

Jack-in-the-Stox: Heavy Rare Earths, the French Connection

written by Jack Lifton | October 12, 2026

In his ongoing *Jack-in-the-Stox* series, [Jack Lifton](#) comments on public companies, technologies, capital markets, supply chains and geopolitics. He is not a licensed investment adviser, and his views are provided for informational purposes only. Nothing in this column constitutes investment advice or a recommendation to buy, sell or hold any security.

Reviving a rare earth industry outside China will require people who can consistently manufacture the materials industrial customers need. Discovering rare earths is the beginning. Financing a project allows work to proceed. Neither event establishes that a manufacturer will receive a qualified product, in the required quantity, at an acceptable cost.

This is why I have been examining [Carester SAS](#), the privately held French rare earth processing and engineering company led by Frédéric Carencotte, and its Caremag subsidiary, which is building a separation and recycling refinery at Lacq in southwestern France. Its importance lies in the industrial function it proposes: converting several sources of rare earth bearing material into individual, high purity rare earth oxides.

My rule remains: **follow where value is added**. Carester deserves attention because it is addressing separation and purification, indispensable steps between a mineral discovery and a usable magnet material. But an investor must follow the chemistry as

carefully as the money. A refinery's capacity announcement matters only when its feed composition, recoveries, supply commitments, and customer requirements align.

What the Plant Is Supposed to Do

Carester's construction [announcement](#) describes annual processing of 2,000 tons of scrap magnets and 5,000 tons of mining concentrates, with startup targeted for late 2026. The project announced €216 million of financing. These are development commitments and design figures; they are not evidence of sustained commercial production.

The company's current plant page [specifies](#) 650 tons annually of mixed NdPr oxide, 150 tons of neodymium oxide, 500 tons of dysprosium oxide and 90 tons of terbium oxide. It gives purity targets above 99.5% for the light rare earth products and above 99.95% for Dy and Tb. Some other [announcements](#) use 500 tons of NdPr and 100 tons of Tb, giving a combined Dy/Tb headline of 600 tons rather than 590. I use the detailed 90 tonne Tb figure as the principal case and show the 100 ton alternative where it matters.

A further detail on that plant page changes the interpretation of the entire calculation. Its primary feed metric is [labeled](#) **REO equivalent of mining concentrates processed**. Consequently, the 5,000 ton figure should be assessed on an oxide equivalent basis, rather than automatically treated as 5,000 tons of gross material crossing the weighbridge.

Five thousand tons of contained rare earth oxides may be delivered as a larger mass of carbonate, hydroxide, mineral material, water, and impurities, depending on the product's composition and moisture content. This distinction corrects the earlier inference that Caremag's gross shipments must average

roughly 12% Dy/Tb oxides by weight. The calculation establishes the required Dy/Tb share of the rare earth oxide basket; determining the gross shipment assay still requires a product specification.

Recycling Cannot Carry the Heavy Rare Earth Production Target

NdFeB magnets are concentrated sources of neodymium and praseodymium. Their dysprosium and terbium content varies with grade, age and manufacturing method. The presence of a recycling circuit therefore tells us little about Dy/Tb output until we know what magnets it will receive.

For this calculation, I assume that all 2,000 tons are actual magnet material or magnet manufacturing residues with the stated assays. If the purchased stream contains whole assemblies, coatings, moisture, or other dilution, less Dy/Tb is available per ton. I also assume 90% overall recovery into saleable oxide. That is a sensitivity assumption, not a verified Caremag operating recovery.

The conversion factors are 1.1477 tons of Dy_2O_3 per tonne of contained Dy and 1.1762 tons of Tb_4O_7 per tonne of contained Tb. The earlier terbium calculation understated this factor. Tb_4O_7 contains about 85.0% Tb by weight; Dy_2O_3 contains about 87.1% Dy.

