated into the quantitative analysis of this report. Aside from the exclusion of these pXRF scanning results, no data collected as a result of known exploration programs to date has been omitted from the input, analysis, or results reported in this TRS.

All 610 drill holes detailed above were used to develop a comprehensive geologic structural model. This geologic structural model was in turn used to define the Exploration Target using the 4,875 ICP-MS assays from 124 drill holes. These ICP-MS quality data points provide sufficient coverage of the property to allow for the estimation of in-place REE tonnage and grade. The increase in number of ICP-MS assays from the March 2024 Report to this current

analysis is approximately 150 percent. In addition to ICP-MS analyses performed for the bulk-sampling and deep core holes, a large amount of core from the 2023 100-hole program that was previously unsampled was analysed.

It is WEIR's opinion that the adequacy of sample preparation, security, and analytical procedures for holes that were drilled by Ramaco, after acquiring the property, are acceptable and that these analytical procedures meet typical industry standards.

The adequacy of sample preparation, security, and analytical procedures are generally unknown for holes that were drilled prior to Ramaco acquiring the property. However, the geologist's logs for these holes contain sampling descriptions and lithologic descriptions that are sufficiently detailed to ascertain that an experienced geologist supervised the drilling and sampling, and WEIR supports their use to better define the structure of the deposit. The holes that were drilled prior to Ramaco acquiring the property targeted solely coal, however, they are valuable in that they provide insight into lithology and geological structure in general.

1.5 EXPLORATION TARGET TONNAGE ESTIMATE

The REEs and relative categorizations, as defined for purposes of this TRS, are summarized in Table 1.5-1 as follows:

Table 1.5-1 Rare Earth Elements And Other Critical Minerals

Symbol	Element	Atomic Number	Heavy/ Light	Primary Magnetic	Secondary Magnetic	Critical Mineral [1]	Critical REE[2]
Sc	Scandium	21	-	-	-	Yes	N/A
Ga	Gallium	31	-	-	-	Yes	N/A
Ge	Germanium	32	-	-	-	Yes	N/A
Y	Yttrium	39	-	-	-	Yes	Yes[4]
La	Lanthanum	57	Light	-	-	Yes	No
Ce	Cerium	58	Light	-	-	Yes	Excess
Pr	Praseodymium	59	Light	Yes	-	Yes	No
Nd	Neodymium	60	Light	Yes	-	Yes	Yes
Pm[3]	Promethium	61	-	-	-	-	No
Sm	Samarium	62	Light	-	Yes	Yes	No
Eu	Europium	63	-	-	-	Yes	Yes
Gd	Gadolinium	64	-	-	Yes	Yes	No
Tb	Terbium	65	-	Yes	-	Yes	Yes
Dy	Dysprosium	66	-	Yes	-	Yes	Yes
Ho	Holmium	67	Heavy	-	Yes	Yes	Excess
Er	Erbium	68	Heavy	-	-	Yes	Yes
Tm	Thulium	69	Heavy	-	-	Yes	Excess
Yb	Ytterbium	70	Heavy	-	-	Yes	Excess
Lu	Lutetium	71	Heavy	-	-	Yes	Excess

[1] U.S. Geological Survey
[2] Ekmann, 2012, Reid, 2018
[3] Promethium is not found in nature on earth
[4] Yttrium is not a Lanthanoid, but is commonly included as one.

WEIR's evaluation of Ramaco's REE Exploration Target was conducted in accordance with Regulation S-K 1300, and WEIR notes that:

- Ranges of tonnage and grade of the Exploration Target are conceptual in nature.
- There has been insufficient exploration of Ramaco's property to reasonably estimate a Mineral Resource.
- It is uncertain if further exploration will result in the estimation of a Mineral Resource.
- The Exploration Target does not represent, and should not be construed to be, an estimate of a Mineral Resource or Mineral Reserve.

The geological model described in Section 6.3 served as the basis for the development of the Brook Mine Property Exploration Target tonnage and grade estimates. Tonnage is reported as in-place CMO weights.

The Brook Mine Property Exploration Target in-place CMO tonnage, as of March 31, 2025 ranges between 1,326 to 1,658 thousand short tons, with a grade ranging between 455 to 569 ppm on an ash-basis. Tonnage estimates on an ash-basis are summarized in Table 1.5-2:

Table 1.5-2 Current Brook Mine In-Place CMO Exploration Target Tonnage and Grade Estimates, Ash-Basis

	Total CMOs		Primary Magnetic REOs		Secondary Magnetic REOs		Heavy REOs		Light REOs		TREOs		Ga and Ge Oxides		Sc Oxide			
Range	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Total Model Volume (M CY)	Total Model Mass (M Tons)
Low	1,326	455	258	89	71	25	39	13	846	288	1,097	375	127	44	102	35	2,054	3,999
High	1,658	569	322	111	89	31	49	17	1058	360	1372	469	159	54	128	44	2,054	3,999

Notes:

- Tonnage estimates reported above are not Mineral Resources or Mineral Reserves and do not meet the threshold for reserve modifying factors, such as estimated economic viability, that would allow for conversion to mineral reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.
- The Exploration Target tonnage estimates are based on actual exploration results from 610 drill holes and 4,875 ICP samples.
- No CMO cut-off grade was applied.
- The ranges of tonnage and grade of the Exploration Target could change as future exploration activities are completed.
- Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

Reported concentrations of CMOs have increased on the high end range from 548 ppm reported in the March 2024 Report to 569 ppm in the current study. The increase is due to key changes including: 1) additional ICP-MS testing, and 2) inclusion of Sc.

A comparison of in-place CMO tonnages between the March 2024 Report and current estimates is detailed in Table 1.5-3.

Table 1.5-3 Brook Mine TRS CMO Tonnage and Grade Comparison, Ash-Basis

	Total		Magnetics				Heavy		Ga and Ge		Sc	
			Primary		Secondary							
Model Version	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)
Current TRS	1,097	375	258	89	72	25	39	13	127	44	102	35
March 2024 TRS	1,105	392	260	93	72	26	39	14	114	46	-	-
Difference (%)	(0.7)	(4.3)	(0.8)	(4.6)	(0.7)	(3.7)	(0.3)	(3.2)	11.4	(5.7)	-	-

Note: Numbers respresent the lower range case

GaO + GeO tonnages and concentrations were estimated based on 3,298 Ga analyes and 2,474 Ge analyses, a significant increase over the 496 analyses each, for Ga and Ge in the March 2024 TRS. The current estimates for GaO + GeO tonnage ranges from 127K to 159K tons with ash-basis concentrations from 44 to 54 ppm. GaO + GeO constitutes approximately 10 percent of the total CMO tonnage. This data in-filling, replacing previously missing data, resulted in a 11.4 percent increase in Ga and Ge oxide tonnage compared to the previous report.

Scandium (Sc) tonnages and concentrations are included in this study but were not included in the March 2024 study. There were 139 analyses completed for Sc that were included in this study. It was discovered that Sc had a strong relation with TREE in regression analyses with an R^2 correlation value of 0.817. The derived regression formula was used to populate missing Sc concentrations for the remaining 4,736 ICPMS samples until such a time that can be replaced with actual analyses. As a result of using these calculated values versus later in-fill analysis data, the total quantity and average concentration of Sc is not expected to significantly change in future updates unless unforeseen anomalies are encountered. Current estimates indicate in-place Sc oxide tonnage ranges from 102K to 128K tons, with average oxide grade ranging from 35 to 44 ppm. This constitutes approximately 8 percent of the total CMO tonnage.

1.6 CONCLUSIONS AND RECOMMENDATIONS

Since 2019, Ramaco has been exploring the potential of a REE deposit within its Brook Mine Property. Each successive exploration program has added continued definition of the deposit. At this point, definition of the minerals within the Brook Mine Permit appears to be adequate to describe the Exploration Target.

- Current estimates of the Brook Mine Property Exploration Target in-place CMO tonnage, range from 1,326 to 1,658 thousand short tons, with a grade ranging from 455 to 569 ppm.
- The Primary Magnetic REEs (PMREEs) and Secondary Magnetic REEs (SMREEs) are estimated to represent 19.4 and 5.4 percent of the TREOs, respectively, a slight decrease from the March 2024 Report.
- While CMOs exist in both the coal and interburden zones modeled, greater CMO tonnage is found within the interburdens, with approximately 60 percent of the estimated CMO tonnage located within clays, carbonaceous units, and siltstone formations.
- The pXRF analysis procedures and protocols used to select appropriate higher REE grade samples to submit for third-party ICP-MS analysis were found to be conservatively biased within coal zones. It was subsequently deemed appropriate to modify the sample selection protocol in order to more accurately identify high REE concentration lithologies that should have originally been analyzed. Ramaco has now recognized this bias and has systematically resampled numerous coal zones.
- Additionally, based upon research by independent institutional research laboratories, it is believed that the coal carbon matrix can hinder accurate detection of REEs in samples analyzed using ICP-MS. SGS has begun to test carbonaceous samples on an ash-basis, by first combusting the sample and then testing the resulting mineral in the ash. In assessing the impact of organic interference in the ICP-MS process, several samples tested previously on a whole rock-basis were ashed and retested on an ash-basis. By conducting this comparison, it is estimated that prior REE tonnages in carbonaceous zones may have been underestimated by approximately 10 percent. Re-analysis of previous samples using this new ICP-MS analysis protocol is on-going.
- Results from the deep core hole drilling program did not reveal any substantial high grade ore zones at depth. The levels of critical minerals below the LOW7 seam were generally lower than those above the LOW7 seam, on average.

Ramaco's sample collection, preparation, security, and testing protocols are well documented and suffice to provide consistent, reliable, and verifiable data. These protocols are planned to be maintained throughout any subsequent extensions of the current exploration program.

As with any exploration-stage mineral mining project, there are risks and uncertainties associated with CMO tonnage and grade estimates. The existing drill hole density provides strong confidence in structural modeling. Significant progress has been made with ICP-MS analyses to fill-in gaps in the modeling of CMO concentrations.

Regardless of the care taken in defining this Exploration Target, tonnage estimates reported throughout this TRS are not Mineral Resources or Mineral Reserves and do not meet the threshold for reserve modifying factors that would allow for conversion to Mineral Reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.

WEIR advises that there are still several issues to be addressed for one to conclude that prospects are reasonable for economically feasible extraction of the minerals at this time. Work is currently ongoing to address these issues.

2.0 INTRODUCTION

2.1 REGISTRANT

WEIR was retained by Ramaco (Nasdaq: METC) to update the existing TRS, which was dated March 21, 2024, related to Ramaco's REE Exploration Target. The REE Exploration Target is located within Ramaco's mineral holdings at its Brook Mine Property located approximately seven miles north of Sheridan, Wyoming.

2.2 TERMS OF REFERENCE AND PURPOSE

This TRS was prepared specifically for Ramaco's REE Exploration Target. The tonnages within the REE Exploration Target have been classified in accordance with SEC mining property disclosure rules under Subpart 1300 and Item 601 (96)(B)(iii) of Regulation S-K. Unless otherwise stated, all quantities, qualities, distances, and currencies are expressed in United States customary units.

Despite the presence of coal within the Brook Mine Property, this TRS does not report estimates of coal tonnage or quality associated with Ramaco's mineral holdings.

Under Regulation S-K 1300, an Exploration Target is defined as a statement or estimate of the exploration potential of a mineral deposit in a defined geological setting where the statement or estimate, quoted as a range of tonnage and a range of grade (or quality), relates to mineralization for which there has been insufficient exploration to estimate a Mineral Resource.

REEs are comprised of a group of 17 chemically similar elements that include the Lanthanoids (atomic numbers 57-71), and Scandium and Yttrium. These elements are critical in the manufacturing of advanced materials, and development of new technologies supporting the United States' infrastructure, defense, and energy needs. REEs are typically found in bedrock and regolith-hosted geologic ore deposits. Domestic coal deposits have also been identified as promising sources of REEs and other critical minerals. Two additional critical minerals, Ga and Ge, have been included in this TRS.

The REEs and relative categorizations, as defined for purposes of this TRS, are summarized in Table 2.2-1 as follows:

Table 2.2-1 Rare Earth Elements And Other Critical Minerals

Symbol	Element	Atomic Number	Heavy/ Light	Primary Magnetic	Secondary Magnetic	Critical Mineral [1]	Critical REE[2]
Sc	Scandium	21	-	-	-	Yes	N/A
Ga	Gallium	31	-	-	-	Yes	N/A
Ge	Germanium	32	-	-	-	Yes	N/A
Y	Yttrium	39	-	-	-	Yes	Yes[4]
La	Lanthanum	57	Light	-	-	Yes	No
Ce	Cerium	58	Light	-	-	Yes	Excess
Pr	Praseodymium	59	Light	Yes	-	Yes	No
Nd	Neodymium	60	Light	Yes	-	Yes	Yes
Pm[3]	Promethium	61	-	-	-	-	No
Sm	Samarium	62	Light	-	Yes	Yes	No
Eu	Europium	63	-	-	-	Yes	Yes
Gd	Gadolinium	64	-	-	Yes	Yes	No
Tb	Terbium	65	-	Yes	-	Yes	Yes
Dy	Dysprosium	66	-	Yes	-	Yes	Yes
Ho	Holmium	67	Heavy	-	Yes	Yes	Excess
Er	Erbium	68	Heavy	-	-	Yes	Yes
Tm	Thulium	69	Heavy	-	-	Yes	Excess
Yb	Ytterbium	70	Heavy	-	-	Yes	Excess
Lu	Lutetium	71	Heavy	-	-	Yes	Excess

[1] U.S. Geological Survey

[2] Ekmann, 2012, Reid, 2018

[3] Promethium is not found in nature on earth

[4] Yttrium is not a Lanthanoid, but is commonly included as one.

2.3 SOURCES OF INFORMATION AND DATA

The primary information used in this study was obtained from the following sources:

- Mineral and surface ownership maps, and supplemental files provided by Ramaco.
- Drilling geological data provided by Ramaco and WWC Engineering (WWC). The geological data includes drill hole information such as driller's logs, geologist's logs, both full and partial scans of geophysical logs, survey data, and MS Excel™ (Excel) versions of drill hole survey and lithology data.
- pXRF REE quality laboratory analysis was provided by Ramaco
- ICP-MS REE quality laboratory analysis relied upon for this study was primarily conducted by SGS. Other laboratories have been utilized in order to perform

comparative analysis checks as well as to expedite final results. The laboratories involved are detailed in Section 8.0 of this TRS.

- Interviews between WEIR personnel and Ramaco personnel including:
  - Chief Executive Officer
  - Chief Operating Officer
  - Senior Vice President and Chief Administrative Officer
  - Senior Vice President and Chief Mine Development Officer
  - Director of Development for Carbon Products
  - Director of Critical Minerals
  - Director of Life Sciences
  - Manager of Laboratory Technologies
  - Laboratory Technician
  - Contract Geologist
  - Contract Driller

A detailed list of all data received and reviewed for this study is provided in Sections 24.0 and 25.0 of this TRS.

2.4 DETAILS OF THE PERSONAL INSPECTION OF THE PROPERTY

WEIR personnel visited the site from July 10 through 11, 2023. WEIR met with various Ramaco personnel at their site office and discussed project status and plans. WEIR was given a demonstration of pXRF sample preparation and analysis and ICP-MS sample preparation.

WEIR also visited the Brook Mine Permit area, accompanied by WWC, in order to observe drilling equipment and activities and general site layout and conditions.

WEIR concluded that Ramaco has facilities and equipment that are more than adequate to perform the tasks required for Ramaco's exploration program. Drilling for the 100-hole program was nearly completed at the time of the site visit.

2.5 PREVIOUS TECHNICAL REPORT SUMMARY

WEIR previously prepared an initial disclosure of an REE Exploration Target for the Brook Mine Property, dated May 2, 2023 (May 2023 Report). WEIR updated this initial TRS in March 21, 2024, for which this report serves as a further update.

3.0 PROPERTY DESCRIPTION

3.1 PROPERTY LOCATION

The REE Exploration Target is located within Ramaco's mineral holdings at its Brook Mine Property, located approximately seven miles north of Sheridan, Wyoming in Sheridan County. The Burlington Northern Railroad and Interstate 90 are located along the southern boundary of the current Brook Mine permit area.

The REE Exploration Target and the Brook Mine Property are situated in the Sheridan Coal Field in the northwestern portion of the PRB coal producing region of the of the United States (see Figure 1.1-1). The USGS 7.5-minute quadrangle map sheets are Acme, Hultz Draw, Monarch, and Sheridan, and the property lies within Townships 56 and 57 North, Ranges 84 and 85 West.

