

Final Transcript

Rare Earth Element Update Call

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Corporate Participants

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Alex Moyes *Ramaco Resources, Inc. – Director of Critical Minerals and Planning*

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Conference Call Participants

Carlos De Alba *Morgan Stanley – Analyst*

Nathan Martin *The Benchmark Company – Analyst*

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Lucas Pipes *B. Riley Securities – Analyst*

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Presentation

Operator

Hello and welcome to the Ramaco Resources update conference call.

[Operator instructions]

I would now like to turn the conference over to Jeremy Sussman, Chief Financial Officer. Please go ahead.

Jeremy Sussman — Chief Financial Officer

Thank you. On behalf of Ramaco Resources, I'd like to welcome all of you to our first rare earth elements update conference call. With me this morning is Randy Atkins, our Chairman and CEO, and Dr. Alex Moyes, our Director of Critical Minerals. Before we start, I'd like to share a normal cautionary statement. Certain items discussed on today's call constitute forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements represent Ramaco's expectations concerning future events. These statements are subject to risks, uncertainties and other factors, many of which are outside of Ramaco's control, which could cause actual results to differ materially from the results discussed in the forward-looking statements. Any forward-looking statement speaks only as of the date on which it is made, and except as required by law, Ramaco does not undertake any obligation to update or revise any forward-looking statements, whether it's result of new information, future events or otherwise. I'd also point you to additional REE specific disclosures in our March 21 material, including Randy's shareholder letter which can be viewed on our website www.ramacoresources.com. Lastly, I'd encourage everyone on this call to go on to the homepage of our website and download both the shareholder letter and the full Weir Technical Report. With that said, let me introduce our chairman and CEO Randy Atkins.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Thanks, Jeremy, and good morning to everyone. Although the day has the feel of one of our quarterly earnings calls, it's somewhat of a different breed. Today we are going to discuss in more detail our rare earths, which is a new line of business that Ramaco has been working on for some time.

I want to make clear that our potential rare earth business is in development mode. Because of the shareholder interest generated in this project, we felt it was appropriate to now have a public presentation of where we are in the development cycle. I have Jeremy speaking to some of the more business-related aspects and importantly we recently brought on Dr. Alex Moyes to help oversee our rare earth efforts. Alex is got some serious experience in the entire area, including a PhD thesis which focused on rare earth mining in Wyoming and we're delighted to have him guiding us.

The updated Weir report was released last week, as Jeremy said, and had some very positive results. They provide us some confidence that on the basis of that geological testing, we may have the foundation for a commercial rare earth project. But that said, we've gotten a lot of geological, metallurgical, mineralogical and techno-economic work ahead of us to prove all that out. So with that as a preamble, the purpose of today's call is to discuss, first where we are on the critical path for the mining, the processing, and future commercialization opportunity. Second, what near-term steps we will be taking for the rest of the year to advance the project. Third, what are the sort of quote "known unknowns and known knowns," so to speak. And lastly, how we're contemplating structuring the capital investment to move the project forward.

As you all know, this rare earth opportunity was publicly introduced about a year ago. Since 2018, however, we have been involved with the US government in an ongoing geological assessment of our Brook Mine property in Wyoming. In 2019, we received the discovery that the Department of Energy's National Energy Technology Lab, or NETL, had determined that the mine had unusually high primary magnetic concentrations, and that was from testing only a limited number of core samples we had provided. And as far back as 2014, NETL had been tasked by the Defense Department to do a national assessment of where REEs might be found in the US, given both their scarcity and the strategic national importance of these elements. Indeed, we hope that this project will one day contribute to solving that scarcity and become a vital national domestic source of these valuable elements.

Today, after several years of core testing and additional core drilling, the geological aspects of the prospects have matured. Because of that, we can now address some threshold issues. One is whether the REE deposit is

large enough or concentrated enough to be considered commercially viable. From the results of the Weir report, it's now our conclusion that the geological analysis has reached this critical mass to validate its commercial prospects. Indeed, one important aspect of this project today is that we essentially began this overall development roughly almost 12 years ago. Because of that we're now positioned to now transition from testing and move forward into a commercial development cycle. Our mine is fully permitted — it took us an eight-year slog — and indeed, we've already begun actual mining to develop bulk core samples for additional pre-commercial chemical testing. Our near-term goal is to complete most of that geological and chemical testing this year and produce a full blown techno-economic report by Q4.

Alongside that work, we will be exploring with third parties the optimal processing techniques that will apply to our geology and chemistry. And this could then set the stage for, in 2025, considering either to construct a pilot processing facility on the site, or to have that pilot testing done in a third-party facility. We hope that this would then lead by 2026 to preliminary commercial production. Admittedly, this is a long runway, but if each piece of the puzzle falls in place, it is achievable. We are starting this REE development as an established metallurgic coal producer and not as a startup junior miner. Ramaco's coal operations are growing in size and financial capability, but with a very conservative capital structure. Our team is experienced in successfully starting new projects from scratch. And we also start the Brook Mine project from the position of already enjoying a solid core cash flow pipeline from our met coal operations. That's going to enable us to develop this project for the optionality of what is going to be the highest value proposition as far as the shareholders of Ramaco are concerned.