Illustrative magnet feed	Dy metal assay	Tb metal assay	Recovered Dy_2O_3 , t/y	Recovered Tb_4O_7 , t/y	Combined oxides, t/y
Low HREE	1.00%	0.05%	20.7	1.1	21.7
Measured sample case	2.92%	0.33%	60.3	7.0	67.3

HREE rich mix	5.00%	0.50%	103.3	10.6	113.9
Extreme sensitivity case	10.00%	1.00%	206.6	21.2	227.8

The middle case uses a composition measured in a published [end-of-life magnet study](#). It is a useful example, but one experimental sample cannot establish the average assay of a European collection system. The other compositions are illustrative assumptions, not claimed Caremag procurement grades.

At the measured sample composition, 2,000 tons contain 58.4 tons of Dy and 6.6 tons of Tb. After conversion and the assumed recovery, they yield about 67.3 tons of combined oxides, 11.4% of the 590 ton target.

Even the extreme case produces only about 253 tons before losses, or 228 tons at 90% recovery. It is an intentionally favorable sensitivity case, not a physical upper bound on every possible scrap material. It still falls far short of Caremag's advertised output.

Under these feed assumptions, the conclusion is unavoidable: the announced Dy/Tb output depends principally on primary or chemically processed feed. Recycling can contribute meaningfully and may be particularly important for NdPr. It cannot be assumed to supply the heavy rare earth nameplate.

There is also a commercial question. A recycler seeking unusually Dy/Tb rich magnets must secure that material repeatedly and pay for its contained value. A richer feed improves the mass balance; it does not automatically improve the margin.

Working Backward From the Products

At 500 tons of Dy_2O_3 and 90 tons of Tb_4O_7 , the finished products contain approximately 435.7 tons of Dy and 76.5 tons of Tb: 512.2 tons of combined elements.

Without any recycling contribution, and at 90% primary feed recovery, Caremag needs 655.6 tons of incoming Dy/Tb oxide equivalent. That is 13.11% of a 5,000 ton REO equivalent primary basket.

With the measured sample recycling case, the primary side must supply 439.7 tons of finished Dy_2O_3 and 83.0 tons of finished Tb_4O_7 . Dividing each by 90% gives the following requirement:

Primary feed requirement	90 t/y Tb product case	100 t/y Tb product case
Incoming Dy_2O_3 equivalent	488.5 t/y	488.5 t/y
Incoming Tb_4O_7 equivalent	92.2 t/y	103.3 t/y
Combined incoming oxide equivalent	580.8 t/y	591.9 t/y
Dy/Tb share of 5,000 t/y REO basket	11.62%	11.84%

Using low HREE scrap raises the combined requirement to about 12.63% of the primary REO basket. Using the HREE rich case lowers it to about 10.58%, on the 90 ton Tb basis.

Thus, a reasonable range for these scenarios is roughly **10.6–12.6% Dy/Tb oxide equivalent within the incoming primary rare earth basket.**

If a physical chemical concentrate contains 50% TREO, an 11.62% Dy/Tb share of that TREO corresponds to about 5.81% Dy/Tb oxide equivalent in the gross dry material. At 80% TREO, it

corresponds to 9.29%. The same oxide equivalent throughput can therefore mean very different shipment tonnages.

The chemistry supports procurement of HREE enriched feeds. It does not, by itself, establish that every shipment must be a partially separated HREE concentrate. Nor does it establish the plant's permissible physical throughput, dissolution load or impurity tolerance. Those require the actual design basis.

Brazil: A Substantial Contract, With a Substantial Timing Qualification

[Brazilian Rare Earths Limited](#) (ASX: BRE | OTCQX: BRELY | OTCQX: BRETF) has a binding ten year [agreement](#) under which Carester will purchase its SEG+ heavy rare earth production, subject to a ceiling of 150 tons annually of **contained Dy plus Tb**. Its planned Camaçari refinery would produce separated NdPr locally and a mixed heavy rare earth product for further processing. Carester also supplies engineering and commissioning assistance.

