

Trilateral Conference  
October 12, 2017  
Pittsburg, PA

# **Creating A U.S. Based Multi-National Resource & Fully Integrated Rare Earth Value Chain Impervious to Chinese Monopoly Influence**

Outlining the Justification & Mechanics of a Proposed  
Multi-National Solution

Currently Under Consideration By the Office of The  
President of the United States by Executive Order

# No Nation Outside of China is Pursuing a Rational or Viable RE Policy

Developing new mining resources is pointless on many levels:

- 1) Chinese monopoly pricing dictates the economic viability of any new mine, recycled materials or REs extracted from coal
- 2) These RE Concentrates & Oxides have no significant economic application until they pass through a value adding process
- 3) China has the only fully integrated RE value chain with available capacity (current Chinese pricing history suggests near-zero or below zero margins for non-Chinese producers)
- 4) Developing non-Chinese resources to feed into China's value chain only strengthens China's monopoly
- 5) It is unnecessary, as high value heavy RE resources are abundant and available (more on this later)

# Developing a Traditional RE Value Chain Outside of China is Economically Implausible

No single company, industry or government can set up a fully integrated RE value chain that is free of Chinese monopoly pricing power at the **resource level**, or the **value chain level**,\* as:

- 1) The economic viability of non-Chinese resource producers continues to remain uncertain and ultimately under China's control
- 2) The capital requirements for developing a value chain run at least 5 times the capital requirements of resource production and will remain subject to the viability of non-Chinese resource producers

\*Metallurgical, alloy, magnet, garnet, or other value added RE materials

# Competing With China On Price Requires On-Scale Value Chain Development

The cost of a fully integrated value chain with competitive efficiencies of scale would

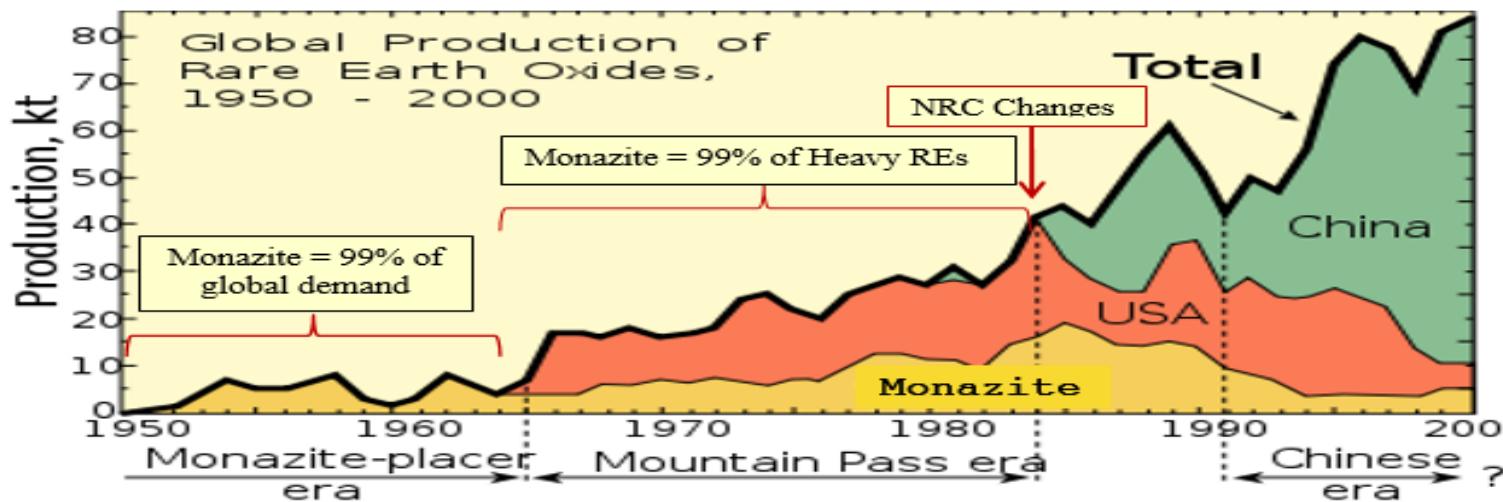
- 1) exceed the demand of any single company, industry or national economy\*
- 2) China would have monopoly pricing power over any such RE value chain producer (and its resource suppliers)
- 3) And any such value chain would always be subject to customer defection for Chinese materials sold below production cost (domestic or Chinese)