3.2 PROPERTY AREA

The Brook Mine Property consists of over 15,800 acres of Ramaco owned and leased mineral holdings located in Sheridan County, Wyoming. Ramaco acquired the Brook Mine Property in 2011 from the Sheridan-Wyoming Coal Company, then a subsidiary of The Brinks Company

When Ramaco began development of the Brook Mine Property as a thermal coal resource in 2012, Ramaco originally permitted approximately 4,600 acres that it regarded as the optimal area for a new surface coal mine. As Ramaco began further core drilling exploration in 2021 and 2022 relative to REE exploration, Ramaco decided to continue to drill in areas within the original permit boundary and at comparable depths related to coal mining in order to leverage the existing drilling core available for sampling.

As such, the REE Exploration Target is limited to the permit boundary of the Brook Mine Property and at relatively shallow depths given that both US Geological Survey and historical data indicate coal deposits as deep as approximately 1,200 feet. Ramaco has indicated its intention to proceed with additional drilling and assessment of the entire Brook Mine Property

to assess the potential for expanding its REE Exploration Target both beyond the current permit boundary and at deeper depths.

Ramaco's properties and facilities in the Sheridan, Wyoming area include the Brook Mine (which is currently undeveloped), the iCAM (Innovating Carbon Advanced Materials) Center, and the iPark Center (explained below).

The iCAM Center is the nation's first integrated carbon resource, research and development, and production facility. It hosts research professionals from national laboratories, universities, private research groups, government organizations, as well as manufacturing organizations in laboratory, pilot-plant, and permanent operating facilities. The iCam Center promotes collaboration to achieve innovations around advanced uses for carbon derived from coal.

The iPark Center is intended to become a next generation mine-mouth "coal to products" manufacturing facility, with zero net emissions. Located next to the Brook Mine Property, operations at the iPark Center intend to utilize coal from the mine to create high-value carbon products. These products include carbon fiber, graphene, graphite, carbon nano tubes, carbon dots, carbon-based resins, carbon-based building products, medical products, and activated carbon.

3.3 SURFACE CONTROL

Ramaco was granted a mineral deed from the Sheridan-Wyoming Coal Company (SWCC) on August 17, 2011. SWCC had previously deeded the surface rights, as described in Table 3.3-1, to Big Horn Coal Company on June 28, 1954, and recorded in Deed Book 98, Page 127 in the Sheridan County Courthouse. The deed grants Ramaco all coal and other minerals contained in all of the lands described in Table 3.3-1, together with the right to mine, explore, drill, extract, and remove the same. The deed also grants Ramaco the right to use surface lands, as needed, to mine, explore, drill, extract, and remove said coal and other minerals.

Further, the deed grants that should Ramaco mine, drill, explore, extract, process, and remove coal or other minerals and utilize any part of the surface lands in connection with those activities, Ramaco will remain free from any liability or claim for damage to the surface of said lands related to subsidence or other injury to the surface of said lands resulting from such operations.

Ramaco was granted a Surface Owner Consent and Surface Use Agreement from Padlock Ranch Company on September 1, 2016. The agreement provided Ramaco with surface owner consent to mining the surface land located in Sheridan County, Wyoming, as described in Table 3.3-1.

Ramaco also entered an agreement with Taylor Investments, LLC (Taylor), effective August 22, 2012, that granted Ramaco the exclusive right and privilege to enter and use all the surface of the lands as may be convenient and necessary for mining the fee coal owned by Ramaco underlying the lands for a period of 20 years and then from year to year thereafter until all mineable and merchantable coal has been exhausted, as described in Table 3.3-1 (Taylor Surface Lands - Ramaco Fee Coal), as well as the exclusive right and privilege to mine, extract, and remove all of the coal deposits, and other minerals comingled therewith, in and under the lands described in Table 3.3-1 (Taylor Surface Lands - Taylor/Legerski Fee Coal) for a period of 20 years.

Table 3.3-1 REE Exploration Target Property Control

Bighorn Coal Company Surface Lands

Township 57 North, Range 84 West, 6th P.M., Sheridan County, WY	
Section 3:	SW¼SE¼, S½SW¼
Section 7:	E½SE¼
Section 8:	S½
Section 9:	NE¼, SW¼NW¼, S½
Section 10:	NE¼, SW¼NW¼
Section 14:	That part of SW¼SW¼ lying south of the Tongue River
Section 15:	NE¼NE¼, W½NE¼, NW¼, W½SE¼, E½SE¼ south or Tongue Elver, the SW¼ excepting therefrom (i) the Acme townsite sold to Gothard Bylund in certain Agreement for Warranty Deed and Bill of Sale dated July 15, 1953, and (ii) certain tracts of land deeded to Montana-Dakota Utilities Company, described as follows: Beginning at a point 50 feet north 26° 54’ 30” west of a point which is 1984.5 feet north 31° 23’ east from the southwest corner; thence south 69° 6’ west 100.51 feet; thence north 26° 54’ 30” west 420.82 feet; thence north 24° 54’ east 127.24 feet; thence south 86° 14’ west 509.5 feet; thence south 26° 55’ east 363.2 feet; thence south 69° 6’ west 477.6 feet to the point of beginning.
Section 17:	All
Section 18:	E½
Section 19:	NE¼NE¼, All of SE¼NE¼ except the SW¼ thereof sold to William Long, also all that portion of NW¼NE¼ lying East of Tongue River
Section 20:	NW¼, NW¼SW¼, All NE¼ north of C. B. & Q. Railroad Company right-of-way
Section 21:	All except tracts and lots of Model Townsite owned by parties of record, and except that portion of SW¼NW¼ lying between the North line of the C. B. & Q. Railroad right-of-way and the North line of said SW¼NW¼, consisting of 4 acres, more or less, as conveyed to Bruno Romeo.

Section 22:	All
Section 27:	N½SE½, and the N½ except a tract of land described as .follows: Beginning 535.5 feet north 59° 30' east from the West Quarter corner of said Sec. 27; thence north 16° 12' east 200 feet; thence south 73° 48' east 200 feet; thence south 16° 12' west 200 feet; thence north 73° 48' west 200 feet to the point of beginning.
Section 28:	NE¼, N½SE¼

Township 57 North, Range 85 West, 6th P.M., Sheridan County, Wyoming:

A certain tract in Sections 14 and 23 as described in Warranty Deed dated January 26, 1916 from George Masters to Peter Kooi, recorded in Book Z of Deeds, Page 214 County Clerk's Office

Padlock Surface Lands

Township 57 North, Range 84 West, 6th P.M., Sheridan County, WY

Section 7:	E½SE¼
Section 8:	S½
Section 15:	SE¼SW¼ Part Containing 5 acres more or less
Section 17:	All
Section 18:	E½ lying north of I-90 ROW
Section 20:	That portion of N½ located north of I-90 ROW and north of Acme Road ROW containing 81 acres more or less
Section 21:	NW¼ Part and W1/2NE¼ Part Containing 4 acres more or less

Taylor Surface Lands - Taylor/Legerski Fee Coal

Township 57 North, Range 85 West, 6th P.M., Sheridan County, Wyoming:

Section 12:	South half of the Northeast quarter, the Southeast quarter of the Northwest quarter, the Southeast quarter and the East half of the Southwest quarter.
Section 13:	North half of the Northeast quarter and the Northeast quarter of the Northwest quarter.
	Excepting that portion conveyed to The State Highway Commission of Wyoming by Warranty Deed recorded February 10, 1981 in Book 255, Page 70.

Taylor Surface Lands - Ramaco Fee Coal

Township 57 North, Range 84 West, 6th P.M., Sheridan County, Wyoming:

Section 18: All that portion of Lot 4 (SW¼SW¼) lying north of the northerly right of way line of Interstate Highway No. 90, said northerly right of way line being of hereinafter stated distances to the left or northerly side measured at right angles or radially to the following described survey line of highway, said parallel right of way line beginning on the west boundary and ending on the east boundary of said Lot 4; beginning at a point on said west boundary from which the southwest corner of Section 18 bears S. 0° 30' E. a distance of 862.5 feet; thence with said parallel right of way lines 270 feet to the left or northerly side, S. 81° 23.6' E. a distance of 876.2 feet; thence with said parallel right of way line 210 feet to the left or northerly side, continuing S. 81° 23.6' E. a distance of 455 feet, more or less, to a point on said east boundary. ALSO, NW¼, N½SW¼ and SE¼SW¼

Excepting that portion conveyed to The State of Wyoming Highway Commission of Wyoming by Warranty Deed recorded February 10,1981 in Book 255, Page 70.

Township 57 North, Range 85 West, 6th P.M., Sheridan County, Wyoming:

Section 11: SE¼SE¼

Section 12: SW¼SW¼

Section 13: NW¼NW¼, S½N½, NE¼SE¼, and also all of the SW¼ and W½SE¼, except that portion thereof lying South of U.S. Highway No. 87 (now Interstate 90); also all that portion of the SE¼SE¼ lying north of the northerly right of way line of Interstate Highway No. 90, said northerly right of way line being 270 feet to the right or northerly side when measured at right angles to the following described survey line of highway, said northerly right of way begins on the east boundary and ends on the north boundary of said SE¼SE¼; beginning at a point on said east boundary from which the southeast corner of said Section 13, bears S. 0° 30' E, a distance of 862.5 feet; thence N. 81° 23.6' W. a distance of 82.9 feet to the point of beginning of a 1° 00' circular curve to the right, the radius of which is 5,729.6 feet; thence along said curve through a central angle of 10° 38.4' a distance of 1,064.1 feet to the point of ending of said curve; thence N. 70° 45.1' W. a distance of 45 feet, more or less, to a point on the west boundary of said SE¼SE¼ from which the northwest corner thereof bears northerly a distance of 230 feet, more or less.

Excepting the right of way of the C.B. & Q. Railroad, also excepting the right of way of the Grand Island and Northern Wyoming Railroad Company as recorded July 11, 1893 in Book E, Page 253 of Deeds, and Recorded June 11,1894 in Book E, Page 427 of Deeds,

Also excepting that portion conveyed to The State Highway Commission of Wyoming by Warranty Deed recorded February 10, 1981 in Book 255, Page 70.

Section 14: E½NE¼, and all of the NE¼SE¼ excepting therefrom the following tract of land, to-wit: Beginning at the Southeast corner of said NE¼SE¼; thence West to the Southwest corner of said NE¼SE¼; thence North 205 feet to the South line of the County Road; thence Southeasterly along said road to the East line of said Section 14; thence South 27 feet to the point of beginning.

Excepting a portion conveyed to The State Highway Commission of Wyoming by Warranty Deed recorded February 10, 1981 in Book 255, Page 70.

3.4 MINERAL CONTROL

Ramaco was granted a mineral deed from SWCC on August 17, 2011. The mineral deed granted Ramaco all of Grantor's right, title and interest in the coal and other minerals, except the oil, gas and coalbed methane for the mineral described in Table 3.4-1.

Ramaco also entered an agreement with Taylor, effective August 22, 2012, that granted Ramaco the exclusive right and privilege to enter and use all the surface of the lands as may be convenient and necessary for mining the fee coal owned by Ramaco underlying the lands for a period of 20 years and then from year to year thereafter until all mineable and merchantable coal has been exhausted.

Additionally, Taylor granted Ramaco the exclusive right and privilege to mine, extract, and remove all of the coal deposits, and other minerals comingled therewith, in and under the lands described in Table 3.4-1 for a period of 20 years and then from year to year thereafter until all mineable and merchantable coal has been exhausted.

In addition to the SWCC and Taylor agreements, Ramaco was granted a Coal Mining Lease Agreement, effective January 7, 2014, by and between William J. Laya and Joyce J. Laya, Trustees of the William J. Laya Trust under Trust Agreement dated November 19, 1993, and Joyce J. Laya and William J. Laya, Trustees of the Joyce J. Laya Trust under Trust Agreement dated November 19, 1993 and Thomas C. Laya (collectively, Laya). The Laya Agreement granted Ramaco the exclusive right and privilege to mine, extract, and remove all of the coal deposits, and other minerals commingled therewith in and under the land described in Table 3.4-1 for a period of 20 years, and from year to year thereafter until all mineable and merchantable coal has been exhausted.

The mineral control located in Sheridan County, Wyoming is described in Table 3.4-1.

Table 3.4-1 REE Exploration Target Mineral Control

Sheridan-Wyoming Coal Company Mineral

Township 56 North, Range 84 West, 6th P.M., Sheridan County, Wyoming:	
Section 3:	All that part of the NW¼ lying East of the right of way of the BNSF Railway (formerly Chicago, Burlington and Quincy Railroad);

Sections 3 and 4:	All that part of the West Half of the Northwest Quarter of Section 3 and East Half of the Northeast Quarter of Section 4 lying east of the center of the channel of Big Goose Creek and West of the County Road which parallels the right-of-way of the BNSF Railway (formerly Chicago, Burlington and Quincy Railroad), as more specifically described in that certain Warranty Deed recorded in Book 15, Page 202 of the Sheridan County records.

Township 57 North, Range 84 West, 6th P.M., Sheridan County, Wyoming:

Section 3:	SW¼SE¼, S½SW¼
Section 7:	E½SE¼
Section 8:	S½
Section 9:	NE¼, SW¼NW¼, S½
Section 10:	NE¼, SW¼NW¼
Section 14:	That part of SW¼SW¼ lying south of the Tongue River
Section 15:	NE¼NE¼, W½NE¼, NW¼, W½SE¼ and that portion of the E½SE¼ lying south of the Tongue River, the SW¼ except a tract of land lying in the N½SW¼ described as follows: Commencing at a point which is North 31° 23' East 1984.5 feet, and thence North 63° 05' 30" East 475 feet from the Southwest corner of said Section 15, said point being marked by a cement monument; thence North 26° 54' 30" West a distance of 357 feet to a point marked by a cement monument; thence running South 86° 13' 55" West a distance of 509.5 feet to a point marked by a cement monument; thence South 24° 54' West 26° 54' 30" East a distance of 420.82 feet; thence running North 69° 06' East a distance of 578.15 feet to the point of beginning, containing 5.8 acres, more or less; and ALSO EXCEPTING That portion of the NW¼SW¼ described as follows:
Section 15 (continued):	Beginning at a point which is located S. 42° 40' 33" E., 1,286.21 feet from the West Quarter corner of said Section 15, thence N. 59° 25' 31" E., 40.33 feet to a point thence S. 31° 27' 08" E., 70.26 feet to a point; thence S. 60° 00' 11" W., 39.88 feet to a point, thence N. 31° 49' 24" W., 69.86 feet to the point of beginning, containing .06 acres, more or less.
Section 17:	All
Section 18:	E½, NW¼, N½SW¼, SE¼SW¼
Section 19:	NE¼NE¼, SE¼NE¼ and that portion of NW¼NE¼ lying East of Tongue River; S½ and all those portions of SW¼NE¼, E½NW¼ and Lot 2 South of the center of the Tongue River.
Section 20:	N½, N½SE¼, SE¼SE¼
Section 21:	All except the Townsite of Model which lies in parts of the SW¼NW¼ and NW¼SW¼ of Section 21 and EXCEPT a four acre tract in the SW¼NW¼ lying between the North line of the BNSF Railway (formerly C. B. & Q. Railroad) Right-of-way and the North line of said SW¼NW¼, said tract being conveyed to BRUNO ROMEO.
Section 22:	All
Section 26:	S½S½
Section 27:	N½S½, and the N½--except a tract of land described as follows: Beginning 535.5 feet north 59° 30' east from the West Quarter corner of said Sec. 27; thence north 16° 12' east 200 feet; thence south 73° 48' east 200 feet; thence south 16° 12' west 200 feet; thence north 73° 48' west 200 feet to the point of beginning.

