Energy Fuels' First 99.9% Dysprosium Oxide Production Marks a U.S. Milestone

written by Jack Lifton | August 22, 2025

Yesterday's announcement that Energy Fuels Inc. (NYSE American: UUUU | TSX: EFR) has produced **a kilogram of 99.9% pure dysprosium oxide** at its White Mesa Mill in Utah marks a milestone in American process engineering history. It's the first time that a substantial **pre-commercial quantity of dysprosium oxide at such high purity** has ever been produced in the United States.

Additionally, the demonstration-scale solvent extraction (SX) system used to produce this material was designed and built in-house by American chemical process engineers. The team leveraged their own experience with solvent extraction technology and their prior design of the first in-house, commercial-scale light rare earth separation system built in the United States since the 1980s. In other words, Energy Fuels independently revived U.S. rare earth separation capabilities that had not been seen domestically in decades.

Before anyone argues that MP Materials Corp. (NYSE: MP) achieved this first, it's important to note key differences. MP Materials has indeed signaled plans for heavy rare earth production, but the details of any dysprosium oxide output from MP remain unknown – no publicly disclosed volume, purity, or specific separation method (solvent extraction or otherwise) has been reported. **In fact, Energy Fuels is *the first* U.S. company to publicly produce high-purity Dy and reveal actual production quantities, underscoring the uniqueness of this milestone.** (MP's Project Phoenix SX facility at Mountain Pass – originally built

by the prior Molycorp — was designed for large-scale light rare earth separation, not the mid/heavy elements like Dy/Tb, and it's unclear if or how it has been repurposed for heavies.)

Besides Energy Fuels and MP Materials, several other U.S. companies have recently announced "first-time" dysprosium or terbium production — **but none have prior rare earth separation experience via solvent extraction**. These efforts may be relying on older, legacy ion-exchange techniques (dramatically uneconomical at scale) to generate a lab sample, amounting to little more than share-price–boosting announcements. In short, *no other* announced U.S. heavy rare earth effort so far has demonstrated the scale, grade, or modern processing approach that Energy Fuels has with its White Mesa pilot run.

The Heavy Rare Earth Feedstock Problem

Notwithstanding Energy Fuels' technical achievements, the overriding issue for building an American high-coercivity magnet supply chain is the **lack of heavy rare earth feedstock**. Dysprosium and terbium — critical for high-temperature magnets in EV motors, wind turbines, and defense systems — are **not currently mined in any significant quantity in the U.S.** MP Materials' Mountain Pass mine, for example, is rich in light rare earths (NdPr) but contains negligible Dy/Tb. This means that even if domestic separation capacity is developed, **secure sources of Dy/Tb-bearing ore or concentrate are needed** to supply those facilities. In the absence of a domestic mine yielding heavy rare earths, U.S. companies will need to import heavy-enriched feedstock (e.g. from allies or byproducts of mineral sands) to produce the full range of magnet materials. Solving this feedstock gap is essential to truly establish a self-sufficient U.S. supply of heavy rare earth oxides.

Lynas’ Heavy Rare Earth Production and U.S. Plans

It’s worth noting that Lynas Rare Earths Ltd. (ASX: LYC) has also made significant strides in heavy rare earth separation *outside* the United States. Lynas commissioned a new heavy rare earth separation circuit at its Malaysia plant in early 2025 and successfully produced its first dysprosium oxide there in May, followed by terbium oxide in June. This marks Lynas as *the world’s only commercial producer* of separated heavy REEs outside of China. The initial output in Malaysia was achieved by using residual heavy-enriched material from Lynas’s large light-REE separation process as feed for the heavy RE circuit – effectively tapping into the previously unseparated Dy/Tb fraction of Mount Weld’s ore.

Looking ahead, Lynas is constructing a heavy rare earth separation facility in Texas, supported by the U.S. Department of Defense. Feedstock for the Texas plant will come from Lynas’s Mt Weld mine in Australia, via intermediate products shipped from Australia’s processing facilities. Once operational (targeted by around 2026), this Texas heavy RE plant will become a domestic American source of mid-range and heavy rare earth oxides. In essence, Lynas’s U.S. facility will supply dysprosium, terbium, and other heavy rare earths on American soil – though the raw material will still be mined overseas. This will greatly bolster U.S. supply chain resilience, but it also underscores that *for now, heavy REE mining remains abroad*.

Energy Fuels’ Donald Project: A Rich Heavy REE Source

However, Energy Fuels is planning to change the heavy feedstock

equation through its **Donald project in Australia**. The Donald mineral sands deposit (located in Victoria, Australia and jointly owned with Astron Corp. (ASX: ATR) is now a development priority for Energy Fuels. Importantly, Donald's ore contains both monazite and **xenotime**, with exceptionally high concentrations of heavy rare earth elements in the xenotime fraction. In fact, Energy Fuels has noted that the Donald Project is *one of the richest known sources of heavy rare earths in the world* in terms of dysprosium and terbium content. For perspective, a rare earth concentrate from Donald is expected to contain around 0.37% Tb and 2.15% Dy (on a TREO basis) – orders of magnitude higher heavy-element content than typical light-REE deposits.

Energy Fuels holds rights to offtake all monazite and xenotime from Donald, meaning once the project comes online, that heavy-enriched concentrate can be shipped to the White Mesa Mill in Utah for processing. At full planned Phase 1 production (~7,100 tonnes of concentrate per year), the Donald Project could yield approximately 16 tonnes of terbium oxide and 92 tonnes of dysprosium oxide annually. These volumes would represent a significant portion of current U.S. demand (about 23% of Tb and 34% of Dy requirements), and far exceed any other potential domestic source. Both Lynas and Energy Fuels have proven track records in designing and operating solvent-extraction separation systems in-house, so they are uniquely positioned to handle such materials where others have yet to gain experience.

When Donald's monazite/xenotime output begins flowing to White Mesa (potentially by 2027, pending a 2025 production decision), **Energy Fuels will become the largest U.S.-based producer of high-purity dysprosium and terbium oxides** ready for conversion into metals and permanent magnets. This integration of a rich heavy-REE resource with established domestic processing capacity could make Energy Fuels a cornerstone of America's emerging rare

earth magnet supply chain – providing the critical heavy rare earth ingredients that have long been the missing piece in U.S. manufacturing independence.