Chinese internal consumption of value added RE products significantly exceeds the rest of the world combined

# Uninterruptable Resource Supply is Foundational to any Solution

Oddly enough, this can easily be achieved within a structured solution

Historically 100% of the world's heavy rare earths were the byproduct of some other commodity



Molycorp never produced a single gram of heavy lanthanides or a commercial quantity of Yttrium oxide in its entire operating history. Its primary business was the sale of Lanthanum to the petroleum industry. It was never a key supplier to the tech metals industry

# Uninterruptable Resources

Existing and operating mines continue to extract these resources but they dispose of them to avoid 1980 NRC & IAEA regulatory changes that terminated the supply of this material and ultimately resulted in the transfer of the RE industry to China

The regulatory change subjected all NRC / IAEA regulated mining operations to the “source material” standards originally devised for the Uranium mining industry: defining source material as any refined or processed ore with a Th/U content of .05% or more

Consequently all heavy RE byproduct ore was classified as source material primarily due to the companion element Thorium

# Resource Abundance

In the U.S. alone less than 20 operating mines could produce the equivalent of 85% of global RE demand with heavy RE distributions at 3 times current Chinese production

The economic viability of these diverse producers would be independent from RE pricing

Recovery is proven and low cost

To bring these materials into a value chain requires a solution to the Thorium problem but does not resolve the larger value chain issue

# A Structured Solution

The larger issue is the establishment of a fully integrated value chain that can operate on-scale with Chinese pricing

This requires a massive capital investment, far too large for any one company or industry

And would require firm off-take commitments across many industries, across many borders

And a solution to the Thorium problem to re-establish the flow of RE byproducts (with no direct mining cost)

The fully integrated value chain part of the structured solution establishes a privately funded\* and operated cooperative – owned and controlled by its multi-national end-user members

In exchange for direct investment and firm off-take commitments the cooperative would provide value added RE materials in accordance with the cooperative owners needs on an ‘at cost’ basis.

All surplus would be sold to non-owner end-users at ‘market’ prices

\*Some level of direct investment from various leading governments may be required to induce private investment.

This structured solution would be impervious to Chinese manipulation and pricing

All thorium and other actinides would be transferred to a ‘Thorium Bank’ that would provide safe long-term storage and act as a multi-national platform for the development of “uses and markets for thorium, including energy”

The Thorium Bank would conform with all NRC & IAEA regulations

# Proposed Executive Order

## How Is This Proposed Solution Structured

The structure is simple. The Executive Order would create a Federally chartered:

- A. Rare earth cooperative
  - 1) to operate as a fully integrated RE value chain
- B. Thorium Corporation
  - 2) to provide long term safe storage and develop uses and markets for Thorium, including energy

Both would be privately owned and funded multi-national entities. The cooperative would act as a ‘public utility’ for all technology sector members

# Multi-National Rare Earth Cooperative

Completely Insulated From Chinese Monopoly Pricing



REEs from Coal



Multiple RE Suppliers – RE is currently treated as waste



RE Refinery Co-op / oxides, metals, alloys, non-IP magnets, etc.

Thorium liability

The Th-Bank assures that Thorium is no longer released into the environment



The Cooperative is Funded by Owner-Operators-End-Users

Japanese, EU & U.S. Technology Companies  
N.A.T.O Member States



U.S., Japanese, EU & other Government Entities

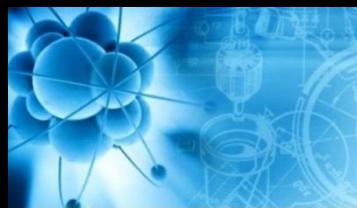


Thorium Bank holds all Actinide liabilities and acts as a multi-national platform for the international development of Thorium energy systems & other industrial uses for Thorium

RE end-users own/control the Co-operative and are guaranteed proportional off-take 'at cost'.