	S½S½ except a 2 acre tract described as follows: Commencing at a point 221 feet East and 30 feet North of Southwest cornr of Section 27, thence Northerly along the West line of the BNSF Railway (formerly C. B. & Q. Railroad) right of way 378 feet to a point; thence West 241 feet to a point; thence South 378 feet to a point; thence East 221 feet to point of beginning. All that part of SW¼SW¼ Section 27 lying West of the BNSF Railway (formerly Burlington Northern Railroad) except the 2 acres above described.
Section 28:	NE¼, N½SE¼, SE¼SE¼
Section 29:	W½W½
Section 30:	All
Section 33:	NW¼NE¼, S½NE¼, SE¼, NE¼NE¼
Section 34:	NE¼, E½NW¼, SW¼NW¼, S½ and all that portion of the NW¼NW¼ described as follows: Beginning at the Northwest corner of said Section 34, thence East along section line a distance of 220 feet to the Westerly right of way line of the BNSF Railway (formerly Chicago, Burlington and Quincy Railroad), thence Southeasterly along said right of way line on a 2° curve to the left a distance of 1,145 feet; thence West a distance of 108 feet to the East bank of Big Goose Creek; thence following the general course of Big Goose Creek as follows: North 53° West 500 feet, South 86° West 130 feet, South 29° West 327 feet. South 70° West 104 feet, North 79° West 150 feet, North 69° West 275 feet, North 36° East 1215 feet, to a point on the North line of said Section 33; thence East along said North Line a distance of 235 feet to the point of beginning, containing 19.2 acres, more or less.
Section 35:	All

Township 57 North, Range 85 West, 6th P.M., Sheridan County, Wyoming:

Section 11:	SE¼SE¼
Section 12:	SW¼SW¼
Section 13:	NW¼NW¼, S½N½, N½S½, that portion of S1/2SW¼, SE¼SW¼ lying North of State Highway US 87 as at present located. That portion of SW¼SE¼, S½SW¼ lying South of State Highway US 87 as at present located.
Section 14:	E½NE¼, and the NE¼SE¼ except the following described tract: Beginning at the Southeast Corner of the Northeast quarter of the Southeast quarter (NE¼SE¼) of said Section 14, thence West to Southwest Corner of the Northeast quarter of the Southeast Quarter of said Section, thence North 205 feet to the South line of the County Road; Thence Southeasterly along said Road to the East line of said Section 14, thence South 27 feet to the point of beginning.
Section 23:	That portion of the N½NE¼, NE¼NW¼ lying South of the Tongue River, S½NE¼, SE¼NW¼, NE¼SW¼, SE¼SW¼, SE¼
Section 24:	Those portions of NW¼NE¼, N½NW¼ lying South of the Tongue River; SW¼NW¼, W½SW¼, SE¼ and that portion of SE¼NE¼ lying South of the Tongue River except the three parcels described immediately above. That portion of NW¼NE¼, N½NW¼ lying North of the Tongue River.
Section 25:	NE¼, W½NW¼, N½SW¼

Section 26:	N½, SE¼
Section 35:	NW¼

Taylor Surface Lands - Taylor/Legerski Fee Coal

Township 57 North, Range 85 West, 6th P.M., Sheridan County, Wyoming:

Section 12:	South half of the Northeast quarter, the Southeast quarter of the Northwest quarter, the Southeast quarter and the East half of the Southwest quarter.
Section 13:	North half of the Northeast quarter and the Northeast quarter of the Northwest quarter. Excepting that portion conveyed to The State Highway Commission of Wyoming by Warranty Deed recorded February 10, 1981 in Book 255, Page 70.

Laya Leased Mineral

Township 57 North, Range 85 West, 6th P.M., Sheridan County, Wyoming:

Section 10:	SE¼NE¼, N½S½, SE¼SE¼ W1/2SE¼, SW¼, SW¼NW¼
Section 11:	W½SE¼, SW¼, SW¼NW¼
Section 14:	W½NE¼, NW¼, and that part of the S½ described as commencing at the half section corner between Section 14 and 15, in Township 57 North, Range 85 West, 6th P.M., being the NW corner of the NW¼SW¼ of said Section 14 as the point of beginning; thence south along the section line 1,000 feet, more or less, to the north line of the right-of-way of the Grand Island & Northern Wyoming Railroad Company; thence running in a southeasterly direction along the north line of the said right-of-way to a point on the east section line of said Section 14, which said point is 408 feet, more or less, south of the NE corner of the SE¼SE¼ of said Section 14; thence running north along said section line to a point, which said point is 27 feet north of the northeast corner of the SE¼SE¼ of said Section 14; thence running in a northwesterly direction 1,336 feet to a point on the north and south dividing line between the E½ of the E½ of said Section 14, which point is 435 feet north of the line of the said right-of-way and 1,115 feet south of the northwest corner of the NE¼SE¼ of said Section 14; from said last named point running thence north along said division line 1,115 feet to the said northwest corner of the said NE¼SE¼ of said Section 14; thence running west to the point of beginning.
Section 15:	E½NE¼ Excepting, therefrom two (2) parcels conveyed to The State Highway Commission of Wyoming in Book 291 of Deeds at page 545, and more particularly described as follows: Parcel 1- All that portion of the SE¼NE¼ of Section 15, T57N, R85W, of the 6th P.M., Wyoming lying south of a parallel right-of-way line of hereinafter stated distances to the right or northerly side when measured at right angles or radially to the following described survey line of highway, said parallel right-of-way line begins on the east boundary and ends on the west boundary of said SE¼NE¼:

Beginning at a point on the east boundary of said Section 15 from which the east quarter corner thereof bears N 0° 28' 05.6" W a distance of 149.81 feet, said point of beginning also being located on a 1° 00" circular curve concave to the north, the radius of which is 5,729.58 feet and at which point a line tangent to said curve bears N 72° 30' 36.7" W;

thence with said parallel right-of-way lines 275 feet to the right or northerly side along said curve through a central angle of 5° 43' 32.4" a distance of 572.57 feet;

thence with said parallel right-of-way line 200 feet to the right or northerly side continuing along said curve through a central angle of 2° 22' 02.6" a distance of 236.74 feet to the point of ending of said curve;

thence continuing with said parallel right-of-way line 200 feet to the right or northerly side, N 64° 25' 01.6" W a distance of 720 feet, more or less, until said parallel right-of-way line intersects said west boundary.

Parcel 2-
All those portions of the SW¼NW¼ of Section 14, T57N, R85W of the 6th P.M. and of a tract of land lying in the S½ of said Section 14 as described in Book 54 at page 569 of the Sheridan County Records, lying between the southerly right-of-way boundary as described in Book 102 at page 72 of the Sheridan County Records and a parallel right-of-way line of hereinafter stated distances to the left or northerly side when measured at right angles or radially to the following described survey line of highway, said parallel right-of-way line begins on the west boundary of said Section 14 and ends on the east boundary of the NW¼SE¼ of said Section 14:

Commencing at a point on the west boundary of said Section 14 from which the west quarter corner thereof bears N 0° 28' 05.6" W a distance of 149.81 feet;

thence N 72° 02' 27.0" W a distance of 93.87 feet to the True Point of Beginning. Said True Point of Beginning also being located on a 1°00' circular curve concave to the north, the radius of which is 5,729.58 feet and at which point a line tangent to said curve bears S 71° 34' 17.4" E;

thence with said parallel right-of-way line 275 feet to the left or northerly side, southeasterly along said curve through a central angle of 4° 12' 46.9" a distance of 421.30 feet;

thence with said parallel right-of-way line 175 feet to the left or northerly side continuing southeasterly along said curve through a central angle of 12° 04' 09.8" a distance of 1,206.94 feet to the point of ending of said curve;

thence continuing with said parallel right-of-way line 175 feet to the left or northerly side, S 87° 51' 14.1" E a distance of 93.06 feet;

thence with said parallel right-of-way line 200 feet to the left or northerly side continuing S 87° 51' 14.1" E a distance of 800 feet;

thence with said parallel right-of-way line 300 feet to the left or northerly side, continuing S 87° 51' 14.1" E a distance of 438.99 feet to the point of beginning of a 0°45' circular curve concave to the south, the radius of which is 7,639.44 feet;

thence continuing with said parallel right-of-way line 300 feet to the left or northerly side, southeasterly along said curve through a central angle of 5° 26' 54.8" a distance of 726.47 feet, to the point of ending of said curve;

thence continuing with said parallel right-of-way line 300 feet to the left or northerly side, S 82° 24' 19.3" E a distance of 435 feet, more or less, until said southerly right-of-way boundary as described in Book 102 at page 72 intersects the east boundary of said NW¼SE¼.

Note:
All bearings and distances in these descriptions are based on the Wyoming State Plane Coordinate System, East Central Zone, modified to Wyoming Highway Department Coordinate System by an adjustment factor of 1.0003000.

3.5 SIGNIFICANT PROPERTY ENCUMBRANCES AND PERMIT STATUS

WEIR has not discovered any significant encumbrances for any of the tracts within the REE Exploration Target area.

Ramaco was issued Permit No. 841-T1 on July 7, 2020, by the Land Quality Division of the Wyoming Department of Environmental Quality for surface mining in Sheridan County, Wyoming. Permit No. 841-T1 consists of 4,549 acres. The permit boundary is shown on Figure 1.1-1.

Ramaco was issued Air Quality Permit P0025939 on July 20, 2020 by the Air Quality Division of the Wyoming Department of Environmental Quality for the Brook Mine, as described in Wyoming Permit No. 841-T1.
The permits are active and up to date.

3.6 SIGNIFICANT PROPERTY FACTORS AND RISKS

Given Ramaco's controlled interests within the REE Exploration Target, which relate in part to property that is either owned by Ramaco or held by others and leased to Ramaco, WEIR assesses that there are no significant issues affecting access to the REE interests, or Ramaco's ability to execute its mine plans.

WEIR did not conduct an independent verification of property control, nor has it independently surveyed the mining locations. WEIR has relied on information compiled from maps and summaries of the owned and leased properties prepared by Ramaco. WEIR did not conduct a

legal title investigation relative to Ramaco's mineral and surface rights. Historically, property control has not posed any challenges related to Ramaco's operations.

3.7 ROYALTY INTEREST

Ramaco, at the Brook Mine Property, holds no royalty or similar interest in property that is owned or operated by another party.

4.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

4.1 TOPOGRAPHY, ELEVATION, AND VEGETATION

The Brook Mine Property is located on the western edge of a broad plain that extends from the Bighorn Mountains to the Black Hills of South Dakota. This area is characterized by high plateaus, which have been dissected by meandering streams, leaving ridges between the main watersheds. Surface elevations range from a low of 3,600 feet above mean sea level (MSL) on the eastern edge of the property to a high of 4,080 feet above MSL in the northwest. The main drainages in the area are the eastward flowing Tongue River and Goose Creek, flowing to the north. The confluence of these drainages is near the old town of Acme in Section 22.

4.2 PROPERTY ACCESS

Access to the property is from Interstate Highway 90, which crosses the property from west to south. State Highway 338, which connects Sheridan to Decker, Montana, crosses the southeastern portion of the Brook Mine permit area. Secondary roads and trails provide access to the remaining lands. Rail access is by the Burlington Northern Railroad, which is located in the Tongue River and Goose Creek valleys.

The nearest airport is the Sheridan County Airport (SHR), which is located in Sheridan, Wyoming, approximately 7 miles southeast of the Brook Mine Property. The Billings Logan International Airport (BIL) in Billings, Montana, is located approximately 95 miles northwest of the Brook Mine Property.

The waterways surrounding the property are not navigable for commercial traffic.

4.3 CLIMATE AND OPERATING SEASON

The Brook Mine Property has a semi-arid climate with four distinct seasons. The summers are warm and dry, with temperatures ranging from the mid-80 to low 90 degrees Fahrenheit (28-33 Celsius) in July and August. The winters are cold and snowy, with temperatures averaging 20-30 degrees Fahrenheit (-6 to -1 Celsius) in December and January. Spring and fall are transitional seasons, with cooler temperatures and occasional rain and snow.

Coal mining operations in the PRB operate year-round, regardless of weather conditions.

4.4 INFRASTRUCTURE

This TRS does not address existing, planned, or required infrastructure that may relate to development of the REE Exploration Target at the Brook Mine Property.

5.0 HISTORY

5.1 PREVIOUS OPERATIONS

Much of the history of coal mining in the Sheridan Coal Field was provided in a John T. Boyd Company report, *Potentially Strip Mineable Coal Reserves Contained on the Sheridan-Wyoming Coal Company Property*, dated November 20, 1979 (Boyd Report).

The Boyd Report indicated that underground coal mining began in the Sheridan coal field around 1894 and lasted until 1953. During this period, there were 14 deep mines in the vicinity of the Brook Mine Property. The coal was used domestically in the Sheridan area, and to supply the railroad. Most of the mines were individually owned until 1920 when the major mines, the Dietz, Acme, Model, Carney, Monarch and Kooi, were consolidated and incorporated under the Sheridan-Wyoming Coal Company, a subsidiary of United States Distributing Corporation. This corporation and the subsidiary, Sheridan-Wyoming Coal Company, merged with The Pittston Company in 1943.

Information on these mines is very sparce and consists of mine maps on six of the mines, although boundaries are available on all of the mines. In March 1978, Boyd Company engineers visited the Wyoming Inspector of Mines in Rock Springs and reviewed mine maps on the Monarch Mine 45, Monarch Mine 45-2, Acme Mine 42, Hotchkiss, Model, and Armstrong mines.

Bottom of seam elevations were shown for all the mines except Model and Armstrong; seam heights were available only for the Acme Mine 42. Available data indicates that the bottom 14 feet of the Monarch Seam was mined in the Monarch Mine 45-2. The maps also indicate that pillars were pulled during retreat mining; i.e., the majority of pillars in Monarch Mine 45 and Acme Mine 42, and 20 percent in Monarch Mine 45-2. Excessive subsidence of the Acme Mine 42 and Dietz No. 1 and 2 mines can be seen in aerial photographs.

In 1943, Peter Kiewit Sons' Company formed a coal mining subsidiary, the Big Horn Coal Company (Big Horn). Operations commenced on a Wyoming state lease in Section 36 (T. 58N., R. 85W.), located approximately three miles north of the northwest corner of the Brook Mine Property. In 1954, Big Horn entered into a coal lease agreement with the SWCC and operations commenced in Section 22 (T. 57N., R. 84W.). From 1954 through 1969, coal production averaged about 350,000 tons per year. In 1970, coal production increased to

approximately one million tons per year due to increased demand for western coal. Big Horn abandoned its mining operations in 2000.

5.2 PREVIOUS EXPLORATION AND DEVELOPMENT

Exploration of the Brook Mine Property, prior to Ramaco's ownership, was limited to coal exploration drilling. In total, data is now available for 476 coal exploration drill holes. Of these holes, 417 were drilled prior to 2011 by previous owners. Ramaco drilled 59 of the total 476 coal exploration drillholes soon after acquiring the property. The assaying of drilled core was targeted at testing thermal coal quality, including moisture, ash, sulfur, and calorific value. No sampling was conducted at the time relative to REE concentrations.

WEIR has reviewed these historical drill holes and successfully correlated the holes with drilling conducted by Ramaco.

6.0 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 REGIONAL, LOCAL, AND PROPERTY GEOLOGY

6.1.1 Regional Geology

The Sheridan Coal Field is within the northwestern portion of the PRB. The regional geology of this area is characterized by a sequence of sedimentary rocks that formed during the Late Cretaceous to early Paleocene Periods. The stratigraphic sequence consists of interbedded sandstones, mudstones, and coal seams that were deposited in fluvial, deltaic, and lacustrine environments.

The Sheridan Coal Field is situated within the Tongue River Member of the Fort Union Formation. This formation is composed of interbedded sandstones, shales, and coals that were deposited during the Paleocene Period. The thickness of the Tongue River Member varies from 150 to 400 feet and contains several coal seams that range in thickness from 1 to 30 feet. These seams exist down to depths of approximately 1,200 feet across the property.

The coal seams in the Sheridan Coal Field are classified as low-sulfur, sub-bituminous coal. These coals have a low ash content, high calorific value, and low sulfur content, making the coal ideal fuel for power generation. The coal seams are generally continuous over large areas and are flat-lying, and amenable to surface mining.

The sedimentary rocks in the Sheridan Coal Field were deposited in a series of ancient rivers and lakes that once covered the area. These rivers and lakes were fed by the highlands to the west and north, and the sediment was deposited as the water slowed and lost its carrying capacity. The sandstones were deposited in the channels of the rivers, while the shales and mudstones were deposited in the floodplains and lakes.

The regional geology of the Sheridan Coal Field has been influenced by tectonic activity in the region. The area has experienced several episodes of uplift and subsidence, which have created a series of fault blocks and basins. The coal seams in the Sheridan Coal Field are located in one of these basins, which has preserved the coal seams from erosion and allowed the seams to be mined.

6.1.2 Local Geology

The Brook Mine Property is located on the western edge of a broad plain that extends from the Bighorn Mountains to the Black Hills of South Dakota. This area is characterized by high plateaus, which have been dissected by meandering streams, leaving ridges between the main watersheds. Surface elevations range from a low of 3,600 feet above MSL on the eastern edge of the property to a high of 4,080 feet above MSL in the northwest. The main drainages in the area are the eastward flowing Tongue River and Goose Creek, flowing to the north. The confluence of these drainages is near the old town of Acme in Section 22.