Now, let me briefly summarize the findings on the geology and chemical testing we released last week. Then I'm going to turn the floor over to Jeremy to discuss some of our options on funding the development, and then I will have Alex explain in more technical detail what the results mean and what we will be doing to move the project forward on a variety of operational fronts.

As I said in my shareholder letter released last week, what we know now is that the Brook Mine is the largest unconventional rare earth discovery thus far the US. Also, NETL has a variety of theories geologically as to why the REE was formed in this spot, and came to be deposited in our mine, which Alex will address. In a nutshell, we have independent testing that's validated we possess about 1.5 million tons of various REEs with an average concentration of almost 600 parts per million. These numbers will likely grow as we do further testing and

coring. Also, recall that these totals are from less than a third of the property and its shallower depths. The deeper and the broader the physical areas we test and core, the more we expect to add to these totals.

The REEs were found in a variety of different seams and but lithologies, but one important fact is we do not have radioactive tailings which would make the mining and processing much more expensive and complex. The concentration levels are important as a marker for the cost and difficulty of processing the REEs economically. Some of the deposits now show concentrations particularly in coal, which are much higher than the norm, and indeed, the level of almost 10,000 parts per million. And through some physical and chemical techniques, all of these concentrations can be further enhanced for processing.

We're now also starting to do more deeper cores, because NETL has a theory that there may be greater concentrations at deeper levels. We have previously cored to only about 200 feet, and we know that there are seams that go down to more than 1000 feet. Testing on these deep cores also opens the possibility that we might pursue a variety of mining techniques, surface highwall or even in situ mining at different parts of the property, and of course with different cost structures. The REEs we've found to date are extremely valuable. Testing so far indicates that about 40% of the deposit contains primary and secondary rare earths, including two very valuable critical minerals, germanium and gallium. And both of those two minerals were banned from export by China last year, and candidly, may be about more valuable than almost all the other rare earths except for perhaps Terbium.

If we step back and look at this opportunity, one analogy would be to size this up as another major Ramaco mine project. But one with the possibility, however, to process the mine product ultimately to an even higher value end product. It's too early to declare that this might be a mine-to-magnets project. However, both the deposit size and the concentration levels would suggest that this concept is not beyond contemplating. And as far as financing the project, as I said in my shareholder letter, we need further information on project economics and costs before we can begin to determine which direction to proceed there. We are going to preserve a great deal of optionality on our finances. However, given the growing cash flow from our met operations, and the potential high value returns from developing the REEs, we will probably have a bias to self-funding so as not to dilute our existing Ramaco shareholders.

So with that as background, I'm going to turn the floor over to Jeremy to discuss the project economics and then to Alex to discuss the technical aspects of what we're doing. At that point, we're going to open the floor to some questions. And with that, Jeremy, please give us some background on the business side.

Jeremy Sussman — Chief Financial Officer

Thank you, Randy. I'm excited to talk about the business prospects of our potential new rare earth element business line. Even though we'll be focused today on rare earth, let me first say how proud we are of the growth in our core metallurgical coal business. With that said, we've been given a unique geological opportunity from the discovery of an exceedingly large and concentrated rare earth deposit at the Brook Mine. It's our goal to now de-risk and advance the commercial prospects of that project. Investors would then have the benefit of being able to view Ramco as both a growing metallurgical coal company and an emerging producer in the REE space.

I believe there are five unique aspects to Ramaco that would allow our prospects to stand out favorably, in contrast to pre-revenue junior mining companies, which as Randy noted we of course are not. First, as Randy mentioned, our mine is permitted after an eight-year odyssey. That in and of itself is a rarity. We also own the minerals, which are on private, not federal land.

Second, the deposit's not only uniquely large, it has now tested to show likely commercial concentration. It contains a slate of the most valuable magnetic REEs in almost 30% of the deposits, such as terbium, dysprosium, neodymium and Praseodymium. Two extremely valuable critical minerals, germanium and gallium, also make up another 10%. Importantly, our deposit does not show any radioactive tailings so we can ultimately process this ore in the United States without shipping to China for refinement.

Third, we're well capitalized to be in a position to fund the capital for development. Ramaco Resources generated almost \$350 million in net cash from operating activities in 2022 and '23 from its metallurgical coal business. This all gives the company a major leg up financially to be self-sufficient compared to the vast majority of pre-revenue junior miners.

Fourth, our management team has an excellent track record both growing a business from scratch and attracting the talent to do so. Ramaco has grown from mining its first ton of coal in 2017, to exiting 2023 at a 4 million ton per annum sales run rate with over 800 employees.