The 150 ton ceiling is an elemental quantity. Depending on the Dy/Tb split, it represents approximately 172–176 tons of oxides before Caremag losses. At BRE's projected oxide proportions, it is about 172.8 tons. At 90% recovery, the corresponding finished output is about 155.6 tons: 26.4% of a 590 ton Caremag target, or 25.9% of a 600 ton target.

That corrects the earlier direct division of 150 by 600. Elements and oxides are different accounting units.

BRE's August 2026 study [projects](#) first production in 2031. Its first five run rate years show 229 tons of Dy oxide equivalent and 45 tons of Tb oxide equivalent annually within its HRE+ product; life-of-mine averages are 205 and 40 tons. Those are contained oxides in an intermediate, not proof of already

separated commercial Dy/Tb production. The stated 2,502 ton first five year HRE+ quantity is also on a contained REO basis.

The first five year basket therefore contains about 10.95% Dy/Tb oxides: 274 divided by 2,502. That is close to our reconstructed Caremag requirement and supports the industrial logic of the arrangement. It does not make BRE a source for Caremag's initial late 2026 or 2027 ramp.

Strange Lake: Major Potential Supply, Undisclosed Allocation

Privately held [Torngat Metals](#) has signed a ten year [agreement](#) to supply Caremag with a partially separated HREE stream containing Dy and Tb once operational. This is direct evidence of the finishing refinery model.

A project [presentation](#) gives prospective annual production of 540 tons of Dy oxide and 80 tons of Tb oxide, or 620 tons combined. These are project scale targets, not disclosed Caremag deliveries.

The combined total exceeds Caremag's combined output target, but the individual element balance does not. Strange Lake's projected 80 tons of Tb would fall short of either 90 or 100 tons, even if its entire projected output were available and no additional finishing loss occurred.

For illustration, if Caremag received an intermediate containing 540 tons of Dy_2O_3 equivalent and 80 tons of Tb_4O_7 equivalent, and recovered 90%, it would produce 486 tons of Dy oxide and 72 tons of Tb oxide. Actual accounting must establish whether the published Torngat targets already include the downstream finishing recovery; otherwise, we risk applying the same loss twice.

[Reports](#) place prospective operation around 2029–30. The material therefore belongs in a future supply scenario, rather than an assumption about the initial startup feed.

The plausible sequence is beneficiation at Strange Lake, hydrometallurgical processing in Quebec, production of a partially separated HREE intermediate, and final separation at Lacq. Exactly how much Y, SEG or other rare earths is removed before shipment is not disclosed in the agreement. We should not turn a plausible reconstruction into an invented flowsheet.

Most importantly, the public agreement does not disclose Caremag's annual allocation. Adding Torngat's whole projected output to BRE's contract ceiling and calling the result secured supply would overstate what has been demonstrated.

Serra Verde and Round Top: Ownership Is Not a Feed Allocation

[USA Rare Earth, Inc.](#) (Nasdaq: USAR) links Carester to Serra Verde in Brazil, Round Top in Texas and Less Common Metals. Its July definitive agreement [announcement](#) describes access to feedstock from Serra Verde and Round Top, alongside access to Carester oxides. The October 1 [disclosure](#) says the Serra Verde combination has closed, while the Carester investment remains pending closing. Definitive agreements should therefore not be described as a completed Carester equity investment.

USAR's April presentation [estimates](#) 2027 Serra Verde derived production equivalent to 164 tons of separated Dy oxide and 29 tons of Tb oxide, assuming 95% MREC to oxide recovery. Reversing that assumption implies about 172.6 tons of Dy oxide equivalent and 30.5 tons of Tb oxide equivalent in the MREC.

If all that contained material were routed through Caremag at

our assumed 90% recovery, it would yield approximately 155.4 tons of Dy oxide and 27.5 tons of Tb oxide. This is an allocation scenario, not a disclosed Caremag delivery commitment. Serra Verde's existing offtake arrangements must also be respected; ownership alone does not establish freedom to redirect its output.

Its mixed carbonate could be accepted directly if the plant is designed for that basket, or upgraded before final HREE separation. The public information reviewed does not establish a mandatory upstream upgrading sequence.