Structurally, the seams dip to the southeast at one to four degrees. Locally the dip may reverse due to differential compaction. Fault traces over the Brook Mine Property have been presented in past studies. However, these faults are not consistent with newly available drill hole data, and could be more attributed to local steep rolls as there are no distinguishable breaks in modeled floor contours.

Interpretation of local faults using existing geophysical drillhole data is currently being performed to improve the structural accuracy of the geological model for future mine planning purposes and is anticipated to improve understanding of mineral continuity within the permit area. Further geological structural details are anticipated to be provided in the next TRS update.

6.1.3 Property Geology

The primary coal seams associated with REEs on the Brook Mine Property, in descending stratigraphic order, are the Dietz 1, Dietz 2, Dietz 3, Monarch, Upper Carney, Lower Carney, and Masters. There are also seven unnamed seams below the Masters Seam that have been included in the models. There are several other coal seams below these down to depths of approximately 1,200 feet. Most of these seams are fairly thin (1-2 feet) and unnamed. However, within this lower group, the Upper Pawnee, Lower Pawnee, and Wall seams are found.

6.2 MINERAL DEPOSIT TYPE

The coal seams can contain significant quantities of REEs, making the coal seams an attractive source for these valuable minerals on an ash-basis. The REEs are believed to have been

incorporated into the coal during its formation and are found in association with clay minerals and organic matter in the coal seams. Interburden between the coal seams also contain elevated levels of REEs, primarily in clays, carbonaceous clays, and siltstones not necessarily associated with the coal seams.

In exploring REE mineralization at the planned Brook Mine, a hypothesis has emerged, as proposed by the NETL in collaboration with WEIR and Ramaco. Notably, various coals within the mine property have REE concentrations far surpassing those observed in coals worldwide, including others in the Powder River Basin (PRB).

According to this hypothesis, the concentrated REEs within the coals may be attributed to the infiltration of fluids through permeable and porous coal zones (via cleat fracturing) and other carrier beds, such as sandstones. These fractured zones have been identified in core, but not mapped and correlated to the highest concentration zones. The fluid flow is believed to have induced an acidic environment within the coals, due to the inherent organic concentrations, while transporting dissolved metals in solution. This is evidenced by the identification of gypsum within the mineralized coal zones. The REE metals could have precipitated and accumulated within oxide minerals at coal/clay boundaries, where varying redox conditions and pH differences facilitated the REEs' aggregation and high-grading, particularly the medium and heavy REEs (MREEs and HREEs). The thickness of these high-grade zones can reach up to eight feet in the cores analyzed (per NETL).

An important component of this hypothesis is establishing if the mineralization is primary or secondary. It could be possible that the source of the Medium and Heavy REEs (MREEs and HREEs) could be primary deposition via airborne particles of volcanic origin, proximal to this particular peat system, and incorporated into the coals during deposition. The substantial volume of coal, reaching a thickness of 30-feet in some zones, certainly implies a dominant airborne input. A comprehensive understanding of the cleat systems is imperative to substantiate the viability of fluid flow through coals as carrier beds.

6.3 GEOLOGICAL MODEL

Two geological models were constructed using Datamine's MineScape® software. This involved a primary stratigraphical model and a resultant block model. The primary stratigraphical model delineated coal seams and interburdens as zone input for the block model. The block model was specifically created for REE estimates, with no consideration for coal

resources. The stratigraphic model is well suited for coal estimates, however, coal mineral estimation is not the subject of this TRS.

The stratigraphic model was created based on ArcGIS® World3D topography. In the United States, this incorporates topography from the USGS 3-D elevation project. Topography data was gridded using MineScape software and a grid cell size of 50 feet by 50 feet from the USGS on-line 3-D Elevation Project data source. The resolution of the topography data is 1/3 arc-second, which results in approximately a 30 by 30 feet data point spacing. The gridded USGS topography contours were compared to drill hole collars. WEIR investigated and resolved significant collar elevation discrepancies.

The block model was constructed using a cell size of 50 feet x 50 feet x 0.5 foot (i, j, k vectors). The k vector was selected to closely reflect the average pXRF sample interval of 0.25 foot. An inverse distance interpolator with the power of 2 was used to interpolate quality analyses into the block model. A search radius of 5,000 feet was implanted based on WEIR's experience. Drill hole spacing was designed at 1,000 feet, which in WEIR's opinion is acceptable for mineral concentration interpretations.

The seam surfaces and thicknesses were created by loading the drilling and mine measurement data into MineScape and gridding the seam intercepts using a grid cell size of 50 feet by 50 feet. The parameters used to create the model are defined in the MineScape modeling schema, which is a specification of modeling rules created for the site. The MineScape interpolators that were used in this study are common in most mine planning software. The Planar interpolator is a triangulation method with extrapolation enabled. The Height interpolator is a variant on the trend surface and inverse distance interpolators. The data points are weighted, thus producing a different plane at each sample point. By using a weighting curve that is infinite at zero distance, data honouring can be assured. Due to the least squares fit, the effect of data clustering is minimised. A trend surface is used in MineScape to promote conformability for the modeled seams to regional structures, such as synclines, anticlines, or simply seam dip. MineScape caters to using different interpolators for thickness, roof and floor surfaces, and the selected trend surface as all are modeled separately. The interpolator used for each of these items is selected on the basis of appropriateness to the data sets involved, as well as modeling experience. Stratigraphic Model Interpolators are shown in Table 6.3-1, as follows:

Table 6.3-1 Stratigraphic Model Interpolators

Interpolator	Parameter	Power/Order
PLANAR	Thickness	0
HEIGHT	Surface	4
PLANAR	Trend	0

The geological model described above served as the basis for the development of the Brook Mine Property REE Exploration Target tonnage and grade estimates.

6.4 STRATIGRAPHIC COLUMN AND CROSS SECTION

Figure 6.4-1 shows the stratigraphic column for the REE Exploration Target. Typical stratigraphy of the Brook Mine property can be seen on Figure 6.4-2. Typical block model cross sections with estimated TREE concentrations displayed can be found on Figure 6.4-3. Higher resolution versions of Figure 6.4-2 and Figure 6.4-3 can be found in Appendix B.

Figure 6.4-1 Brook Mine Property Stratigraphic Column

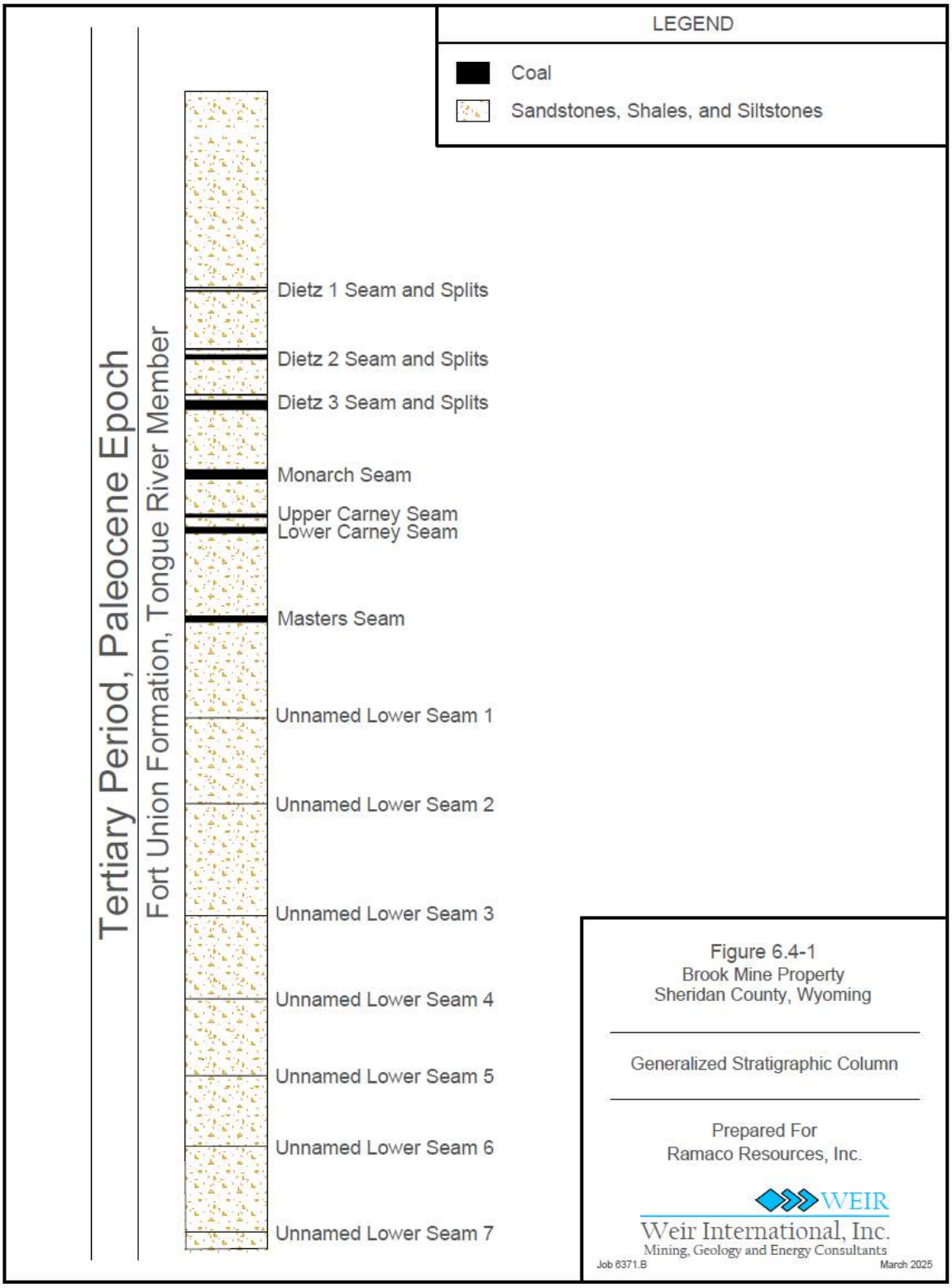
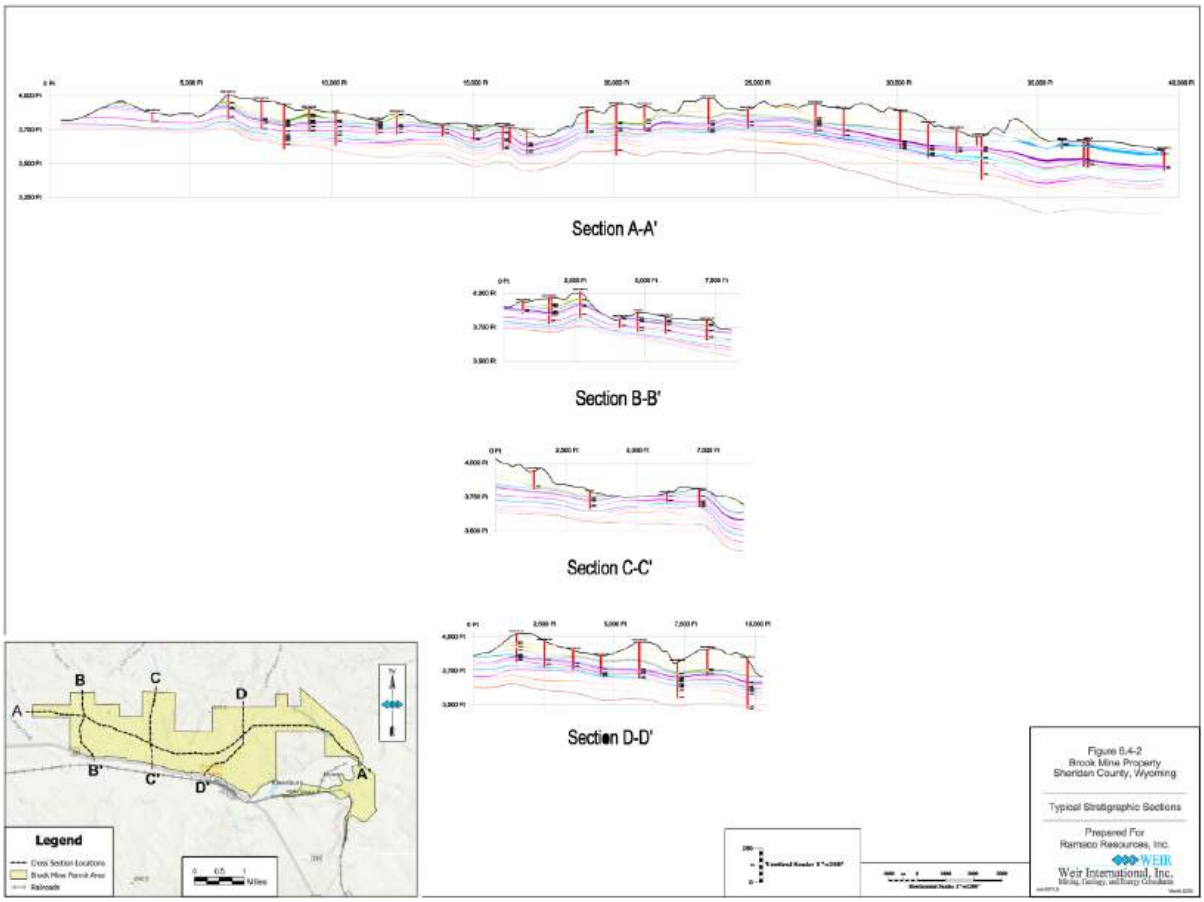
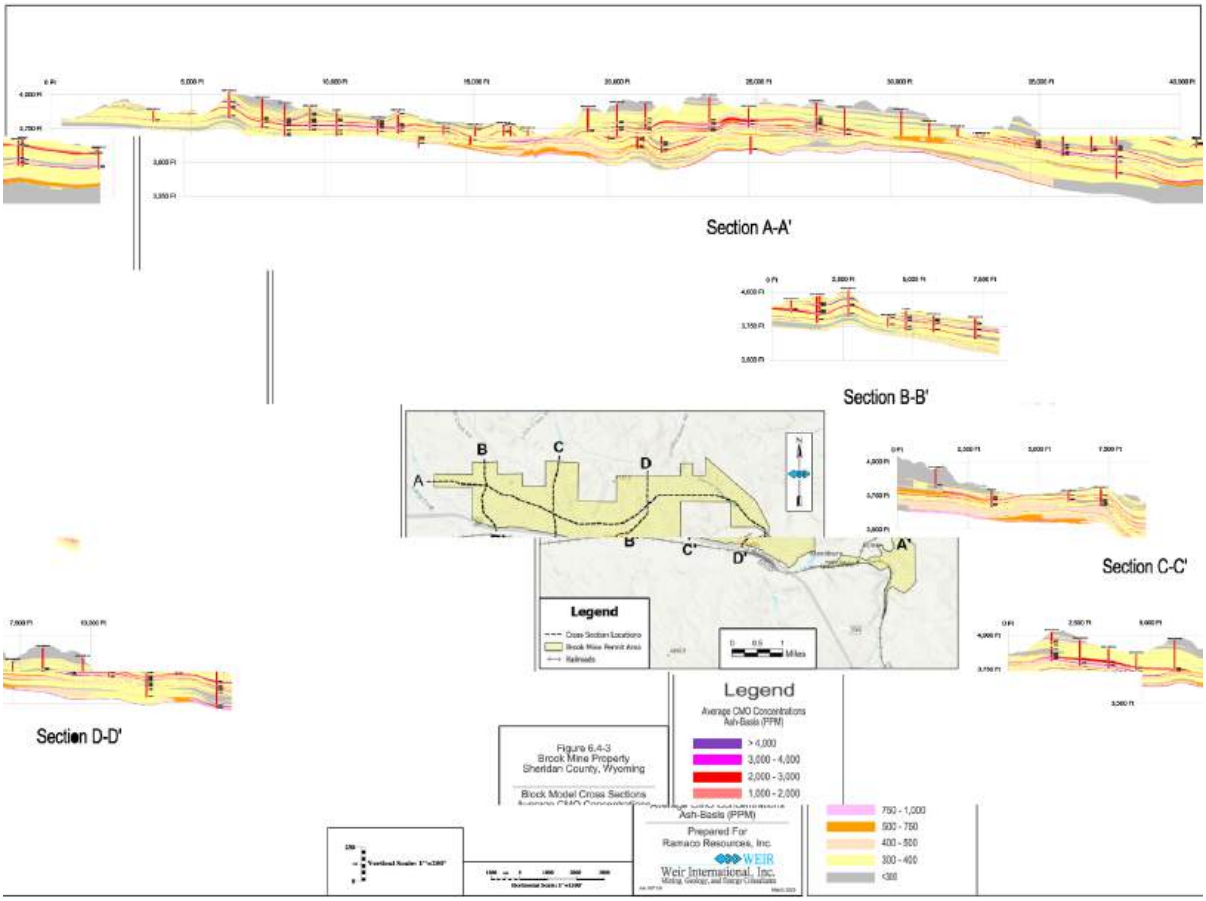