Fifth, Brook Mine is located in the true tier one jurisdiction near Sheridan, Wyoming. It's intersected by both Interstate 90 and the main line of the BNSF railroad. By contrast, over two thirds of all critical minerals are found in conflict zone countries around the world.

In terms of the value proposition of this mine, it's noted on page five of Randy's shareholder letter, the estimated size of the deposit is 1.5 million tons of total rare earth oxide or TREO. This is from sampling only a third of the site. The market value of our magnetic REEs and critical minerals are found in Randy's shareholder letter. Our mining extraction plans will focus on maximizing that value by focusing on mining and extracting those valuable elements, and not concentrating on the lesser value REEs. In terms of financing the project, we believe both the necessary investments to commercialize this asset is within both our operational and financial capabilities. Once we understand the capital and operational requirements to develop this new REE business, we can more logically provide a capital structure around how this unique opportunity should be financed. We'll maintain optionality on this, with of course one option being to internally fund the investment from Ramaco's own growing financial resources. Alternatively, there are other financing options and, in any scenario, METCB could maintain a royalty position in the REEs and critical minerals being mined.

As everyone is aware, there's increased focus from the government on securing domestic sources of key critical minerals. In fact, speaking of financing, earlier this month, a single clay lithium deposit received more than a \$2 billion conditional loan from the US Department of Energy. The Brook Mine may also be positioned to be of significant strategic and economic benefit to the US.

I want to be clear that regardless of the financial direction we take, Ramaco's management remains committed to maintaining a conservative balance sheet while at the same time striving to return increasing amounts of cash to our shareholders. Lastly, as we look at the somewhat different unconventional opportunity, reality is the coal companies generally trade at fairly low multiples. This is one of the motivations for Ramaco to pursue this unique business line. There's only one active REE mine in the US today owned by MP Materials in California. For some comparative purpose or context, Ramaco generated more adjusted EBITDA net income in the second

half of 2023 alone than MP generated for all of 2023, yet Ramaco's market cap is currently less than 1/3 of the market cap of MP. In summary, while there's clearly a lot of work that remains as we embark on a path to REE commercialization, we're excited for what lies ahead on this journey.

With that said, I'd now like to turn the call over to Alex Moyes, our Director of Critical Minerals to discuss the geological aspects of the deposit and our next steps in the commercialization timeline.

Alex Moyes — Director of Critical Minerals and Planning

Thank you Jeremy, and good morning everyone. Randy and Jeremy touched more on the business and financial aspects of the Brook deposit. I'm going to focus on the geological and operational aspects of our development.

Our exploration efforts at the Brook Mine deposit have been nothing short of exciting. As Randy mentioned, based on the Weir report released last week, our estimated tonnage has almost doubled since last year. That is because we've identified mineralization spanning multiple rock types, ranging from near surface level down to depths of approximately 400 feet. We now have significantly more drill holes in core compared to last year. Not only did we organically drill new bore holes and cut core, but we also inherited a massive drilling database with significant data from prior work on the property. We now have approximately 600 boreholes informing our geologic model and over 100,000 feet of core and lithologic logs. We have performed almost 30,000 XRS scans and over 1900 ITPMS analyses to date. This does not include the significant testing we are doing on our new deep 850 foot core.

The additional sampling has increased our average deposit concentration to 550 parts per million on an ash basis, a near doubling since last year. This number includes gallium and germanium, which are incredibly valuable elements, and as Randy mentioned, found in unusually significant quantities at the Brook deposit. We are currently estimating approximately 140,000 tons of gallium and germanium and at high concentration.

We are currently evaluating both the best way to process and separate these two elements as well as where we have the most overlap from our high-grade rare earths. This will have implications on the design of our process flow sheet and subsequent pilot operations. Also keep in mind that our efforts around gallium and germanium are relatively new. We had not previously focused on these two elements and therefore have significantly less

data compared to our rare earths. We are however, now systematically resampling all our core and are dramatically increasing the number of tests we have on these two elements. So tonnage and concentration may actually increase as we further define these two elements.

I mentioned a moment ago, the concentration on an ash basis. Let me describe ash basis in more detail, because it's a really important point. The Weir report indicates our highest-grade zones are associated with rock types that have high organic carbon content. That is to say, it is not mineral matter, but an easy to remove constituent of the rock mass. Removing this carbonaceous material allows us to assess the concentration of the rare earth and the actual mineral matter. This is just like any conventional rare earth mining operation would report, given that their ore is 100% mineral matter.

Furthermore, it has been documented in academic literature and confirmed by us and SGS that dissolving the carbon in solution when performing concentration testing leads to an underestimation of the rare earths. This is due to the carbon matrix interfering with the machine's measurements. Early retesting suggests that, due to not removing the carbon from our original samples, we were likely underreporting our rare earths concentration by 10%. We are currently in the process of retesting a majority of our samples, and we will rereport our revised concentrations and a later TRS.