# Thorium Storage | Energy | Industrial Products

## Safe Storage



Energy

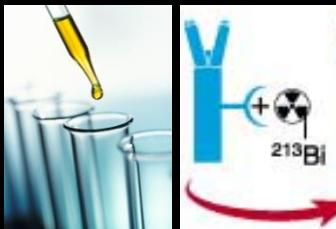


Bank

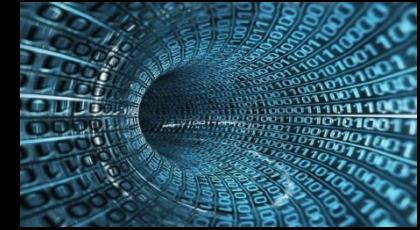
Storage | Energy | Industrial Products



## Energy Systems



## Industrial Uses



Computing & Electronics



Advanced Alloys

A multi-national corporation to develop uses and markets for Thorium, including energy

End of Presentation

History of Policy Failure: Notes on 1980 NRC / IAEA Regulations  
and outline of the nature and structure of China's RE monopoly

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# More Detail on 10 CFR 40, part 75: The regulatory change that killed the U.S. rare earth industry

10 CFR 40, and the corresponding IAEA regulations, define any ‘processed or refined material’ with thorium and or uranium concentration above .05% as “source material”. These regulations regarding source material were originally only applied and enforced within the uranium mining and processing industry. In 1980 the NRC implemented part 75 of 10 CFR 40 to mirror similar regulatory changes under the IAEA’s regulatory regime. The application of part 75 brought all mining operations and material processing under 10 CFR 40 or its IAEA counterpart.

In nature heavy rare earths and thorium are companion elements. Historically global heavy rare earth production was typically a byproduct of some other commodity or came from thorium rich deposits. As a result of part 75 of 10 CFR 40, and its IAEA counterpart, every heavy rare earth producer outside of China met the technical definition of a source material producer.

Why No Alarm Regarding Regulatory Change ? Byproduct producers and domestic value chain consumers of these materials never informed regulators or Congress of the problem because both entities had concerns over the potential liabilities associated with decades of unregulated thorium disposal. Self preservation required silence.

Technical Notes: To conform with state and federal environmental regulations and not exceed the threshold standards of the NRC these mining operations devised various processes to dilute the thorium bearing rare earths below threshold and background radiation levels. This costly diversion continues today even though these materials are easily recoverable at little or no cost (less cost than the existing dilutive process).

Even light rare earths, like those found in Molycorp's Mt. Pass deposit, contain low levels of thorium. For the record, it was a thorium spill that caused Mt. Pass to shut down in 1998, not lower cost rare earth products from China: a key feature of the dominant narrative.

# **China's Monopoly was built on U.S. & International Regulatory Blunders – Nothing More**

In 1980 the Nuclear Regulatory Commission (NRC) and the International Atomic Energy Agency (IAEA) agreed to apply “source material” regulations, specific to the uranium mining industry, across the entire mining industry. The U.S. regulatory change was part 75 of U.S. 10 CFR 40 regulations (for more detail see pages 31 – 33).

The NRC / IAEA regulatory term, “source material”, defines any processed or refined material with a thorium / uranium concentration above .05% as an input for nuclear fuel. Due to the application of this NRC / IAEA rule on all mining companies, in all IAEA member state, the production of all heavy rare earth resources outside of China were indiscriminately defined as “source material”.

Note: Heavy rare earths are always associated with thorium or uranium, with the exception of Ionic Clays that are exclusively mined in China.<sup>7</sup>

In order to protect their core businesses from NRC and IAEA regulatory, compliance and liability issues these historical (mostly) byproduct producers of heavy rare earths terminated the sale of this byproduct.

These commodity producers diverted thorium rich rare earths back into the ground or into tailings storage facilities (and they still do).

This resulted in the eventual termination of all heavy rare earth production in the U.S. and all IAEA compliant countries.

Consequently all operating U.S. / E.U. rare earth value chain producers lost access to these critical domestic heavy rare earth sources.

China used this to its advantage, manipulating relative cost (via export taxes), supply security and an aggressive technology acquisition policy from the highest levels of the government.

The end result was that all rare earth resource mining and value chain production quickly shifted to China.