Figure 6.4-2 Typical Stratigraphic Cross Sections



See Appendix B for high-resolution version of this Figure

Figure 6.4-3 Block Model Cross Sections with Average CMO Concentrations



See Appendix B for high-resolution version of this Figure

7.0 EXPLORATION

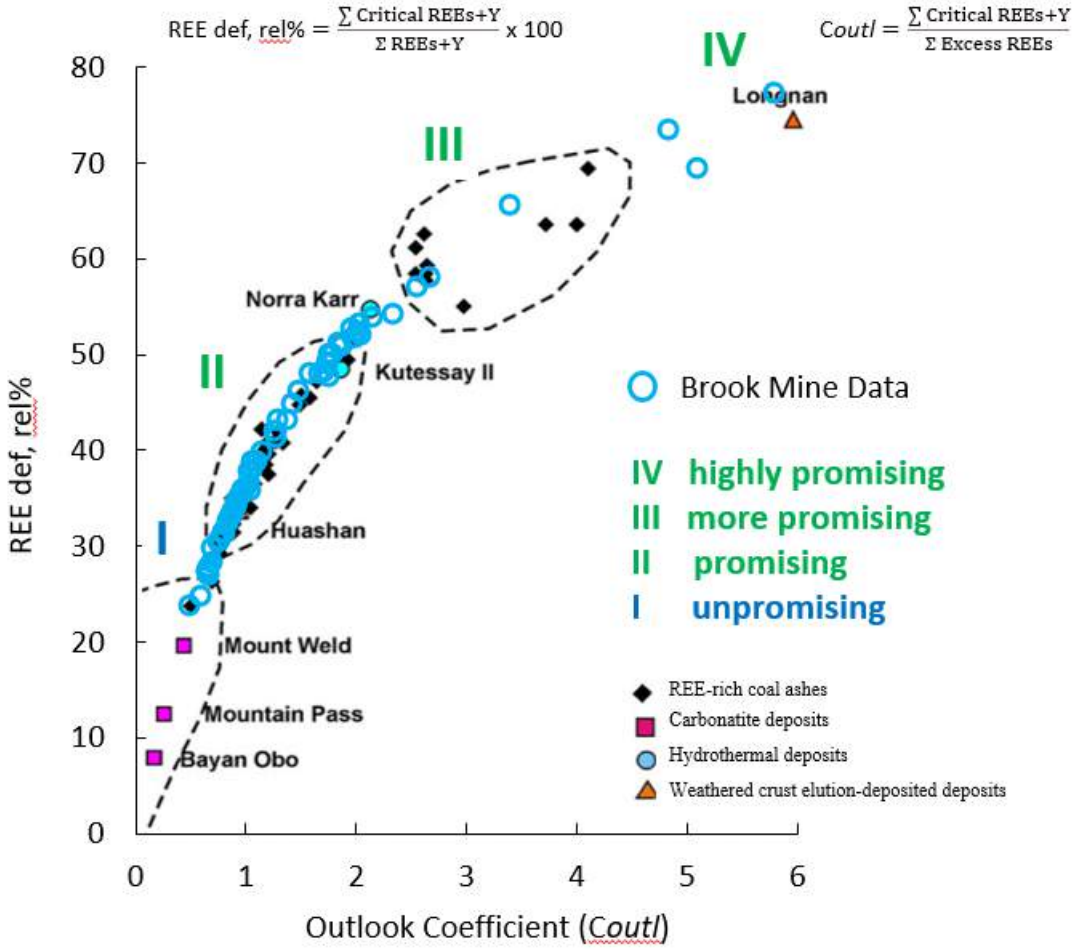
7.1 DRILLING

In 2019, Ramaco provided drill cores from the Brook Mine Property for a battery of qualitative and quantitative analyses conducted by the NETL. Analysis conducted by NETL included the following:

- High resolution photographic analysis
- Analysis of stratigraphic logs from existing coring
- Lithologic description and analysis
- Elemental analyses, including:
  - REE, trace and major element analysis
  - Thermogravimetric analysis
  - Bulk X-Ray Diffraction/X-Ray Fluorescence analysis
  - Inductively Coupled Plasma Mass Spectrometry
- Microscopy and Microanalysis by:
  - Imaging (small and large area)
  - Elemental analysis
  - Phase Identification

The results of the NETL analysis were summarized in October 2020 by the NETL indicating that "Based on this data the Brook Mine would rank as among the highest concentrations of REEs found in any deposits on a world-wide basis, including Chinese deposits." The NETL prepared a comparative figure ranking the Brook Mine Property as *promising* to *highly promising* to contain the full range of REEs. The NETL's comparative plot is found on Figure 7.1-1 as follows:

Figure 7.1-1 Comparative Analysis of Promisivity



As a result of the preliminary analysis conducted in conjunction with the NETL, between November 2021 and February 2022, Ramaco completed a comprehensive exploration drilling and coring program consisting of 14 new drill holes (1,937 linear feet of core drilling), targeting the Monarch, Upper Carney, and Masters coal seams across the Brook Mine Property. This exploration program marked the first time the Masters Seam had been sampled and analyzed for REEs within the Brook Mine Property.

In April 2022, Ramaco initiated an additional 100-hole exploration program at the Brook Mine Property. This continued exploration was designed to establish a 1,000 feet sampling grid for the Dietz, Monarch, Carney, and Masters coal seams within the Brook Mine Property permit area. Planned analysis of the new drill core data included pXRF analysis, as well as targeted secondary ICP-MS testing. This drilling program was completed in July 2023. The targeted secondary ICP-MS testing was completed in January 2024.

Drilling locations for this 100-hole program were determined by Ramaco to provide uniform sampling of the subsurface mineral. Coring locations were laid out in a grid format, with approximately 1,000 feet between each planned subsurface 3-inch cylindrical core.

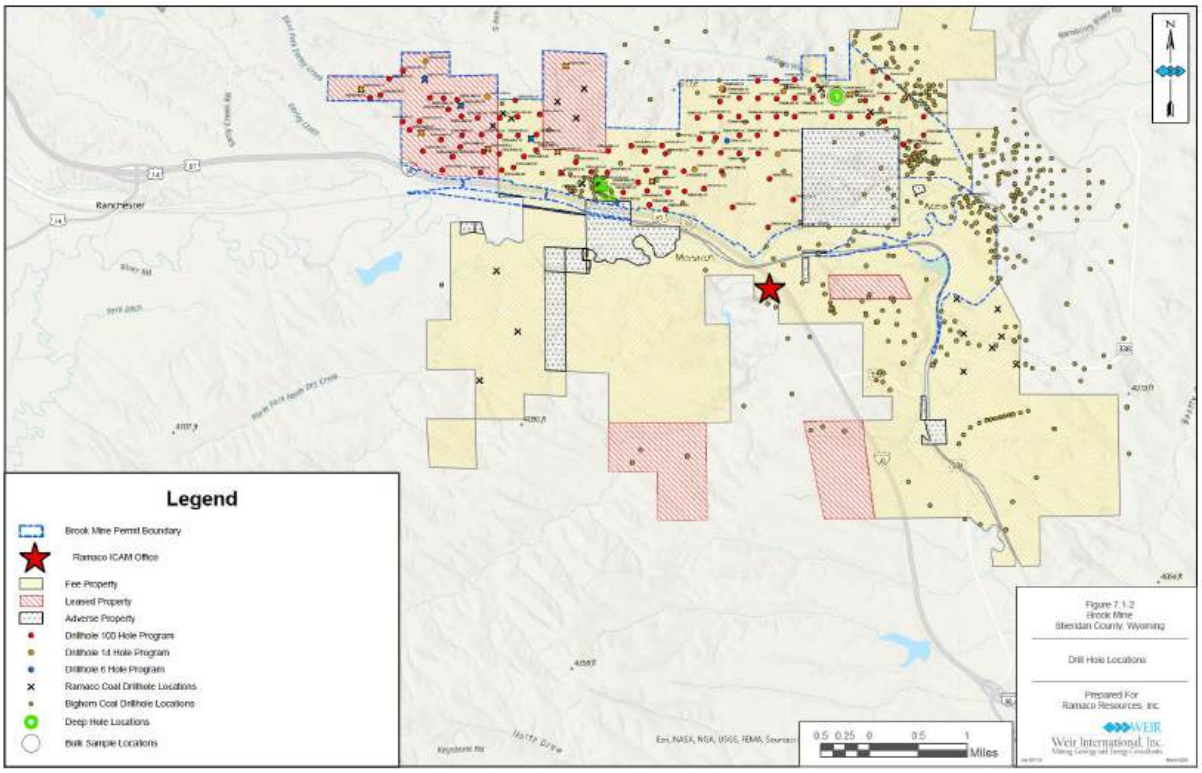
Based upon the independent test results by SGS, there has been estimation by Ramaco and other third parties that REE grade could increase at depths beyond the approximate 200 foot average hole depths that have previously been completed. To investigate this estimated REE grade increase, Ramaco initiated a deep core hole program in late 2023 which involved three drillholes at planned depths of approximately 850 feet. Two of these holes were successfully completed to planned depths, while the other did not. These deep core holes were analysed using ICP-MS along their full length. Geophysical logging was performed on all three holes as well. Results from the deep core hole drilling program did not reveal any substantial high grade ore zones at depth. The levels of critical minerals below the LOW7 seam were generally lower than those above the LOW7 seam, on average.

After completing the deep core hole program, Ramaco drilled an additional nine holes for bulk sampling purposes. These holes were analysed using ICP-MS and were geophysically logged. The bulk samples are intended to assist in analysing mineral extraction and recovery options. The bulk sampling program was performed during the 2024 calendar year.

In addition to the deep core and bulk sampling programs, cores from the 100-hole program were extensively sampled and analysed using both pXRF and ICP-MS to in-fill previously unsampled areas within the geological model. As noted above, ICP-MS analyses increased approximately 150 percent from the March 2024 update. This sampling/analysis program continued through most of 2024.

The location of all drill holes on the REE Exploration Target is provided on Figure 7.1-2.

Figure 7.1-2 Drill hole Locations



Drilling and subsequent sampling data collected to date and incorporated into the results reported in this TRS are summarized in Table 7.1-2.

Table 7.1-2 Drilling Programs

					Base Data				Quality Analysis					
	Drill Holes		Hole Type		Drill Hole	Geophysical	Downhole Deviation	Geologist's	XRF Analysis[1]			ICP Analysis[2]		
Exploration Program	Count	Drill Depth (Ft)	Rotary	Core	Header	Logs	Log	Log	Holes	Samples	Feet	Holes	Samples	Feet
Bighorn Coal Drilling	417	81,083	336	81	417	318	-	417	-	-	-	-	-	-
Ramaco Coal Drilling	59	11,306	-	59	36	28	-	8	-	-	-	-	-	-
2019 Drilling	6	1,132	-	6	6	-	-	6	3	125	74	5	115	74
2021-2022 Drilling	14	1,937	-	14	14	14	-	14	14	2,196	549	14	421	270
2022-2023 Drilling	102	21,593	-	102	102	-	-	100	94	26,173	6,661	94	2,437	1,649
2023-2024 Drilling	9	900		9	9	9		9	9	723	186	9	734	192
Deep Drilling	3	2,030	-	3	3	3	-	3	2	1,584	404	2	1,168	791
Total	610	119,981	336	274	587	372	-	557	122	30,801	7,874	124	4,875	2,976

[1] As of Dec-31-2024
[2] As of Jan-31-2025

As pXRF devices do not provide reliable measurements of all REE concentrations, pXRF data is not incorporated into the quantitative analysis of this report. It is only used procedurally to assist in identifying zones to be sent for ICP-MS confirmatory analysis. Aside from the

exclusion of these pXRF scanning results, no data collected as a result of known exploration programs to date, has been omitted from the input, analysis, or results reported in this TRS.

All 610 drill holes detailed above were used to develop a comprehensive geologic structural model. This geologic structural model was in turn used to define the Exploration Target using the 4,875 ICP-MS assays from 124 drill holes. These ICP-MS quality data points provide sufficient coverage of the property to allow for the estimation of in-place REE tonnage and grade. The increase in number of ICP-MS assays from the May 2023 Report is approximately 150 percent.

A detailed listing of drill hole data can be found in Appendix A.

WEIR did not have direct involvement with the implementation or supervision of Ramaco's drilling programs to date. The recent deep core and bulk sampling programs have been conducted by Kid Pronghorn Enterprises, Inc. (Sheridan, Wyoming) an independent drilling contractor overseen by the independent engineering firm, WWC. However, having reviewed the progress of the drilling program, and having had many technical discussions with Ramaco personnel and third-party consultants, WEIR finds the results to be consistent with industry standards and appropriate for use in this TRS.

7.1.1 Planned Drilling

Infill drilling will continue to be conducted to validate and delineate the highest-grade zones that are beginning to emerge based on elemental testing and geologic mapping. To the best of WEIR's knowledge and observations, Ramaco's recent drilling programs and associated methodologies are safe, successful, and productive. WEIR confirms that Ramaco intends to utilize similar drill hole spacing, processes, protocols and chain of custody requirements as utilized during the existing core drilling program, as well as the improved pXRF and ICP-MS sampling and analysis protocols.

7.2 NON-DRILLING EXPLORATION

Drilling has served as the primary form of exploration within the REE Exploration Target.

7.3 HYDROGEOLOGICAL DATA

Ramaco has not gathered hydrogeological data at this stage of exploration for its planned operations at the REE Exploration Target.

7.4 GEOTECHNICAL DATA

Ramaco has not gathered geotechnical data at this stage of exploration for its planned operations at the REE Exploration Target.

7.5 OTHER RELEVANT DRILLING DATA

Ramaco employs Kid Pronghorn Enterprises, Inc. (Sheridan, Wyoming) to perform exploration drilling. Downhole geophysical logging was not conducted during the 100-hole exploration program. However, the most recent deep core and bulk sampling holes were geophysically logged.

7.6 EXPLORATION TARGET

WEIR's evaluation of Ramaco's REE Exploration Target was conducted in accordance with Regulation S-K 1300, and WEIR notes that:

- Ranges of tonnage and grade of the Exploration Target are conceptual in nature
- There has been insufficient demonstration of economic viability or methodologies for development of the Exploration Target to estimate a Mineral Resource or Reserve.
- It is uncertain if further exploration will result in the estimation of a Mineral Resource or Reserve.
- The Exploration Target does not represent, and should not be construed to be, an estimate of a Mineral Resource or Reserve

The geological model described in Section 6.3 served as the basis for the development of the Brook Mine Property REE Exploration Target tonnage and grade estimates described in the following sections.

7.6.1 Assumptions, Parameters, and Methods

While ICP-MS elemental analysis is reported on the basis of concentration and mass of rare earth elements, for purposes of reporting results in a fashion consistent with industry practice, elemental mass is converted to oxide mass. Conversion factors for density of each element to its oxide are detailed in Table 7.6-1:

Table 7.6-1 Element to Oxide Density Conversions

Sym	Element	Atomic No	Atomic Wt	Oxide Form	Oxide Molecular Wt	Conversion Factor
Sc	Scandium	21	44.96	Sc^2O^3	137.91	1.53
Y	Yttrium	39	88.91	Y^2O^3	225.81	1.27
La	Lanthanum	57	138.91	La^2O^3	325.81	1.17
Ce	Cerium	58	140.12	Ce^2O^3	328.23	1.17
Pr	Praseodymium	59	140.91	Pr^2O^3	329.81	1.17
Nd	Neodymium	60	144.24	Nd^2O^3	336.48	1.17
Pm	Promethium	61	145.00	Pm^2O^3	338.00	1.17
Sm	Samarium	62	150.36	Sm^2O^3	348.72	1.16
Eu	Europium	63	151.96	Eu^2O^3	351.93	1.16
Gd	Gadolinium	64	157.25	Gd^2O^3	362.50	1.15
Tb	Terbium	65	158.93	Tb^2O^3	365.85	1.15
Dy	Dysprosium	66	162.50	Dy^2O^3	373.00	1.15
Ho	Holmium	67	164.93	Ho^2O^3	377.86	1.15
Er	Erbium	68	167.26	Er^2O^3	382.52	1.14
Tm	Thulium	69	168.93	Tm^2O^3	385.87	1.14
Yb	Ytterbium	70	173.05	Yb^2O^3	394.11	1.14
Lu	Lutetium	71	174.97	Lu^2O^3	397.93	1.14
Ga	Gallium	31	69.72	Ga2O3	187.44	1.34
Ge	Germanimu	32	72.64	GeO2	104.64	1.44

The REEs of most interest to Ramaco on the Brook Mine Property are Neodymium, Praseodymium, Terbium, and Dysprosium, as well as the critical minerals Scandium, Gallium, and Germanium. These REEs exhibit unique magnetic properties and are commercially valuable due to high demand and scarce supply. For purposes of this TRS, these elements are defined as the Primary Magnetic REEs (PMREEs). PMREEs are important components for super-power constant magnets, which are critical in industrial generators and in transforming any kind of energy (wind, tidal, thermal, etc.) into electricity. Another group of magnetic REEs, including Samarium, Gadolinium, and Holmium, exhibit similar magnetic properties, but given minor commercial significance, these magnetic REEs are categorized here as Secondary Magnetics REEs (SMREE).