Now back to the geology. We have determined that the mineralization encompasses coal seams and associated rock types including sandstones, siltstones, and shells. Importantly, our mineralization is essentially free of radioactive materials, which many domestic and international deposits are having to contend with. Removing radioactive waste can create a significant cost increase when compared to a deposit free of them. As a result, many producers find the only place they can refine their radioactive ore is in China.

Also what's particularly intriguing, geologically, is the emergence of what we've come to term "fairways," which exhibit significantly higher grades of rare earths. These zones demonstrate lateral continuity, suggesting geological controls that concentrate the rare earth elements within specific areas of the Brook. We will now focus on these high-grade regions to gather additional data and optimize our exploration efforts. As we better define and understand these high concentration zones, such as depth and ore thickness, we can make determinations of initial mining methods and do mine sequence planning.

Interestingly, we've now found the highest concentration zones to be associated with the coal seams. This finding holds immense significance in how we think about our mining and processing of this highest-grade ore. Because of enhanced testing techniques recommended by our consultants, we are able to more precisely sample our coal. Now as we resample these zones from both recovered core and new drilling, we anticipate a combined increase in average concentration within the deposit as a whole, as well as tonnage associated with the coal. Rare earth element oxide tonnage associated with the coal currently stands at 5% or 70,000 tons of the deposit.

It is also worth noting that while we have not definitively established the trend, it appears based on limited tests from deeper zones, that concentrations are increasing the deeper we go. We have a handful of cores down to 400 feet, and those deeper zones do show an increase in concentration. We now have a new deep core that went down to 850 feet and has intersected some large coal zones that we are awaiting testing data on. Having even higher concentrations at depth opens up possibilities for alternative and probably less expensive mining methods such as in situ recovery mining.

This trend is so far consistent with the hypothesis proposed by our colleagues at NETL. That theory suggests that concentrated rare earths within our coals may be due to the infiltration and upward migration of fluids through permeable and porous coal zones and sandstone. These zones have high flow ability which could be due to extensive fracture. The fluid could have been acidic enough to then dissolve the rare earth into solution in situ and then redeposit them in these high concentration zones. The fact that the location of the Brook deposit is on the steep structural edge of the Powder River Basin and likely in an area with increased fracture intensity could partly explain why this deposit is so enriched compared to other parts of the basin. These fractured zones have been identified in core, but not mapped related to the highest concentration areas at this point. That work is ongoing.

Looking forward towards our critical path, let's delve into our ongoing initiative and what lies ahead. Mineralogical analysis of both ore and non-ore zones is now underway. Understanding which minerals our rare earths are associated with, as well as the gains or the non-portion, the non-ore portion of the rock mass, is pivotal for cost efficient concentrating techniques. Understanding mineral distribution, sizes, associations and other properties will be used to inform which physical concentrating tests we should focus on.

We're also currently engaged in bulk sampling with material from the areas where we have already begun mining. Based on the results of our mineralogical analysis, there will likely be some further combination of physical testing that could include crushing and grinding, density separations, flotation and magnetic separation. It is important to select the right physical concentrating methods for the specific mineral properties that are found within the ore for optimal results. This testing will provide crucial insights into optimizing our process flow sheet and generating the highest feedstock possible for the leaching portion of the operation.

Sequential digestion testing is also in motion. These forms of tests require reacting the ore with various chemicals. The nature of the chemical — whether it is acidic, basic, reducing, etc. — will inform what fraction of the minerals the rare earths are most associated with, since various minerals react to various chemicals in different ways. To say it another way, we want to know what percentage of our rare earths dissolve in acid, which percent dissolve in a basic solution, and so on. That way we know how to sequence the leaching and determine the most cost-effective method for rare earth recovery from our ore. These tests, however, take a significant amount of effort. You are testing various chemicals, then you need to optimize the chemicals to the right temperature, the right concentration, get a solid-to-liquid ratio right, and find the right contact time to get the most effective and cost-optimized recovery.

Once optimal physical concentration and leaching conditions are determined, we'll explore the various processing techniques such as solvent extraction and ion exchange to extract the concentrated rare earth elements from the leaching. Solvent extraction is likely the most common and proven technique for extracting and separating the various rare earths. In addition to testing traditional processing techniques, we will be exploring various unconventional processing techniques with academic and government partners.

Again, as mentioned prior, we are at a huge advantage, as our process flow sheet will not need to include the handling of radioactive waste. This will be a large cost savings both at the pilot scale and commercial production scale. They'll also be important for us to determine what modifications to the process flow sheet we will need to efficiently incorporate for the recovery of gallium and germanium. With all of this data we are beginning to construct an internal techno-economic model to determine the most cost-effective mining and processing techniques. This model will bring together a large list of geological parameters. We will be looking at depth, thickness, and grade with processing parameters such as recovery, reagent costs and consumption. We will factor in energy usage as well as mining operation parameters such as extraction costs and production volumes.

And as we update this model, we will also factor in current and forward forecast market parameters. This model will, of course, be validated by SRK, our third-party consultants. Looking ahead, we believe our development plans are sound and present very real possibilities.