Round Top likewise remains a prospective feed source. We cannot assign it a useful Caremag Dy/Tb tonnage without a demonstrated production schedule, product assay, recovery, and contractual allocation.

The Terbium Balance Needs Its Own Calculation

Combined Dy/Tb totals can conceal a Tb shortage. Caremag's Dy-to-Tb oxide ratio is 5.56:1 using 90 tons of Tb, or 5:1 using 100 tons. Strange Lake's projected ratio is 6.75:1; the Serra Verde estimate is about 5.66:1; our measured sample recycling case is about 8.63:1.

Consider a blend using our common recovery basis. Recycling supplies 60.3 tons of Dy oxide and 7.0 tons of Tb oxide. The modeled Serra Verde contribution supplies 155.4 tons and 27.5 tons. The remaining Dy requirement is 284.3 tons.

At Strange Lake's ratio, enough intermediate to fill that Dy requirement supplies approximately 42.1 tons of finished Tb oxide, assuming equal Dy and Tb recoveries. The blend then produces 500 tons of Dy oxide but only about 76.6 tons of Tb

oxide. It leaves a Tb shortfall of approximately 13.4 tonnes against the 90 tonne target, or 23.4 tons against 100 tonnes.

This does not prove the need for a new Tb rich source. Caremag could process additional feed, produce more Dy than the nominal figure, stockpile an intermediate, use different recoveries, or operate different campaigns. But an exactly matched product slate requires an explanation.

BRE's projected Dy/Tb oxide ratio, about 5.09:1, is relatively richer in Tb than the other illustrative streams. Whether BRE or Malaysian material closes the balance depends on delivered quantities and assays. Geography cannot substitute for chemistry.

Malaysia: an Important Unknown

Carester's partnership with privately held Malaco Mining includes proposed extraction and separation work in Malaysia. Reporting [describes](#) a Perak plant with capacity for 13,000 tons of raw rare earth feedstock annually, alongside prospective feed sites and ongoing environmental approvals. The proposed outputs include refined concentrates and NdPr, Dy and Tb oxides.

That 13,000 tonne figure cannot be compared directly with Caremag's 5,000 tons of REO equivalent processing without establishing its basis. Nor can it be converted into Dy/Tb supply without the recovered rare earth distribution.

A plausible route is IAC leaching, recovery of a mixed rare earth product, Malaysian processing and shipment of an agreed product to France. It could include an HREE intermediate. The evidence does not establish that Malaysia will supply a deliberately Tb enriched stream, or how much Caremag will receive.

I want five figures: actual recovered Dy and Tb assays, annual recovered REO production, upstream recoveries, the composition of the exported intermediate, and Caremag's committed allocation. Until then, Malaysia remains an important unquantified variable.

Lindian: Distinguish the Mine From the Processing Platform

[Lindian Resources Limited](#) (ASX: LIN) [announced](#) a September 2026 agreement for Carester to purchase 70% of its SEGH production from the Kazakhstan processing platform, with a right of first refusal over 70% of MHREC production. The arrangement also covers development work for an 8,000 ton REO annual separation facility. These percentages do not specify annual contained Dy/Tb deliveries.

The earlier Kangankunde sensitivity used 12,500 tons of concentrate at 55% TREO and a Dy/Tb oxide share of 20 divided by 21,900. On those inputs, the arithmetic is 6.28 tonnes of contained Dy/Tb oxide equivalent; 70% is 4.40 tons before Caremag losses, or 3.96 tonnes at 90% recovery. This is an illustrative calculation using the earlier resource average assumptions, not a verified commercial concentrate assay or whole platform production forecast.

The broader conclusion must be qualified. Lindian's disclosure envisages additional Kazakhstan and third party feed, and specifically refers to HREE feedstock. A low HREE monazite calculation cannot cap the supply potential of a processing platform accepting other sources. The missing quantity is the contracted, recoverable Dy/Tb content of its actual feed program.