Heavy REEs (HREEs) include Holmium, Erbium, Thulium, Ytterbium, and Lutetium. HREEs are also of particular value given relative shortages in supply. HREEs are critical in technology, fiber optic, and medical device manufacturing.

Also reported are the Light REEs (LREE), which include Lanthanum, Cerium, Praseodymium, Neodymium, and Samarium.

All REEs, with the exception of Promethium, have been classified by the U.S. Geological Survey (USGS) as Critical Minerals, according to the USGS 2022 listing of critical minerals. Critical Minerals are defined by the agency to play a significant role in United States' national security, economy, renewable energy development and infrastructure. Promethium, the only REE not on the Critical Mineral list, exhibits a half-life of approximately 18 years and is not found naturally on earth.

The REEs and relative categorizations, as defined for purposes of this TRS, are summarized in Table 7.6-2 as follows:

Table 7.6-2 Rare Earth Elements And Other Critical Minerals

Symbol	Element	Atomic Number	Heavy/ Light	Primary Magnetic	Secondary Magnetic	Critical Mineral [1]	Critical REE[2]
Sc	Scandium	21	-	-	-	Yes	N/A
Ga	Gallium	31	-	-	-	Yes	N/A
Ge	Germanium	32	-	-	-	Yes	N/A
Y	Yttrium	39	-	-	-	Yes	Yes[4]
La	Lanthanum	57	Light	-	-	Yes	No
Ce	Cerium	58	Light	-	-	Yes	Excess
Pr	Praseodymium	59	Light	Yes	-	Yes	No
Nd	Neodymium	60	Light	Yes	-	Yes	Yes
Pm[3]	Promethium	61	-	-	-	-	No
Sm	Samarium	62	Light	-	Yes	Yes	No
Eu	Europium	63	-	-	-	Yes	Yes
Gd	Gadolinium	64	-	-	Yes	Yes	No
Tb	Terbium	65	-	Yes	-	Yes	Yes
Dy	Dysprosium	66	-	Yes	-	Yes	Yes
Ho	Holmium	67	Heavy	-	Yes	Yes	Excess
Er	Erbium	68	Heavy	-	-	Yes	Yes
Tm	Thulium	69	Heavy	-	-	Yes	Excess
Yb	Ytterbium	70	Heavy	-	-	Yes	Excess
Lu	Lutetium	71	Heavy	-	-	Yes	Excess

[1] U.S. Geological Survey

[2] Ekmann, 2012, Reid, 2018

[3] Promethium is not found in nature on earth

[4] Yttrium is not a Lanthanoid, but is commonly included as one.

The confirmatory ICP-MS analysis protocol utilized in the sampling of the Brook Mine Property drill holes provides accurate data relative to the concentrations of all REEs.

7.6.2 Estimates of Exploration Target Tonnage and Grade

Pending further analysis necessary to determine mining and processing recoveries and associated economics, no cut-off grade was employed in preparing estimated tonnage associated with this Exploration Target. This effectively represents a comprehensive estimate of all in-place mineral, regardless of grade.

A range of 25 percent has been applied to all tonnage and grade estimates.

The Brook Mine Property Exploration Target in-place CMO tonnage, as of March 31, 2025 ranges from 1,326 to 1,658 thousand short tons, with a grade ranging from 455 to 569 ppm on

an ash-basis. In-place CMO Exploration Target tonnage and grade estimates on an ash-basis by category are summarized in Table 7.6-3 as follows:

Table 7.6-3 Current Brook Mine In-Place CMO Exploration Target Tonnage and Grade Estimates, Ash-Basis

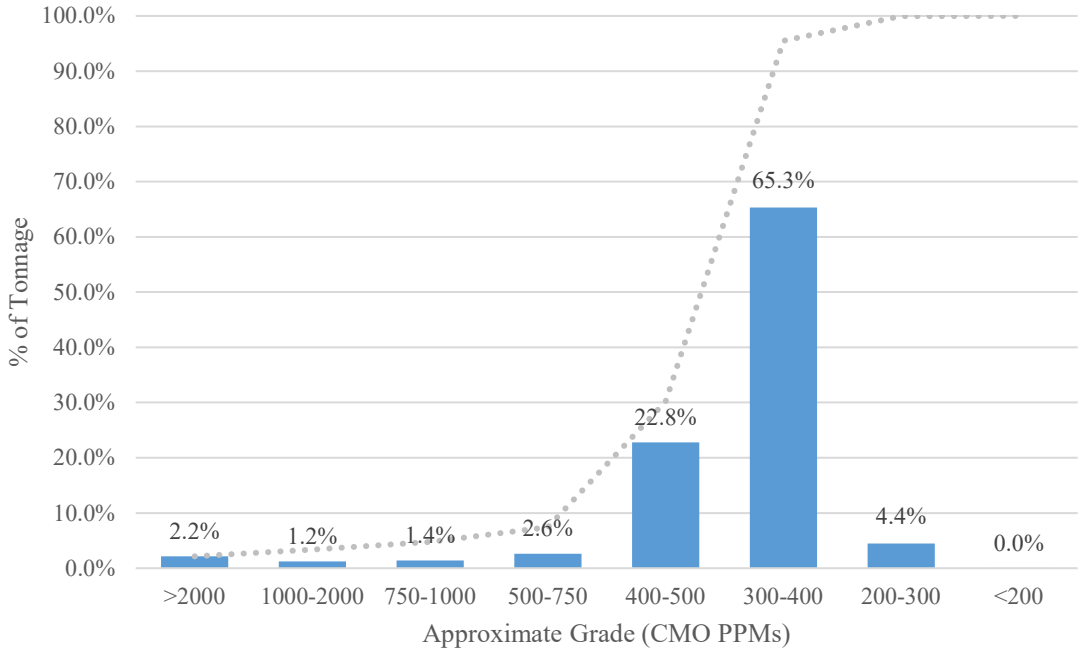
	Total CMOs		Primary Magnetic REOs		Secondary Magnetic REOs		Heavy REOs		Light REOs		TREOs		Ga and Ge Oxides		Sc Oxide			
Range	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Tons (000)	Grade (ppm)	Total Model Volume (M CY)	Total Model Mass (M Tons)
Low	1,326	455	258	89	71	25	39	13	846	288	1,097	375	127	44	102	35	2,054	3,999
High	1,658	569	322	111	89	31	49	17	1058	360	1372	469	159	54	128	44	2,054	3,999

Notes:

- Tonnage estimates reported above are not Mineral Resources or Mineral Reserves and do not meet the threshold for reserve modifying factors, such as estimated economic viability, that would allow for conversion to mineral reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.
- The Exploration Target tonnage estimates are based on actual exploration results from 610 drill holes and 4,875 ICP-MS samples.
- No CMO cut-off grade was applied.
- The ranges of tonnage and grade of the Exploration Target could change as future exploration activities are completed.
- Numbers in the table have been rounded to reflect the accuracy of the estimate and may not sum due to rounding.

The estimate of distribution of CMOs by grade are displayed on Figure 7.6-1 as follows:

Figure 7.6-1 Estimated CMO Grade Distribution, Ash-Basis



The estimate of CMO Tonnage by Zone (in descending stratigraphic order), are displayed on Figure 7.6-2 as follows, with all concentrations on an ash-basis:

Figure 7.6-2 Estimated CMO Tonnage by Zone, Ash-Basis

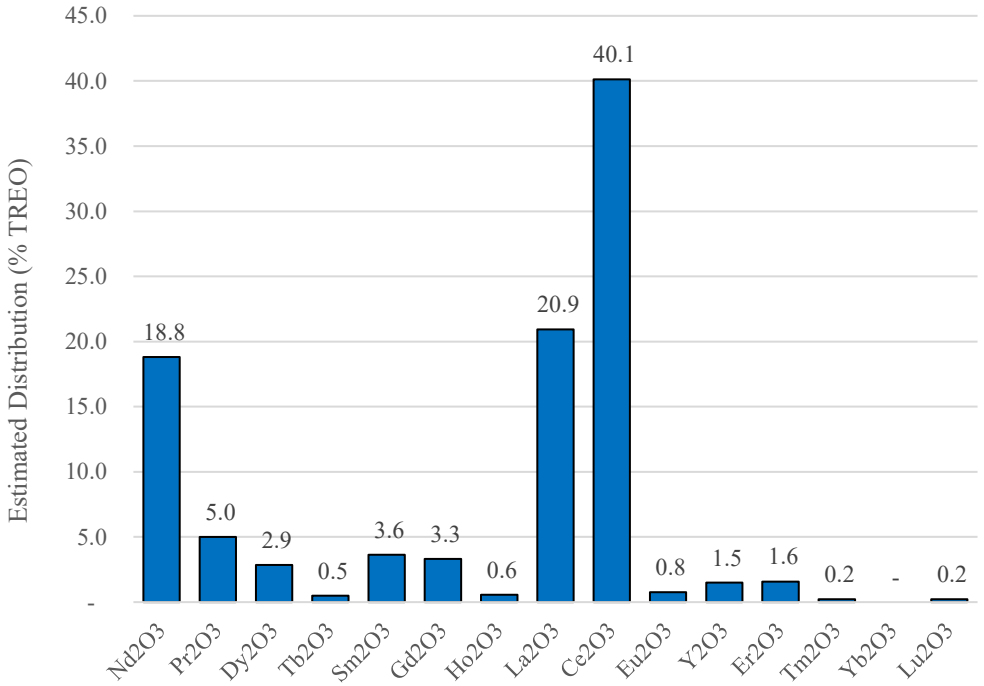
		Low End of Range									High End of Range								
Seam	Interval Type	Primary Magnetics REO Tons (000)	Secondary Magnetics REO Tons (000)	Heavy REO Tons (000)	Light REO Tons (000)	GaO Plus GeO Tons (000)	ScO Tons (000)	TREO Tons (000)	Total CMO Tons (000)	CMO Avg. PPM (Ash-Basis)	Primary Magnetics REO Tons (000)	Secondary Magnetics REO Tons (000)	Heavy REO Tons (000)	Light REO Tons (000)	GaO Plus GeO Tons (000)	ScO Tons (000)	TREO Tons (000)	Total CMO Tons (000)	CMO Avg. PPM (Ash-Basis)
Dietz 3 B Upper	Interburden	30.4	8.4	4.8	100.8	16.6	12.1	130.7	159.4	344	38.0	10.5	6.0	126.0	20.7	15.1	163.4	199.2	429.7
Dietz 3 B Upper	Coal	0.1	0.0	0.0	0.4	0.1	0.0	0.6	0.7	747	0.2	0.1	0.0	0.6	0.1	0.1	0.8	0.9	933.7
Dietz 3 B Lower	Interburden	0.1	0.0	0.0	0.2	0.1	0.0	0.4	0.5	320	0.1	0.0	0.0	0.3	0.1	0.0	0.5	0.6	399.7
Dietz 3 B Lower	Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	118.0
Dietz 3 C Upper	Interburden	1.4	0.4	0.2	4.7	0.8	0.6	6.1	7.4	343	1.7	0.5	0.3	5.9	0.9	0.7	7.6	9.2	429.3
Dietz 3 C Upper	Coal	0.2	0.1	0.1	0.7	0.4	0.1	1.0	1.4	2,109	0.3	0.1	0.1	0.9	0.4	0.2	1.2	1.8	2,636.4
Dietz 3 C Lower	Interburden	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
Dietz 3 C Lower	Coal	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.2	923	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.3	1,153.6
Monarch	Interburden	20.4	5.5	3.1	68.7	11.2	8.1	88.4	107.7	341	25.5	6.9	3.9	85.9	14.0	10.1	110.5	134.7	426.1
Monarch	Coal	0.6	0.2	0.1	1.9	0.5	0.4	2.6	3.5	3,306	0.8	0.2	0.1	2.3	0.6	0.5	3.3	4.4	4,132.5
Upper Carney	Interburden	22.1	6.2	3.6	72.6	14.3	8.5	95.6	118.4	360	27.7	7.7	4.5	90.7	17.9	10.7	119.5	148.0	450.6
Upper Carney	Coal	1.1	0.3	0.2	3.5	0.5	0.4	4.6	5.5	1,290	1.3	0.4	0.2	4.4	0.6	0.5	5.7	6.8	1,612.9
Lower Carney	Interburden	2.6	0.7	0.4	8.6	1.3	1.0	11.2	13.5	390	3.2	0.9	0.5	10.8	1.7	1.3	13.9	16.9	487.7
Lower Carney	Coal	1.9	0.5	0.3	6.2	1.0	0.7	8.1	9.7	1,799	2.4	0.7	0.4	7.8	1.2	0.8	10.1	12.1	2,248.2
Masters	Interburden	22.6	6.2	3.5	74.5	11.9	9.0	96.6	117.6	369	28.2	7.7	4.3	93.2	14.9	11.2	120.8	147.0	461.1
Masters	Coal	2.1	0.6	0.3	6.7	1.0	0.8	8.7	10.4	2,234	2.6	0.7	0.4	8.4	1.2	1.0	10.9	13.0	2,792.1
Lower 1	Interburden	11.5	3.1	1.7	38.0	6.0	4.5	48.8	59.3	372	14.4	3.9	2.1	47.5	7.5	5.7	61.0	74.2	465.1
Lower 1	Coal	0.2	0.1	0.0	0.6	0.1	0.1	0.8	0.9	2,293	0.2	0.1	0.0	0.8	0.1	0.1	1.0	1.2	2,866.0
Lower 2	Interburden	13.9	3.8	2.2	46.8	7.4	5.6	60.4	73.4	365	17.4	4.8	2.7	58.5	9.2	7.0	75.5	91.7	455.7
Lower 2	Coal	0.6	0.2	0.1	2.0	0.2	0.2	2.5	3.0	2,965	0.8	0.2	0.1	2.5	0.2	0.3	3.2	3.7	3,706.3
Lower 3	Interburden	10.4	2.9	1.5	34.1	5.3	4.1	43.7	53.0	384	13.0	3.6	1.9	42.6	6.6	5.1	54.6	66.3	479.9
Lower 3	Coal	0.4	0.1	0.1	1.2	0.0	0.1	1.5	1.7	2,185	0.5	0.1	0.1	1.5	0.0	0.2	1.9	2.1	2,731.1
Lower 4	Interburden	20.7	5.6	3.1	69.0	10.1	8.2	88.5	106.8	368	25.9	7.0	3.8	86.3	12.6	10.3	110.6	133.5	460.6
Lower 4	Coal	0.6	0.2	0.1	2.0	0.3	0.2	2.6	3.1	3,122	0.8	0.2	0.1	2.5	0.3	0.3	3.2	3.8	3,902.0
Lower 5	Interburden	29.0	8.1	3.9	92.3	12.2	11.3	118.9	142.3	417	36.3	10.2	4.9	115.4	15.3	14.1	148.6	177.9	521.3
Lower 5	Coal	0.3	0.1	0.0	1.0	0.2	0.1	1.3	1.6	1,560	0.4	0.1	0.1	1.2	0.2	0.1	1.6	2.0	1,949.7
Lower 6	Interburden	32.8	9.1	5.1	109.8	11.9	13.2	143.1	168.3	344	41.1	11.4	6.4	137.3	14.9	16.6	178.9	210.4	430.2
Lower 6	Coal	0.2	0.1	0.0	0.8	0.1	0.1	1.0	1.2	2,149	0.3	0.1	0.0	1.0	0.1	0.1	1.3	1.5	2,686.3
Lower 7	Interburden	30.8	8.8	4.4	96.5	13.6	12.1	126.7	152.4	460	38.5	11.0	5.6	120.7	16.9	15.2	158.3	190.4	575.2
Lower 7	Coal	0.8	0.2	0.1	2.3	0.2	0.3	3.0	3.5	4,812	1.0	0.3	0.1	2.9	0.3	0.4	3.7	4.4	6,014.9
Total		258	71	39	846	127	102	1,097	1,326	455	322	89	49	1,058	159	128	1,372	1,658	569

Average whole rock-basis United States concentrations of REEs within coal are 62 ppm (Finkelman,1993). World coal is estimated at 68 ppm on a whole rock-basis (Ketris and Yudovich, 2009) and 485 ppm on an ash-basis (Dai, 2016). As can be seen on Figure 7.6-2, there are multiple coal seams that on a whole rock and ash-basis greatly exceed world and US coal and coal ash averages. These zones will be further delineated with infill drilling as well as re-testing of core where the coal seams were not sampled due to prior pXRF calibration issues. With additional sampling of core, it is expected that average CMO concentrations will increase within coal zones, resulting in increased tonnage associated with all coal zones.