So to summarize, we hope to have a process flow sheet and techno-economic model by the end of this year. This will inform the design of our pilot plant. We are currently assessing the potential size, scale, cost, and location of the plant given the data we have today. The size will largely depend on what we think we can mine on a commercial scale and how many kilograms of finished product we will need for our potential offtake customers. It's important to keep in mind that due to the pioneering nature of our ore deposit, our pilot plant will incorporate some unique features, such as dealing with this organic carbon.

Our journey of the Brook Mine deposit has and will be marked by exciting discoveries and diligent progress. With a comprehensive understanding of our findings and strategic development plan, we are in a great position to be commercially successful in this fascinating new rare earth mining sector. Thank you all for your attention, and this now concludes management's prepared remarks. I would now like to turn the call back to the operator to open up the question-and-answer portion of this call. Thank you.

Questions and Answers

Operator

[Operator instructions]

Today's first question comes from Lucas Pipes with B. Riley Securities. Please go ahead.

Lucas Pipes — Analyst, B. Riley Securities

Thank you very much, operator. Good morning everyone. My first question is to... this was very helpful. My first question was, as for the budget in 2024, how much do you expect to spend on the rare earth opportunity this year? And then I have a few follow up questions from there. Thank you very much.

Jeremy Sussman — Chief Financial Officer

Thanks, Lucas. It's an excellent question. I think, as Randy said on our earnings call, kind of the beauty of this is what we've been able to accomplish so far is with minimal spend. So we're talking in the few million dollar range this year for 2024. So not too material.

Lucas Pipes — Analyst, B. Riley Securities

Very helpful, thank you. And then, on this call, you shared your expectation to preferably self-fund this opportunity and first, is it possible to think about some percentage of free cash flow that would go towards this rare earth opportunity? Just trying to size up, because I imagined the capital spending could be very large. And obviously, shareholder returns is also a priority for many coal investors. So wondering how you think about balancing those interests.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Sure. Thanks Lucas, this is Randy. So I think the first answer to your question is, of course, we do not have costs associated with this at this point. So we certainly can't start here and give you percentages of what our potential cash flow would be dedicated towards this opportunity. You know, you have as good a sense as any analyst on sort of what our forward cash flow generations look like, so you know that they're fairly substantial.

I think the interesting thing about an opportunity such as this, which is much different, of course, than a coal opportunity, is that there's a lot of other alternative financing opportunities that come into play here. Least of which is potentially be associated with the government, which of course we already are. So I think before we could sit there and give you any sort of a definitive answer on either what percentage of cash flow would be dedicated, we first of course have to understand the costs. We have to understand what our financing alternatives and opportunities are. But as I said, you know, the main hallmark of anything we do is we're trying to keep our eye on the ball that our first goal is to enhance current Ramaco long-term shareholder value. So

anything we're going to do is not going to try to jeopardize coal cash flow, if you will. And we'll do everything we can to enhance sort of the development cash flow coming off this opportunity, which again, is going to be a much different type of entity, even within Ramaco, than we currently are operating.

Lucas Pipes — Analyst, B. Riley Securities

Thank you, Randy. And I'll try to squeeze one last one in before turning it over. I think I heard at the end of the year we can expect a process flow sheet. Is that right? And what are kind of the critical pieces to conclude that analysis? Thank you.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Yeah, and I think I'll let Alex detail, but what we said is we will have sort of a techno-economic analysis which is going to cover obviously, what operational steps we think we need to advance the project and of course, to be able to start generating some costs and potential cash flows associated with that. But with that as an overview, Alex, take it away.

Alex Moyes — Director of Critical Minerals and Planning

Yeah, great question. And the answer to your question is yes, this will be a lab-based or call it a bench scale process flow sheet is where we start. And, you know, there's really, I like to think, three components to the process. Flow sheet one, there's the physical upgrading, or the concentrating, and that requires the bulk samples, which I mentioned we're in the process of getting about a ton or a little over a ton of material to start that. And so that's kind of [inaudible]. But running parallel, we can do what we call a sequential digestion where we're understanding what is the optimal leaching conditions, leaching chemicals, etc. And then that final part of the process flow sheet, if we want to maintain as much optionality in the process as possible, but if we decide to go forward with extracting and separating individual rare earths, that's where the solvent extraction testing that we're going to get done goes in as well. So at the end of the year, it would be kind of a lab-based bench scale that we can then use that to inform our pilot design and as Randy mentioned, we're assessing potential third party places to do that or assessing doing that on site ourselves.

Lucas Pipes — Analyst, B. Riley Securities

Very helpful. I appreciate it and best of luck.

Operator

The next question comes from Carlos De Alba with Morgan Stanley. Please go ahead.... Carlos, your line is open. You may ask your question.