At the time of these regulatory changes rare earth applications were not wide-spread.

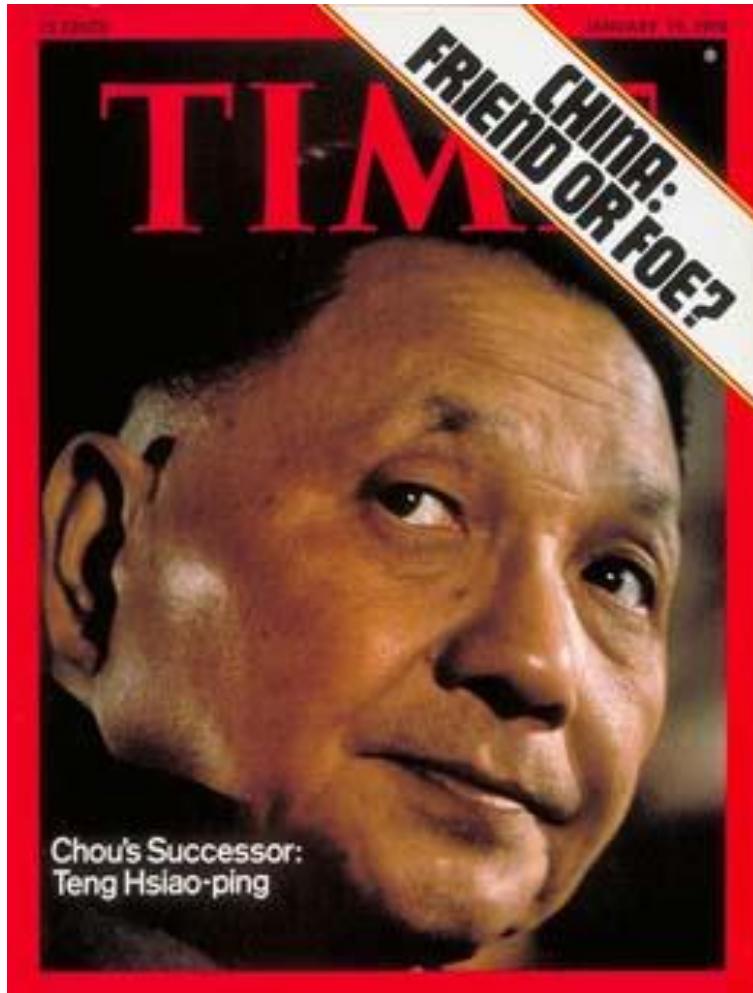
The understanding and utilization of RE metallurgy and magnet applications was nascent.

The list of U.S. / E.U. value chain technology leaders could be counted on one hand.

Few people in the U.S. fully grasped the potential for these materials.

# What Are We ‘Competing’ With ?

## China’s Official Policy: “All Civil is Military”



In 1997, the CCP formally codified the 16-Character Policy. The “16-Character Policy” is the CCP’s overall direction that underlies the blurring of the lines between State and commercial entities, and military and commercial interests. The sixteen characters literally mean:

- *Jun-min jiehe* (Combine the military and civil)
- *Ping-zhan jiehe* (Combine peace and war)
- *Jun-pin youxian* (Give priority to military products)
- *Yi min yan jun* (Let the civil support the military)<sup>14</sup>

### The PRC’s 16-Character Policy

軍 民 結 合  
平 戰 結 合  
軍 品 優 先  
以 民 養 軍

In 1997, the PRC formally codified Deng Xiaoping’s “16-Character Policy,” which literally means: Combine the military and civil; combine peace and war; give priority to military products; let the civil support the military.

Determined to control the global supply chain, China initiated an official policy to acquire rare earth assets at all levels of the value chain

Rare Earths were a top priority for the last 3\* Chinese Leaders, Deng Xiaoping, Jiang Zemin & Xi Jinping

Today China's value chain spans two cities, officially referred to by their government as "rare earth cities", with a combined population of 17 million people\*\*.

The Chinese RE value chain industry is made up of over 400 companies producing over 1,000 highly specialized products.

This is a government sponsored monopoly.