In addition to high concentrations of TREOs, the Brook Mine also contains significant concentrations of Sc, Ga, and Ge oxides. Combined, Ga and Ge oxides have an average concentration of 44 ppm across the deposit, with an average of 35 ppm for Sc, both on an ash-basis. As Ramaco continues to analyze Sc, Ga, and Ge in new core, it is likely that tonnage and grade may change to some degree.

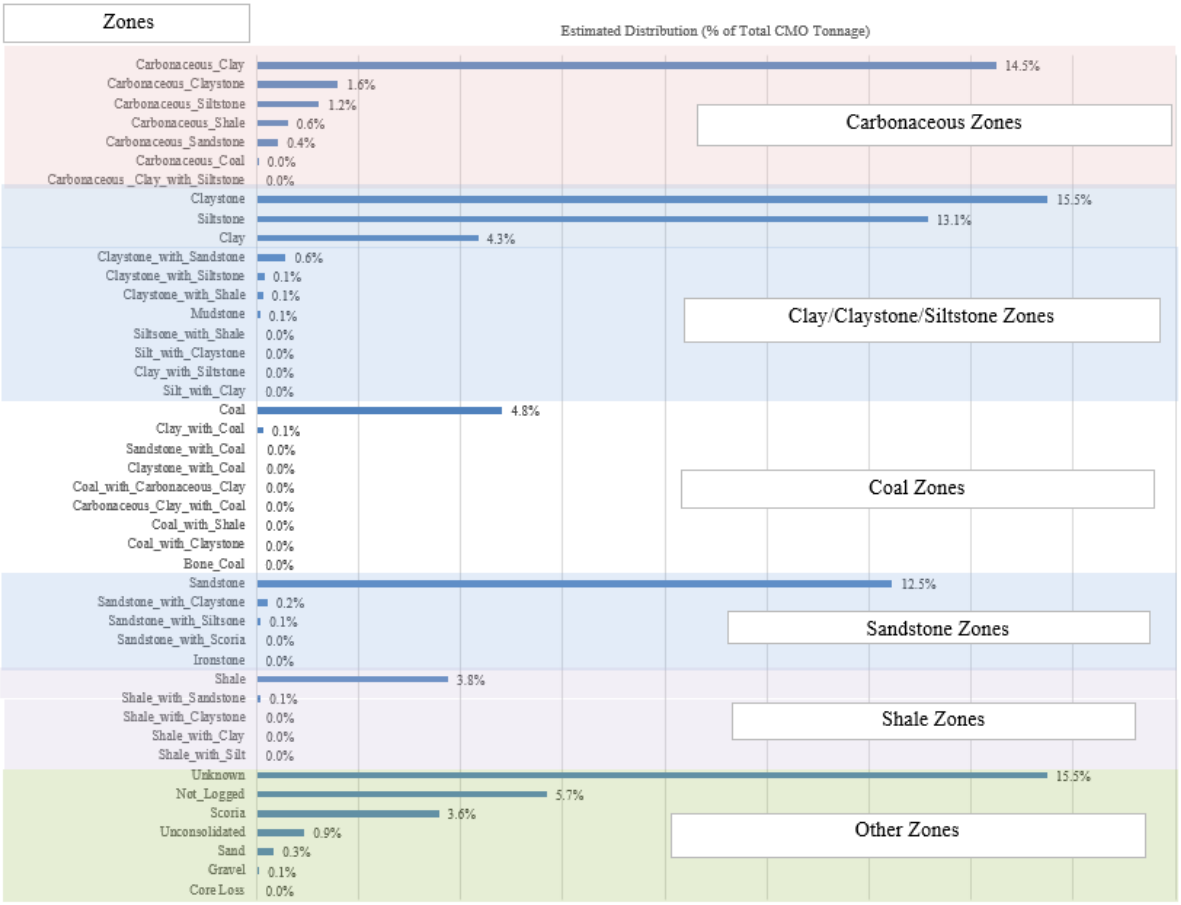
The estimate of distribution of CMOs by oxide are displayed on Figure 7.6-3 as follows:

Figure 7.6-3 Estimated TREO Distribution by Oxide



Estimates of distribution of TREOs by Lithology Type are displayed on Figure 7.6-4 as follows:

Figure 7.6-4 Estimated CMO Distribution by Lithology Type



The distribution of CMOs by lithology type and concentration are further summarized in Table 7.6-4 as follows:

Table 7.6-4 CMO Distribution by Lithology Group

CMO Concentration (ppm)	Carbonaceous Material	Clay/Silt	Claystone	Coal	Coal Mixed	Shale	Sandstone	Scoria	Unconsolidated	Not Logged	Other	Total %
<200	0.01	0.00	0.00	0.01	-	-	0.00	0.00	0.02	0.00	-	0.04
200-300	0.87	0.71	0.67	0.05	0.02	0.07	1.01	0.15	0.11	0.29	0.49	4.45
300-400	11.08	12.81	10.73	0.71	0.06	3.35	9.37	3.28	1.09	3.57	9.26	65.30
400-500	5.62	3.72	3.67	0.52	0.14	0.40	2.33	0.11	0.06	1.60	4.66	22.81
500-750	0.61	0.22	1.00	0.29	0.01	0.03	0.01	0.02	0.00	0.07	0.38	2.64
750-1000	0.10	0.02	0.30	0.15	0.00	0.01	0.02	0.00	-	0.07	0.73	1.41
1000-2000	0.03	0.01	0.03	1.08	0.00	0.00	0.00	-	-	0.05	0.00	1.20
>2000	0.07	0.01	0.01	2.02	0.00	0.00	0.00	0.00	-	0.03	-	2.15
Total Percentage	18.39	17.49	16.41	4.82	0.22	3.86	12.75	3.57	1.28	5.69	15.52	100.00

7.6.3 Uncertainty in Estimates of Tonnage

The range of tonnage and grade of the Brook Mine Property REE Exploration Target could change as proposed exploration activities are completed. A range of 25 percent has been applied to all tonnage and grade estimates.

Modeling of tonnage and grade within the geological model relies on the density of drill hole data, and in particular, the measurements of REE concentration in each particular stratigraphic zone. Where points of measurement within a zone are more than 5,000 feet apart, the geological model interpolator is set to stop projecting REE concentrations. As a result, where there are gaps in the interpolation, REE concentrations are set to a missing value. Given the consistency/continuity of REE concentrations in a given zone, it likely that this modeling parameter results in lower REE concentrations than would be expected when gaps in REE concentration data can be filled in through continued exploration.

Further, as it relates to highly carbonaceous samples, it is believed that the coal carbon matrix can hinder accurate detection of REEs in samples analyzed using ICP-MS. To avoid this inaccuracy, SGS began to test carbonaceous samples on an ash-basis, by first combusting the sample and then testing the resulting mineral in the ash. In assessing the impact of organic interference in the ICP-MS process, several samples tested previously on a whole rock-basis were ashed and retested on an ash-basis. By conducting this comparison, it is estimated that prior REE tonnages in carbonaceous zones may have been underestimated by approximately 10 percent prior to testing on an ash-basis.

Mining is a high risk, capital-intensive venture and each mineral deposit is unique in its geographic, social, economic, political, environmental, and geologic aspects. At the base of any mining project is the mineral resource itself. Potential risk factors and uncertainties in the geologic data serving as the basis for deposit quantity and quality estimates are significant considerations when assessing the potential success of a mining project.

Geological confidence may be considered in the framework of both the natural variability of the mineral occurrence, and the uncertainty in the estimation process and data behind it. The mode of mineralization, mineral assemblage, geologic structure, and homogeneity naturally vary for each deposit. Structured variability like cyclic depositional patterns in sedimentary rock can be delineated mathematically with solutions like trend surface analysis or variography. Unstructured variability, in the distribution of igneous rock composition, for example, is more random and less predictable.

The reliability of mineral tonnage estimation is related to uncertainties introduced at different phases of exploration. An exploration program comprises several stages of progressive data collection, analysis, and estimation, including:

- Geological data collection
- Geotechnical data collection
- Sampling and assaying procedures
- Bulk density determination
- Geological interpretation and modeling
- Tonnage and quality estimation
- Validation

Error may be introduced at any phase. Data acquisition and methodologies should be properly documented and subject to regular quality control and assurance protocols at all stages, from field acquisition through resource estimation. Managing uncertainty requires frequent review of process standards, conformance, correctional action, and continuous improvement planning. Risk can be minimized with consistent exploration practices that provide transparent, backwards traceable results that ultimately deliver admissible resource estimates for tonnage and quality.

As discussed in Sections 8.0 and 9.0, it is WEIR's opinion that Ramaco's methodology of data acquisition, record-keeping, and QA/QC protocols are adequate and reasonable for tonnage and grade estimation related to the REE Exploration Target.

The drill hole data and quality assays of REE attributes at the Brook Mine Property is demonstrated to be professionally developed, well maintained, quantitative, and qualitative data. WEIR finds no material reason, regarding geologic uncertainty, that would prohibit acceptably accurate estimation of mineral tonnage or grade.

7.7 ADDITIONAL COMMODITIES OR MINERAL EQUIVALENT

Concentrations of Uranium (U) and Thorium (Th), radioactive contaminants, were sampled during pXRF scanning and with ICP-MS analyses. The results of both methods of analysis indicate these elements exist in low, unharmful quantities. The results of the more accurate ICP-MS analyses for 2459 Th samples and 2473 U samples showed an average of 18 ppm for Thorium and an average of 7 ppm for Uranium. These concentrations are slightly higher than

those presented in the March 2024 report in which Th and U average concentrations were 14 ppm and 5 ppm respectively, calculated from 613 analyses.

In addition to the REEs, there is subbituminous coal of interest within the REE Exploration Target that would likely be extracted to obtain the REEs. Future updates upon completion of the drilling program for the REE Exploration Target will likely include estimates of coal tonnages and qualities.

8.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 SAMPLE PREPARATION METHODS, ANALYSIS, AND QUALITY CONTROL

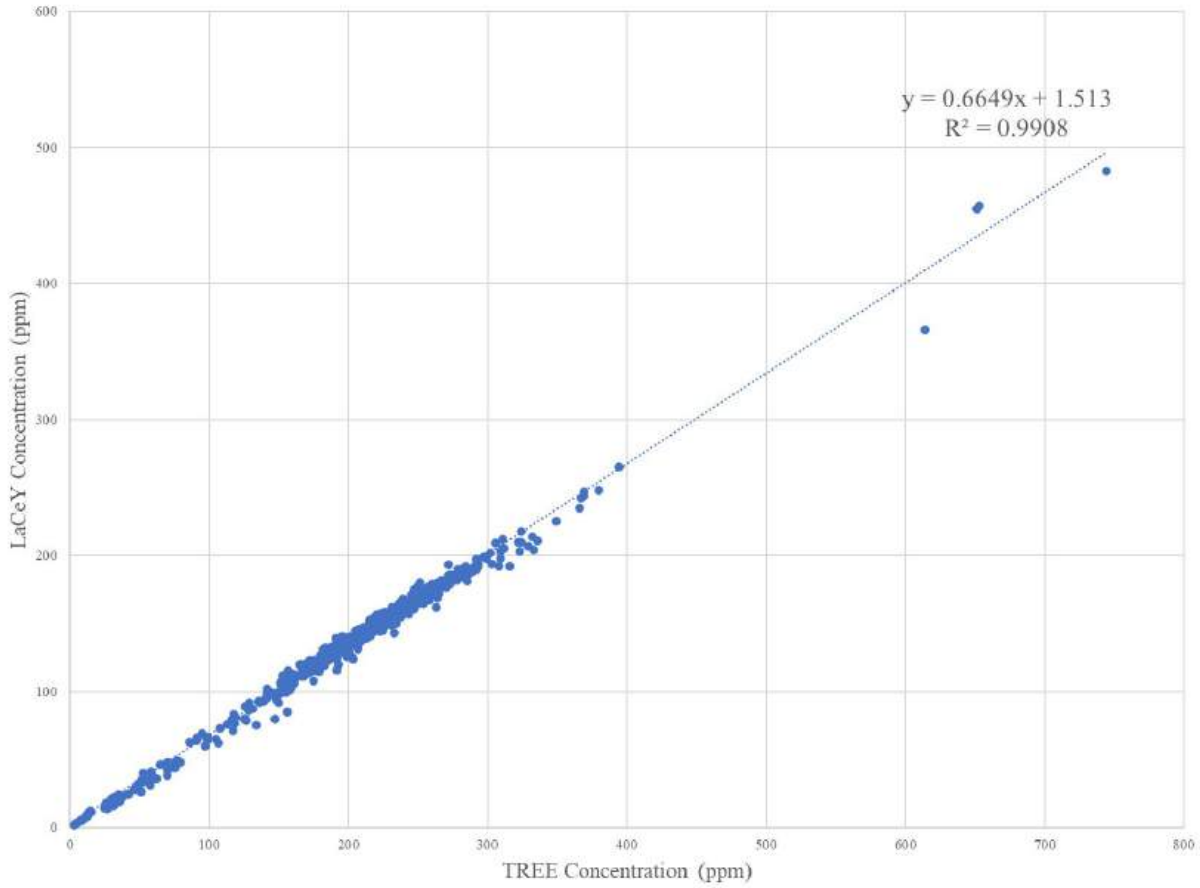
Relative to the drilling overseen by Ramaco, once 3-inch diameter core samples are obtained, the cores are placed in plastic sleeves or tubing, measured and marked every two feet, photographed, and logged. The sleeved cores are transferred to a cardboard core box and labeled. Full core boxes are closed, secured, and transported to one of two secure storage locations. At the secure locations, the full boxes are checked in and added to the secure storage location inventory. Subsequently, and at a Ramaco secure location, cores are logged by geologic technicians and then reviewed by a professional geologist.

Ramaco is conducting on-site pXRF scanning. In order to prepare cores for sampling/scanning, the cores are dried for 24 hours, then broken into 3-inch disks. Samples are taken near the center of each disk. In some cases, core recovery consists of broken material. In these instances, a sample of the broken material will be taken and scanned with the scanner dismounted from the stand.

Ramaco utilizes an Olympus Vanta handheld pXRF device and employs a three-beam scanning protocol. After two feet of core have been scanned, two check samples selected are scanned, two times each. All data collected is logged and identified with the hole number and footage.

The pXRF scanning technology only provides reliable analysis of Lanthanum, Cerium, and Yttrium (LaCeY). It does not detect or accurately determine the concentration levels of most of the remaining REEs. However, utilizing Ramaco's ICP-MS sampling, which is an analytical technique that can be used to measure elements at trace levels, a very strong correlation has been measured between LaCeY and TREE concentrations ($R^2 = 0.9908$). Based on the available ICP-MS sampling results, a regression of LaCeY versus TREE was prepared and is displayed on Figure 8.1-1.

Figure 8.1-1 LaCeY versus TREE Regression Analysis



Given this relationship, Ramaco utilizes LaCeY results from its pXRF scanning as a representative marker of areas to subject to confirmatory sampling with ICP-MS analysis.

Generally, ICP-MS analysis is performed where samples are extracted from pXRF scanned areas where LaCeY and Y concentrations are greater than 250 and 30 ppm, respectively, and where the sample is located within approximately one foot above or below clay or carbonaceous clay seam boundaries. From these selected areas, a cross section sample of at least 200 grams is taken. Half of the sample is retained, packaged, and returned to the core box and the other half is packaged for transport to third-party laboratories.