Carlos De Alba — Analyst, Morgan Stanley

Yep, sorry, thank you. I was on mute. Good morning everyone. I recognize that it might be too early to respond to my question, but do you have a sense of the potential range of prices for rare earths that you may need for the project to be viable? Any color around these will be great. Given where prices, particularly for NDPR, are right now, it is a relevant debate out there.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Sure, good question. So I think the first comment I would make, again, going back to the earlier question is we don't have our costs yet. So we don't obviously know what we need for breakeven purpose. Having said that, we start this with a pretty low basis, if you will, in the property. You know, we certainly didn't buy this property as a rare opportunity. We bought it as a coal mine. It's been widely publicized what we paid for it, which is very nominal.

And frankly, to date, we've got a very low cost in what we've done for development purposes to date. I think our hope is that from a cost standpoint, we've got a couple of things working in our favor. First, of course, is that we're dealing with a relatively softer form of matter or material than typically is associated with a hard mineral rare earth extraction program. You know, we're dealing with coal, carbonaceous material, clays, pretty soft stuff. So first of all, that's easier to mine. Secondly, as Alex pointed out, it's not radioactive. So that's, that's a big leg up. And then thirdly, from a processing standpoint, because it's softer and is not radioactive, we are hopeful that we will come up with some processing techniques that will be frankly more benign, both environmental and cost effective than is, again, associated with hard mineral. This is a sort of first of its kind, certainly here in the US, and frankly, we're not quite aware of any other project around the world that has gotten its start by really

looking at coal as the primary feedstock. So it's a bit of a brave new world. And I think you're absolutely correct, you know, we all understand that the Chinese is pretty much a monopolist in this space, go to great lengths to manipulate pricing to try and deter or eliminate potential competition from other sources. We're aware of that. And I think we will certainly hope to be, you know, a low-cost producer in this space, just as we are a very low-cost producer in the met coal space.

Carlos De Alba — Analyst, Morgan Stanley

All right, thank you very much and good luck with the development. Thank you.

Operator

The next question comes from Nathan Martin with the Benchmark Company. Please go ahead.

Nathan Martin — Analyst, The Benchmark Company

Good morning guys. Maybe just asking a little bit of a different way on the possible capital spend, understanding all the elements we just talked about. I mean, maybe can we think about this from a way of potential magnitude of spend as we move through the various stages? Obviously, we're still doing some core samples here. Digging some deeper samples, it sounds like, then it sounds like moving to, you know, lab scale testing, and possibly pilot plant testing, and then eventually, you know, scaling up to commercial production levels, if that makes sense. But maybe just kind of talk about the magnitude of spending as we move along that trajectory, if that makes sense?

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Well, I'll let Alex perhaps answer that in more detail. But I think again, the magnitude is going to be a function of... I expressed the outset of my remarks that we have knowns knowns and known unknowns. So many of the known unknowns are essentially matters that would go to the heart of your question, which is, what is the magnitude of potential spend, which is based on how much of the property we may be mining, what technique we would be mining at, how we would be processing the material that we take out. These are all things that are gonna have key bearing on what our cost will be virtually every stage of the game. And as I just expressed to the

to the last question, I think, just at a 10,000 foot level, we are hopeful that a lot of the spend that would be typically associated, even with a rare earth project, would be less in this case, because of the material that we're using and some of the advantages that we've got on this project we cited earlier. Alex, if there's something you'd like to add, please.

Alex Moyes — Director of Critical Minerals and Planning

Yeah, no, it's a great question. But again, one that's kind of hard to answer without the crystal ball at this point. And you mentioned the laboratory testing and that coincides. Jeremy gave a budget for 2024 of approximately a few million dollars that will cover the laboratory testing that's important, plus the handful of infield drilling. Now, I want to make it known that, because I've seen some questions pop up, we've reported an average deposit concentration of 550. We certainly have, I mentioned fairways in my conversation, that are considerably higher concentration. So there will be efforts to further delineate these fairways.

But the thing that's really going to drive the price, particularly when you get to the pilot scale, is going to be what that process flow sheet is. If we have to do everything from crushing, grinding, density, gravity, flotation, magnetic, that's going to be a very different pilot cost than if we can just crush, grind, and then do some magnetic separation. You know what I mean? So that being said, we have explored with third parties what pilot testing can cost and we don't expect that pilot testing to be considerably more material than the budget we have mentioned for 2024 into 2025. So with that, we will certainly have a lot more to update everyone on after we've been through the laboratory testing by the end of this year, and give more concrete numbers for you.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Yeah, I think one of the things to add, Nate, that Alex just touched on... so interestingly, with respect to our pilot, we probably have got the option to either build one ourselves, or frankly take this or to a third party testing group that already has the mechanical and structural infrastructure in place, and simply have them run the test and then get the data to design and develop our full commercial plan. So that is potentially a pretty decent savings as opposed to having to construct something on our own site. We'll get to that, we'll maintain the optionality. But you know, just like everything we do in every development project, whether it's coal or rare earth, you know, we try to economize as best we can.