Japan is securing the output

JOGMEC and Iwatani Corporation (TSE: 8088) [committed](#) up to €110 million in equity and debt through their joint vehicle, alongside a long term agreement securing 50% of Caremag's heavy rare earth production for Japan. This connects financing to a destination market.

If full nameplate were achieved and the agreement applied proportionally to Dy and Tb, that share would correspond to about 250 tons of Dy oxide and 45–50 tons of Tb oxide annually. That is an illustrative allocation, not a newly disclosed element specific contract quantity.

Japan is supporting the processing step and securing its output. Other countries can supply the feed. This is a serious model for diversification: place industrial functions where there is competence and connect them through enforceable commercial arrangements.

The chain still continues beyond oxides. Metal and alloy production, magnet manufacturing and OEM qualification remain necessary. An oxide purity figure does not establish customer qualification; impurities, consistency, shipment history and reproducibility matter.

The Reconstructed Industrial Model

My interpretation is that Caremag is being built as a central separation and purification refinery with a magnet recycling feed circuit and a primary feed circuit that can receive different rare earth intermediates.

For magnets, the likely sequence is preparation, chemical extraction or dissolution, rejection of iron and other

constituents, recovery of a rare earth bearing solution, individual separation, precipitation and calcination. For primary feeds, the entry steps depend on whether the material is carbonate, hydroxide, or another chemical or mineral concentrate. Some suppliers perform substantial upstream processing; others may supply a broader mixed product.

This is a functional reconstruction, not a disclosure of Carester's proprietary reagents, acid system, circuit arrangement or extraction stage count. Different feeds might require separate conditioning or campaigns before entering common downstream equipment. It would be premature to assume every feed goes directly into one standardized solution.

The industrial advantage is specialization. Reject bulk material upstream where appropriate; perform difficult final separation where the expertise and infrastructure exist. Carester's engineering relationships may help align supplier products with its own refinery requirements. But those relationships also link Caremag's utilization to the financing, construction and operating performance of several other projects.

A ten year supply agreement does not make the supplier operate sooner. Government support cannot suspend economic reality. Working capital, feed payability, reagents, waste handling, energy, recovery losses and customer acceptance will determine the economic result.

Capacity, Startup, and the Question Still Unanswered

The investigation establishes an industrially plausible network. It does not yet establish a fully supplied startup or a fully allocated mature state mass balance.

BRE's modeled commercial production begins in 2031. Strange Lake is prospective later decade supply. Malaysia remains unquantified. Kazakhstan's broader feed program needs assays and annual delivery commitments. Serra Verde provides a nearer term operating source, but its Caremag allocation and contractual routing cannot be assumed. Recycling contributes according to the material actually purchased.

Consequently, the proper question is what Caremag plans to produce during each ramp up year, from which contracted feeds, with what recoveries and customer qualified yields. A late 2026 commissioning date does not promise immediate production of 500 tons of Dy oxide and 90–100 tons of Tb oxide. The absence of a public feed reconciliation is not proof that the business plan fails; it means the public record does not yet establish the result.

I regard Carester as a company addressing a real industrial bottleneck. The appropriate test is whether it can turn its engineering competence, financing, and commercial relationships into sustained shipments of qualified material at a competitive cost.

The decisive open issue is the **actual feed specification and design basket for Caremag's 5,000 ton REO equivalent primary circuit**. What physical product forms will it accept? What are the required TREO concentration, moisture basis, individual Dy and Tb assays, other rare earth distributions, impurity limits, and radiological limits? What recoveries and simultaneous product outputs were assumed? And which committed deliveries meet those specifications during startup and full operation?

My question to Frédéric Carencotte is therefore: **Will Carester disclose the REO accounting basis and target individual element composition of its primary feed basket, the acceptance**

specifications for each supplied intermediate, and the contracted feed schedule that supports both its dysprosium and terbium production targets? That answer would allow us to complete the flowsheet reconstruction and distinguish announced capacity from a demonstrably supplied refinery.