\*Deng = prog 863 & Magnequench / Jiang = prog 973 & Th-MSR program / Xi \$400M ownership in RE Tech

\*\*With over 100,000 registered PhD members in one of China's Professional Rare Earth Societies.

China has achieved monopoly control over all aspects of the RE industry: forcing all RE dependent technologies / industries to relocate inside China, aggregating global IP, manufacturing and jobs

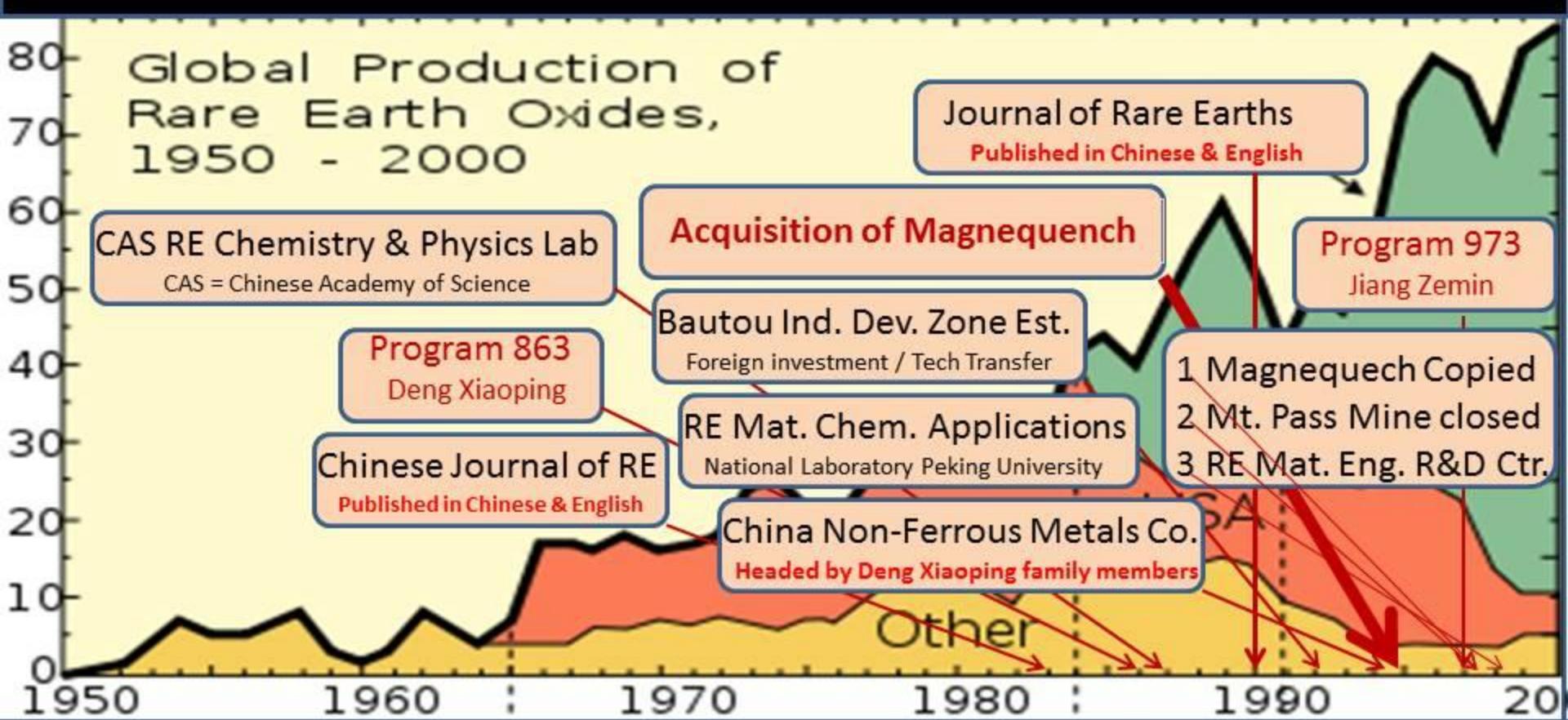


China boasts of two cities primarily committed to Rare Earth R&D, production, material science & commercial application

This monopoly strategy has already deeply compromised many of the world's defense contractors and military procurement supply lines

China's human commitment to rare earths is many times larger than the U.S. commitment to the Manhattan Project during the peak of World War II

The Chinese government, at the highest levels, implements state sponsored industrial policy, including government funded programs and targeted acquisition of 'western' technology. All programs were part of the public record.