Nathan Martin — Analyst, The Benchmark Company

Very helpful comments are guys I appreciate that. And then maybe just again, taking kind of a bigger picture look here. As we move through these various stages we just talked about, could you possibly lay out what you need to see in those different stages to kind of give you confidence to move forward with the next stage? Or, you know, what would a possibility or what would a possible situation look like? What would you need to see to be like, alright, you know, if I'm playing devil's advocate, this would keep us from moving forward?

Randall Atkins — Founder, Chairman, and Chief Executive Officer

I'll let again Alex go through sort of the more specific steps, but I think just like any project, mining is an uncertain art. And like everything involved with mining whatever material, Mother Earth is going to provide its own share of surprises for you. So I think we approach this with the normal discipline of saying, we'll take our temperature at various points along the line, but I think we've gotten far enough out on the diving board, so to speak, to understand that from a geology standpoint, the project looks like it's a go.

The question then becomes, because this is not like coal, where you're simply mining the product and you ship it, almost on an unvarnished basis, here you're dealing with almost an industrial chemical situation where you've got to go through a fairly rigorous amount of processing and refinement to get that end product. So, you know, we'll have a lot of steps along the way. And I think the first milestone will, of course, be the techno-economic report, which will essentially visualize what the economics of this will look like, and will make judgments from that step forward.

Alex Moyes — Director of Critical Minerals and Planning

Yeah, that's a good point, Randy, and I'll speak in generalities here, not with specific numbers. But, for example, you asked milestones. Again, I've mentioned our internal techno-economic analysis. So as we go through the physical concentrating steps, we have numbers in mind that are going to be important to get that feedstock concentration to prior to leaching. And again, since we haven't done those tests, let's say we, let's say worst case, you know, we can only upgrade our feedstock by 5%. That could be a big problem, but fortunately, the way we've set this up and Randy described it is going to be step-by-step.

So one, we do need to see certain physical concentrating numbers, which we'll plug into the techno-economic model. And then two, if you think of a very worst-case scenario, which fortunately our ore isn't this kind of ore,

because we don't have the same hard rock minerals that a lot of the traditional ones are dealing with. If you had to use the most concentrated expensive acid to get it out then of course that's going to be uneconomic for any rare earth element producer. So of course we're very excited to start doing the chemical testing and seeing which fraction and percentage we can recover with environmentally benign and relatively low cost reagents. But again, we are setting up this model so that each step we're going to have a very good handle on if we want to progress to the following step after that. So we certainly have a good linear plan in place to make sure that we're checking the right boxes.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

And I think as an overview, frankly the reason we're having this call today is, you know, this is a different line of business from obviously our met coal operation. So we've tried to be pretty transparent about it. We are having this call obviously with the milestone that we've got an update from Weir on the geology and about every quarter or every six months depending upon the velocity of generation of new information, we will certainly intend to inform our shareholdering public where we stand on this project moving forward.

Nathan Martin — Analyst, The Benchmark Company

Appreciate the thoughts guys and then Randy, just maybe one last one along those lines. I know I asked you on the earnings call, but any updates on the timing of the SRK report? I'm assuming that information will be included in the techno-economic analysis you guys hope to have by your end.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

You bet. Great question, Nate. So you know, the beauty of having Alex on board is he is very, very familiar with putting together techno-economic analysis. So we will be doing that, frankly, in conjunction with SRK. So that it will, we'll certainly run our own numbers, but we're going to have SRK on our side to validate what we're doing. And when we publish the SR, pardon me, when we publish our technical economic report, it will have the validation of SRK. Everything we're trying to do to inform the public, as we best can, is being done by independent third parties.

Nathan Martin — Analyst, The Benchmark Company

Great, appreciate that guys. Best of luck going forward.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Thank you Nate.

Operator

Next question comes from Pavel Molchanov with Raymond James, please go ahead.

Pavel Molchanov — Analyst, Raymond James

Thanks for taking the question. My pleasure to get on your call for the first time. Have you looked at what kind of Section 45 X incentives, via the inflation Reduction Act, this project may be able to accumulate?

Alex Moyes — Director of Critical Minerals and Planning

Yeah, that's a great question. So we haven't modeled it but we're certainly aware of the 45X and the implications. And so we will as we build this techno-economic model, we're fairly confident with the operational coverage of the costs on the processing side. And as you might know, there's a push to get more of that 45X to coverage on the upstream side. So we are awaiting some more guidance on that front. But certainly, we want to look at the model two different ways. We want to run it with the 45X on what we know will be covered on the processing side, but then we also want to run it without it and so we will certainly be sharing our view and the model both ways. Once we get to that point here hopefully in Q4.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Yeah, and I also think this is a rapidly emerging area with a lot of existing and potential government support in different ways. I think the government's trying to somewhat figure out what's the best way to incent creation of more rare production, obviously, which is domestically cited, and processed domestically. And I think once

again, we check the box to uniquely be somebody who can sort of be Team USA, in terms of both mining on private land as well as processing here in the United States.