Third-party ICP-MS testing has been conducted at one of the laboratories listed in Table 8.1-2 as follows:

Table 8.1-2 ICP-MS Testing Laboratories

Laboratory	Contact	Address
SGS North America Inc. Natural Resources Geochemistry Laboratory	Byron Caton Natural Resources-Mineral Branch Manager	4665 Paris Street Suite B-200 Denver, Colorado 80239
University of North Dakota	Xiaodong Hou Research Associate Professor Institute of Energy Studies	Leonard Hall Room 300 81 Cornell Stop 8153 Grand Forks, ND 58202-8153
US Department of Energy, National Energy Technology Laboratory	Evan Granite	626 Conchrans Mill Road Pittsburgh, Pennsylvania 15236
SGS Canada Inc. Natural Resources Geochemistry Laboratory	Sridevi Thomas Metallurgist	185 Concenssion Street Lakefield ON, Canada K0L 2H0
Hazen Research	Tom Broderick	4601 Indiana St. Golden, CO 80403

The NETL served as the initial laboratory for Ramaco's ICP-MS testing, however, for the 100-hole exploration program, Ramaco has utilized Hazen, UND, and SGS interchangeably based on availability at each facility.

All three laboratories have documented procedures on chain of custody verification and sample receipts, login, preparation, storage, and disposal.

The NETL and SGS both utilize the ICP-Mass Spectrometry (ICP-MS) technology for elemental analysis, employing a Sodium Peroxide Fusion process in preparing samples for testing. The UND utilizes an ICP-Optical Emission Spectrometry (ICP-OES) technology for elemental analysis, employing microwave acid digestion in preparing samples for testing.

The minimum limits of detection associated with each laboratory elemental ICP-MS analysis are summarized in Table 8.1-1 as follows:

Table 8.1-2 ICP-MS Assay Minimum Limits of Detection

			Minimum Limits of Detection (ppm)			
		Atomic	ICP-MS			ICP-OES
Symbol	Element	Number	SGS	NETL	Hazen	UND
Sc	Scandium	21	n/a	n/a	0.001	0.050
Y	Yttrium	39	0.500	4.000	0.001	3.330
La	Lanthanum	57	0.500	0.300	0.001	0.500
Ce	Cerium	58	0.500	0.060	0.001	3.330
Pr	Praseodymium	59	0.100	0.050	0.001	0.020
Nd	Neodymium	60	0.300	0.050	0.001	1.000
Pm	Promethium	61	n/a	0.100	0.001	n/a
Sm	Samarium	62	0.100	0.040	0.001	1.300
Eu	Europium	63	0.050	0.020	0.001	2.600
Gd	Gadolinium	64	0.100	0.040	0.001	0.500
Tb	Terbium	65	0.050	0.007	0.001	0.700
Dy	Dysprosium	66	0.100	0.050	0.001	0.600
Ho	Holmium	67	0.050	0.007	0.001	0.800
Er	Erbium	68	0.100	0.030	0.001	0.100
Tm	Thulium	69	0.050	0.007	0.001	0.080
Yb	Ytterbium	70	0.100	0.010	0.001	3.330
Lu	Lutetium	71	0.050	0.007	0.001	0.400

Quality Control is generally analyzed on a 10 percent basis with certified reference materials, sample duplicates, Continuing Calibration Verification (CCV), and blanks.

WEIR has determined the sample preparation, security, and analysis procedures used for the REE Exploration Target's drill hole samples meet industry standards and practices for quality testing, with laboratory results suitable to use for geological modeling.

9.0 DATA VERIFICATION

9.1 DATA VERIFICATION PROCEDURES

Ramaco provided WEIR copies of all available drilling records for its REE Exploration Target, which included Excel spreadsheets, driller's log, field geologist's logs, core photographs, quality results sheets from the REE quality laboratories, as well as drawing files or PDFs of the e-logs. Each hole in the database was individually checked by WEIR against a copy of the driller's and/or geologist's log to confirm data accuracy.

Geological reviews performed by WEIR included:

- Drill hole lithology database comparison to geophysical logs
- Drill hole REE quality database comparison to quality certificates

After completing the precursory verifications and validations described, the drill hole data was loaded into Datamine's MineScape® Stratmodel, a geological modeling software. MineScape provides robust error checking features during the initial data load, which include confirmations of seam continuity, total depth versus hole header file data, interval overlap, and quality sample continuity with REE zones. Once the drill hole data was loaded, a stratigraphic model was created.

Further verifications were then possible, which included:

- Creating cross sections through the model to visually inspect if anomalies occur due to miscorrelation of seams
- Creating structural and quality contour plots to visually check for other anomalies due to faulty seam elevations or quality data entry mistakes in the drill hole database

Typical errors that may impact reserve and resource estimates relate to discrepancies in original data entry, and may include:

- Incorrect drill hole coordinates (including elevation)
- Mislabeled drill hole lithology
- Unnoticed erroneous quality analyses where duplicate analyses were not requested
- Excessive drill hole core loss

WEIR conducted a detailed independent geological evaluation of data provided by Ramaco to identify and correct errors of the nature listed above. Where errors are identified and cannot be successfully resolved, it is WEIR's policy to exclude that data from the geological model. Based on WEIR's geological evaluation of data provided, 15 drill holes were excluded from the database due to duplicate locations. In these instances, the drill hole with the greatest depth and detail was retained in the model. Two drill holes were not included in the model as a result of the coal being on fire, and thus no meaningful logs were available.

The pXRF scanning technology only provides reliable analysis of Lanthanum, Cerium, and Yttrium (LaCeY). It does not detect or accurately determine the concentration levels of most of the remaining REEs. As such, no pXRF data was incorporated into the geological model utilized in estimating REE tonnage and grade, but rather, the model relied on results of the ICP-MS sampling analyses. All available ICP-MS sampling analyses were included in the drill hole quality database.

9.2 DATA VERIFICATION LIMITATIONS

Limitations of data verification included incomplete or missing records for some drill holes. The primary reason for this situation is incomplete data transfers upon change in property ownership. Based on its modeling results, WEIR found some of the drill holes with incomplete data, for example lacking geologist's logfiles and/or e-logs, to be consistent with the deposit and appropriate to include in WEIR's geological model.

9.3 ADEQUACY OF DATA

It is WEIR's opinion that the adequacy of sample preparation, security, and analytical procedures for holes and procedures that were drilled by Ramaco after acquiring the property are acceptable and that these procedures meet typical industry standards. Ramaco employs detailed process and procedures, described in Section 8.0 that are followed each time a core hole is to be sampled. The geologist's logs for these holes contain sampling descriptions and lithologic descriptions that are sufficiently detailed to ascertain that an experienced geologist supervised the drilling and sampling. Ramaco REE quality analyses performed by the NETL, SGS, Hazen, or UND are performed to ASTM standards, as detailed in Section 8.0.

The adequacy of sample preparation, security, and analytical procedures are generally unknown for drill holes that were drilled prior to Ramaco acquiring the property in 2011. However, the geologist's logs for these holes contain sampling descriptions and lithological

descriptions that are sufficiently detailed to ascertain that an experienced geologist supervised the drilling and sampling. All REE quality analyses have been performed since Ramaco's acquisition of the property and these analyses have followed the procedures detailed in Section 8.0. The legacy drill hole information was not used for REE quality analyses, however, the drill holes were used for coal seam structure and thickness modeling. Model verifications further support WEIR's high level of confidence that a representative, valid, and accurate drill hole database and geological model have been generated for the REE Exploration Target that can be relied upon to estimate REE tonnage to an accuracy that is acceptable for this report's specified standards.

10.0 MINERAL PROCESSING AND METALLURGICAL TESTING

Mineral processing of mined coal and REEs related to this Exploration Target has not yet been defined.

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11.0 MINERAL RESOURCE ESTIMATES

Exploration Target tonnage estimates reported are not Mineral Resources or Mineral Reserves, and do not meet the threshold for reserve modifying factors, such as estimated economic viability, that would allow for conversion to Mineral Reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.

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12.0 MINERAL RESERVE ESTIMATES

Exploration Target tonnage estimates reported are not Mineral Resources or Mineral Reserves, and do not meet the threshold for reserve modifying factors, such as estimated economic viability, that would allow for conversion to Mineral Reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.

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13.0 MINING METHODS

Mining methods related to this Exploration Target have not been defined.

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14.0 PROCESSING AND RECOVERY METHODS

Processing and recovery methods related to this Exploration Target have not been defined.

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15.0 INFRASTRUCTURE

Necessary infrastructure related to this Exploration Target has not been defined.

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16.0 MARKET STUDIES

A marketing study related to this Exploration Target has not yet been completed.

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17.0 ENVIRONMENTAL STUDIES, PERMITTING, AND LOCAL INDIVIDUALS OR GROUPS AGREEMENTS

Ramaco was issued Permit No. 841-T1 on July 7, 2020 by the Land Quality Division of the Wyoming Department of Environmental Quality for surface mining in Sheridan County, Wyoming. Permit No. 841-T1 consists of 4,549 acres.

Additionally, Ramaco was issued Air Quality Permit P0025939 on July 20, 2020 by the Air Quality Division of the Wyoming Department of Environmental Quality for the Brook Mine, as also described in Wyoming Permit No. 841-T1.

At this stage in the project development, no environmental or social impact studies have been completed.

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18.0 CAPITAL AND OPERATING COSTS

Capital and operating costs related to this Exploration Target have not been developed.

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19.0 ECONOMIC ANALYSIS

An economic analysis related to this Exploration Target has not been developed.

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20.0 ADJACENT PROPERTIES

This TRS does not include any estimates of REE tonnage associated with adjacent controlled or uncontrolled properties.

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21.0 OTHER RELEVANT DATA AND INFORMATION

Conducting a due diligence investigation relative to the mineral and surface rights of Ramaco's proposed mining operations was not part of WEIR's scope of work. This TRS is based on Ramaco controlling, by lease or ownership, or having the ability to acquire the REE resources and surface lands necessary to support its mine plans.

The ability of Ramaco, or any mining company, to achieve production and financial projections is dependent on numerous factors. These factors primarily include site-specific geological conditions, the capabilities of management and mine personnel, level of success in acquiring reserves and surface properties, mineral sales prices and market conditions, environmental issues, securing permits and bonds, and developing and operating mines in a safe and efficient manner. Unforeseen changes in legislation and new industry developments could substantially alter the performance of any mining company.

Mining is carried out in an environment where not all events are predictable. While an effective management team can identify known risks and take measures to manage and/or mitigate these risks, there is still the possibility of unexpected and unpredictable events occurring. It is not possible therefore to totally remove all risks or state with certainty that an event that may have a material impact will not occur.

22.0 INTERPRETATIONS AND CONCLUSIONS

Since 2019, Ramaco has been exploring the potential of a REE deposit within its Brook Mine Property. Each successive exploration program since then has added continued definition of the deposit. While the current exploration program is ongoing, as of March 31, 2025, there is sufficient data to clearly define the Brook Mine Property REE Exploration Target.

The Brook Mine Property Exploration Target in-place TREO tonnage (excluding GaO, GeO, and ScO) as of March 31, 2025, ranges from 1,097 to 1,372 thousand short tons and the average grade ranges from 375 to 469 ppm on an ash-basis. The PMREE and SMREE are estimated to represent 23.5 and 6.5 percent of the TREOs, respectively. While CMOs exist in both the coal and interburden zones modeled, the CMOs are concentrated to a higher degree within the interburdens, with approximately 60 percent of the estimated CMO tonnage located within clay and siltstone formations.

GaO + GeO tonnages and concentrations were estimated based on 3,298 Ga analyes and 2,474 Ge analyses, a significant increase over the 496 analyses each, for Ga and Ge in the March 2024 TRS. The current estimates for GaO + GeO tonnage ranges from 127K to 159K tons with ash-basis concentrations from 44 to 54 ppm. GaO + GeO constitutes approximately 10 percent of the total CMO tonnage.

ScO tonnages and concentrations are included in this study but were not included in the March 2024 study. There were 139 analyses completed for Sc that were included in this study. It was discovered that Sc concentrations had a strong relation with TREE levels in regression analyses with a resulting R^2 correlation value of 0.817. The derived regression formula was used to populate missing Sc concentrations for the remaining 4,736 ICPMS samples until such a time that can be replaced with actual analyses. As a result of using these calculated values versus later in-fill analysis data, the total quantity and average concentration of Sc is not expected to significantly change in future updates unless unforeseen anomalies are encountered. Current estimates indicate in-place Sc oxide tonnage ranges from 102K to 128K tons, with average oxide grade ranging from 35 to 44 ppm. This constitutes approximately 8 percent of the total CMO tonnage.

When combining ScO, GaO, and GeO with TREO's, the deposit has a range of 1,326 to 1,658 thousand short tons of CMO, with concentrations ranging from 455 to 569 ppm.

Ramaco's sample collection, preparation, security, and testing protocols are well documented and suffice to provide consistent, reliable, and verifiable data.

As with any exploration state mineral mining project, there are risks and uncertainties associated with CMO tonnage and grade estimates. While existing drill hole density provides strong confidence in structural modeling, continued ICP-MS testing will necessarily fill-in existing gaps in the modeling of CMO concentrations.

Regardless of the care taken in defining this Exploration Target, tonnage estimates reported throughout this TRS are not Mineral Resources or Mineral Reserves and do not meet the threshold for reserve modifying factors that would allow for conversion to Mineral Reserves. There is no certainty that any part of the Exploration Target tonnage estimates will be converted into Mineral Resources or Mineral Reserves.

23.0 RECOMMENDATIONS

Ramaco has indicated it intends to continue its REE exploration efforts throughout areas of the Brook Mine Property, beyond the existing permit area which serves as the boundary for this Exploration Target. In continuing its exploration programs, Ramaco should consider the following:

- Continue to employ an experienced geologist to log core holes, measure core recovery, and complete sampling.
- Maintain current practices on core drilling, chain of custody, sample collection, preparation, security, pXRF scanning, ICP-MS testing, and geological modeling.
- Utilize the existing geological model to assist in targeting areas with low REE concentration data coverage within a stratigraphic zone.
- Geophysically log drill holes to verify strata and thickness.
- Continued testing to evaluate REE mineralogical associations and extraction methods
- Continued design and study of a techno-economic model to assess deposit economics

24.0 REFERENCES

References used in preparation of this TRS are as follows:

- *A Geo-Data Science Method for Assessing Unconventional Rare-Earth Element Resources in Sedimentary Systems*, National Resources Research, 2023
- *Towards A Geo-Data Science Method for Assessing Rare-Earth Element and Critical Mineral Occurrences in Coal and Other Sedimentary Systems*, National Energy Technology Laboratory, July 22, 2021
- Seredin, V. V., & Dai, S. (2012). *Coal deposits as potential alternative sources for lanthanides and yttrium*. International Journal of Coal Geology, 94, 67–93.
- John T. Boyd Company report, *Potentially Strip Mineable Coal Reserves Contained on the Sheridan-Wyoming Coal Company Property*, November 20, 1979,
- Golder Associates, Ramaco Mineral Property, Sheridan, Wyoming Interim Report, March 9, 2012
- Rose, K., *Update on the NETL's analysis of Brook Mine cores under Umbrella CRADA: AGMT-0787, PTS #2: AGMT-0875*, October 1, 2020
- Finkelman, Robert B. "Trace and minor elements in coal." Organic geochemistry: principles and applications. Boston, MA: Springer US, 1993. 593-607.
- Ketris, M. áP, and Ya E. Yudovich. "Estimations of Clarkes for Carbonaceous biolithes: World averages for trace element contents in black shales and coals." International journal of coal geology 78.2 (2009): 135-148.

Websites Referenced:

- Securities and Exchange Commission - Modernization of Property Disclosures for Mining Registrants - Final Rule Adoption
  https://www.sec.gov/rules/final/2018/33-10570.pdf

25.0 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

In preparing this report, WEIR relied upon data, written reports and statements provided by the registrant. It is WEIR's belief that the underlying assumptions and facts supporting information provided by the registrant are factual and accurate, and WEIR has no reason to believe that any material facts have been withheld or misstated. WEIR has taken all appropriate steps, in its professional opinion, to ensure the information provided by the registrant is reasonable and reliable for use in this report.

The registrant's technical and financial personnel provided information as summarized in Table 25.0-1 as follows:

Table 25.0-1 Information Relied Upon from Registrant

Category	Information	Report Section
Legal	Mineral control and surface rights	3

APPENDIX A

DRILL HOLE DATABASE

APPENDIX B

REE EXPLORATION TARGET, GEOLOGICAL CROSS SECTIONS

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