The U.S. ignores this phenomenon, with Congress approving key technology transfers !

# Understanding China's Current-Day Monopoly

China employs a multi-leveled strategy of global hegemony over commercial & military production.

China's rare earth monopoly operates on 4 levels:

- 1. Mining: Basic Resource Production Monopoly**
  - 2. Value Chain: Integration Monopoly**
  - 3. Industry & IP Capture: Leverage & Control over All End-Users**
  - 4. Supplication & Resource Redirection**
- 

## **1. Mining: Basic Resource Production Monopoly**

- a. Mining REs without a supporting domestic value chain is pointless because RE concentrates & oxides are useless to technology & defense end-users
- b. Consequently, these RE resources would need to pass through China which has the world's only fully integrated value chain with available capacity
- c. Realistically, China will undercut western production costs, resulting in bankruptcies, as evidenced by Molycorp's bankruptcy and all other '*ongoing*' non-Chinese producers

## 2. Value Chain: Integration monopoly:

- a. Free market actors cannot be expected to establish any part of the value chain through independent action because the capital required is significantly higher than what is required for resource production (mining), and is at risk of bankruptcy through Chinese manipulation at the value chain level and indirectly through the resource supply level.
- b. China's value chain consists of over 400 companies that produce over 1000 ultra-high specification products spanning two cities, referred to by the Chinese government as '*rare earth cities*', with a combined population of 17 million people.
- c. Corporations are exclusively motivated by short term profits. Purchasing low cost Chinese value added RE materials lowers production cost. Relocating manufacturing operations to China results in higher margins (in the short-term).
  - i. Short term profit incentives for publicly traded companies outweigh long term consequences. This fuels China's aggressive mercantilist strategy of knocking off non-Chinese producers through relocation and the incremental capture of their technologies and industries
- d. China can bankrupt the value chain directly or bankrupt the resource supplier (the rare earth mine(s)): a two-tiered strategy.

### **3. Industry & IP Capture: Leverage & Control over End-Users**

- a. China is the only country that can guarantee an uninterrupted flow of value added rare earths.
- b. China uses its monopoly control over rare earths to incrementally capture non-Chinese technologies and manufacturing: first by capturing the production of rare earth dependent components, then component sub-assemblies, then product lines, then entire industries.
  - China has already captured much of the world's RE dependent technology and RE end-users because most of the world's leading technologies, consumer goods, commercial goods, industrial goods and defense systems are rare earth dependent.
- c. Now under China's control, China can use carrot-and-stick incentives to force these Chinese dependent companies to continue to use Chinese only value added rare earth products and prevent these companies from developing or supporting the emergence of alternative non-Chinese supply lines through the implied threat of supply disruption.
  - This threat is greatly compounded for defense contractors who may be utilizing Chinese materials without federally required 'waivers' to do so (a federal crime)
- d. As time goes on, China's relative position in all of the above increases. Eventually all rare earth related technology, IP and manufacturing ends up in China
  - Japan is the only exception, but they are losing ground to China
- e. Soon China's control over global technology, markets and economics will become unassailable as it continues to expand far outside the confines of rare earth related technologies, products and industries

# Supplication & Resource Redirection:

- a. China will eventually run out of rare earths, but before that happens,
- b. China's next play will be to make the rest of the world its resource supplier
- c. China will allow supplicant non-Chinese producers to feed China's rare earth value chain, but China will retain its monopoly at the value adding, metallurgy, component, system, product, industry and IP level.
  - Molycorp was an example of resource supplication, as it became a supplier to China's metallurgical value chain.
  - All new non-Chinese resource producers can be expected to follow the same strategy.

Without the direct sanction of China the potential viability of any stand-alone 'direct mining' RE project will suffer the same fate as Molycorp, or survive on subsidies like Lynas because:

***China is the world's value chain,  
China is the market and China sets price.***

For more information on these issues:

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