Pavel Molchanov — Analyst, Raymond James

Yeah, interesting. You know, we've seen a lot of battery and EV manufacturing new builds in more kind of a southern portion of the United States, Nevada, Texas and so forth. You know, your perspective rare earth project is quite a bit further north. Have you worked out what the logistics you know, the presumably rail-based shipping what would look like, if you were to enter production down the road?

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Well, we've got some very interesting logistics because of the fact that our property, if you had to design where to have a mine to have it right on the mainline of the Burlington Northern Railroad and intersect a major interstate, gives you a lot of logistics optionality. And interestingly, as you mentioned, the southeast... So we are and have been for a number of years in partnership with Oak Ridge National Labs on exploring a number of different kinds of coal-to-product technologies, including battery-related technologies. As matter of fact, we're working with them right now on a sort of a synthetic graphite production from coal, and indeed ship a lot of material to the Oak Ridge folks on a regular basis. So you know, we're very familiar with the logistics between Wyoming and Tennessee if you will.

Pavel Molchanov — Analyst, Raymond James

Understood. Thanks very much. Thank you.

Operator

The next question comes from Sam Tisch with Millennium. Please go ahead.

Sam Tisch — Analyst, Millennium Management

Oh, hey, how you doing? I think it has my old information on there. But thanks for the question. Really appreciate it. Just a quick one, following up on something Pablo touched on just now. I was wondering in the timeline that you've put out there of the pilot plant, and then commercialization, 2025-26, what period would you start applying for government money, not under the Inflation Reduction Act, but just in general? DOE funding or anything like that?

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Well, I think it's not like there's an online application that you sign up for, you know, how to start a rare earth mine. But, you know, we have been involved in the government from day one on this. We're in relatively constant contact with a number of different levels and a number of different aspects of the government. You know, and as opportunities for funding come along in no small measure, we will be incented to try to move as quickly and then of course, as prudently as we can, because as I mentioned, this satisfies a very strategic national need for domestic source of these, frankly, particular elements that we seem to find. So we will avail ourselves of any kind of government funding that seems to make sense for us. It's like any funding, you've got to look at the pros and cons of it, but we are very familiar with these types of programs. And, you know, we'll look forward to working with the government at different levels to develop what seems to be the best for all parties involved.

Sam Tisch — Analyst, Millennium Management

Just a quick one, a follow up. Is there any sort of milestones you feel like you have to reach before getting into that? Like the techno-economic report or anything like that?

Randall Atkins — Founder, Chairman, and Chief Executive Officer

I think there's not necessarily any specific check-the-box moments. I mean, you know, NETL has been involved with us on assessment. We are already working with Oak Ridge, and frankly, a number of other national labs on various forms of potential processing, extraction and separation techniques. All of those, frankly, although many of those are novel techniques, because that's sort of what the government does, is they kind of act as the cutting edge of technology on a number of projects of this nature. But we will be informed as we go along, from the

government of what aspects they may want to work with us to try to accelerate some aspects and we'll certainly be open to all their suggestions.

Sam — Analyst, Selenium

Makes total sense, really appreciate it. Thank you.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Thank you Sam.

Operator

The next question comes from Lucas Pipes with B. Reilly Securities. Please go ahead.

Lucas Pipes — Analyst, B. Riley Securities

Thank you very much for taking my follow up question. Alex, maybe this is too early, but obviously there's a range of concentrations that that have been discovered, and I wondered how you think about a cutoff grade at this stage. Thank you very much.

Alex Moyes — Director of Critical Minerals and Planning

Yeah, great question. We are certainly thinking about cutoff grade. But before we get to that point, we are waiting on some specific laboratory data that can... unfortunately, these labs have been kind of backed up lately. So hopefully here in the next few months is when we'll be kind of diving in on what that cutoff grade ought to be. And certainly by the time we get to our techno-economic model, we'll have a great handle on that. But again, I just want to want to emphasize, because there's been some questions, we're not coming out here saying that 550 is that grade. That's a composited average, which candidly for a sedimentary deposit is quite high. But we do have some much higher fairways and we expect that we're going to start narrowing in and then zeroing in on that cutoff grade here in the next few months.

Lucas Pipes — Analyst, B. Riley Securities

I appreciate it. Thanks again, and good luck.

Operator

This concludes our question-and-answer session. I would like to turn the conference back over to Randall Atkins, Chairman and CEO, for any closing remarks.

Randall Atkins — Founder, Chairman, and Chief Executive Officer

Thank you very much. And of course, very much appreciate all the folks that have gotten on the call to listen to us today. We will probably expect to have calls relating to rare earth on a probably less periodic basis than we do our normal coal mining quarterly calls. But we will certainly schedule calls when we have information that we feel would enlighten our shareholder public as to where we stand, and certainly probably have one within the next six months. So that's sort of the cadence that we would expect to be able to continue to make disclosures in this area. And with that, we certainly again, appreciate everybody being on the call today, and we look forward to catching up again. Thank you.