Rare Earth Elements in Alaska

TRADE OUR SALMON FOR "CLEAN" ENERGY?

Rare Earth Oxides courtsey of USGS

Summary

An all-but-forgotten uranium mine on Prince of Wales Island has is experiencing a renaissance of much of the hype and speculation for developing a domestic source for rare Earth Elements (REEs) is focused on a small deposit on Prince of Wales Island near Bokan Mountain.

If you have missed the rhetoric, China controls 97% of the world's supply of REE's and is restricting exports threatening the development of renewable energy and green technologies. Mining on POW is considered necessary to break China's control.

Read about an operating Rare Earth Element mine.http://www.kidela.com/stans-energy-corp/stans-energy-mining-licenses

This rhetoric is an over simplification of complex global markets, energy development and the creation of new technologies. It is being used as a tool to prop up destructive mining practices and mine profits rather than investing in recycling technologies and alternatives that promise to solve the rare earth supply problem permanently.

Rare earths are used in many of the new "green" technologies, from electric car batteries, solar panels and magnets in wind generators. China wants to be the world leader in manufacturing this technology and has threatened to cut exports to the U.S. This has lead to rampant speculation in developing a domestic rare earth source, most notably for Alaska, at Bokan Mountain. [Link to fact sheet, below].

Due to a very favorable exchange rate, cheap labor, and lax environmental standards, China flooded the market with cheap REE's until it drove out the competition and cornered the market. The Mountain Pass Mine in California, once the world's leading producer couldn't compete.

Rare earths are not rare. They are more abundant in the Earth's crust than copper, silver, lead and platinum. Although they are widely used in the latest technology, from flat screen televisions to missile guidance systems, most technologies require only very small amounts. The technical difficulties and amount of hazardous waste generated in separating and concentrating REEs from their ore is what makes them rare.

Mineral deposits containing Rare Earths are located all over the world. As global markets for rare earth's change, many other sources for rare earth elements are expected to open up.

Environmental Concerns

Rare Earth mining is a threat to the environment. REE mining is especially troubling. The difficulty and expensive process to separate them is also what makes them a potential for creating environmental disaster. REE's are associated with radioactive thorium, which is a waste by-product. One of the reasons the Mountain Pass Mine in California closed was due to a series of fines levied by the EPA for releasing radioactive water into the surrounding environment.

The rare earth deposit under Bokan Mountain on Prince of Wales is no exception.

In addition to the environmental damage from the mining process the concentration of REE from the ore requires a dozens of industrial steps. Many of these steps create acid and radioactive waste that needs to be contained, treated or shipped off site. Each deposit has a

unique chemical make-up and requires a unique processing procedure. **It is not yet known if the REE's at Bokan Mountain can be economically concentrated.**

The truth about REEs is that they present a quandary. They are used in many clean energy applications such as compact fluorescent bulbs, wind turbines and hybrid/electric cars, but they themselves are neither green nor clean. The promotion of mining new rare earths instead of promoting alternatives, recycling and reusing is short sighted and unsustainable. The supply problem of critical resources such as rare earths has less to do with the amount of the resource available and more to do with how we manage that resource.

Solving the Problem

Meeting our needs for clean energy technologies and other products that use REEs has less to do with the mining of new sources of REEs and more with how our society waste's energy and maintains a wasteful extract-use-throw away philosophy. Any new source of energy or new technology, no matter how clean or green it may be, will lead to negative impacts our clean air, water, and wild places if we apply this same wasteful philosophy. This is the reason other countries are investing in developing recovery and recycling technology, rather than subsidizing a dirty mining industry.

Cleaner Solutions

According to a recent report by the U.S. Dept of Energy (http://www.energy.gov/news/documents/criticalmaterialsstrategy.pdf) the solution to the scarcity of REE's is to develop other global supplies, explore substitutes and recycle and reuse what we already

have. The Dept of Energy report emphasizes investing in recycling and reuse technology to create a long term sustainable solution to the rare earth supply problem.

Other countries, most notably Japan and Germany, have approached the problem thoughtfully by investing in recycling technology and developing alternative technologies that use less REEs. Japan, who has been hit the hardest by the reduction in global REE supply, has started a program called **Urban Mining**. They estimate that there is 300,000 tons of REEs in Japanese landfills alone. Roughly twice the amount that may be found on Prince of Wales.

The only way not to encourage more dirty mining practices for new technology is to recycle and reuse those minerals.

Develop Other Domestic Sources in less Critical Areas

A recent report by the USGS (http://pubs.usgs.gov/sir/2010/5220/) rated possible domestic sources of REE's. The Iron Mountain deposit in Colorado contains an estimated 9,700,000 tons of REEs alone compared to 164,000 tons estimated at Bokan. **The Alaska deposit is less than 2% the size.** There are also larger deposits in California and Wyoming. None of these areas are in critical salmon habitat or where people gather their food.

REE Hype in Alaska

The deposit located near the former Ross Adams uranium mine, is being explored by Ucore Rare Metals. It is on the southwest corner of Prince of Wales Island. This deposit is the subject of House Resolution 16 - *Mining / Processing* of *Rare Earth Elements* passed last year through the Alaska State legislature. Although the deposit is unproven and uncertified, this resolution **calls for "expediting" the permit process** normally designed to mitigate any potential damage the mine might have intoct the water quality, wildlife or habitat.

Bokan Mountain

Thie area proposed for development is drained by Kendrick Creek and boarders Kendrick Bay. Kendrick Creek is listed as an important stream for the rearing and spawning of salmon by Alaska Fish and Game. Kendrick Bay is a significant commercial salmon fishery and is also heavily used for subsistence fish and shellfish gathering. The area is still recovering from decades of uranium mining that have contaminated Kendrick Creek and portions of Kendrick Bay with heavy metals and radioactive isotopes that are quickly moving up the food chain.

Proposals for new mining threaten to cause more contamination and increased danger to salmon populations and human health.

The truth about REEs is that they present a quandary. They are used in many clean energy applications such as compact fluorescent bulbs, wind turbines and hybrid/electric cars, but they themselves are neither green nor clean. The promotion of mining new rare earths instead of promoting alternatives, recycling and reusing is short sighted and unsustainable. The supply problem of critical resources such as rare earths has less to do with the amount of the resource available and more to do with how we manage that resource.

Conclusion

Long-term protection of water quality should not be sacrificed to satiate our continued rate of energy consumption. We should not be in a race to the bottom on environmental protection. When the United States takes a stand to protect its land from pollution, other countries follow.

The United States has long been the leader in protecting its natural resources and been the driving force to encourage other countries to do the same. Now we intend to be a world leader in clean energy technologies. Alaska can shape and benefit from policies and approaches that will provide truly clean, sustainable benefits to our citizens without destroying the values that make Alaska unique.

This is a great opportunity for the state to develop technical innovations to identify substitutes, encourage recycling and re-use as well as minimize the requirements for these key materials wherever possible. We should rely on the creative genius and entrepreneurial ingenuity of the business community and universities here in Alaska to meet this challenge without compromising our values. Long-term protection of water quality and our fisheries should not be sacrificed to satiate our continued wasteful energy use and disposable lifestyle.

Further Reading

Rare Earth Elements in U.S. Not So Rare (2010) Department of the Interior, U.S. Geological Survey at:

http://www.usgs.gov/newsroom/article.asp?ID=2642&from=rss_home

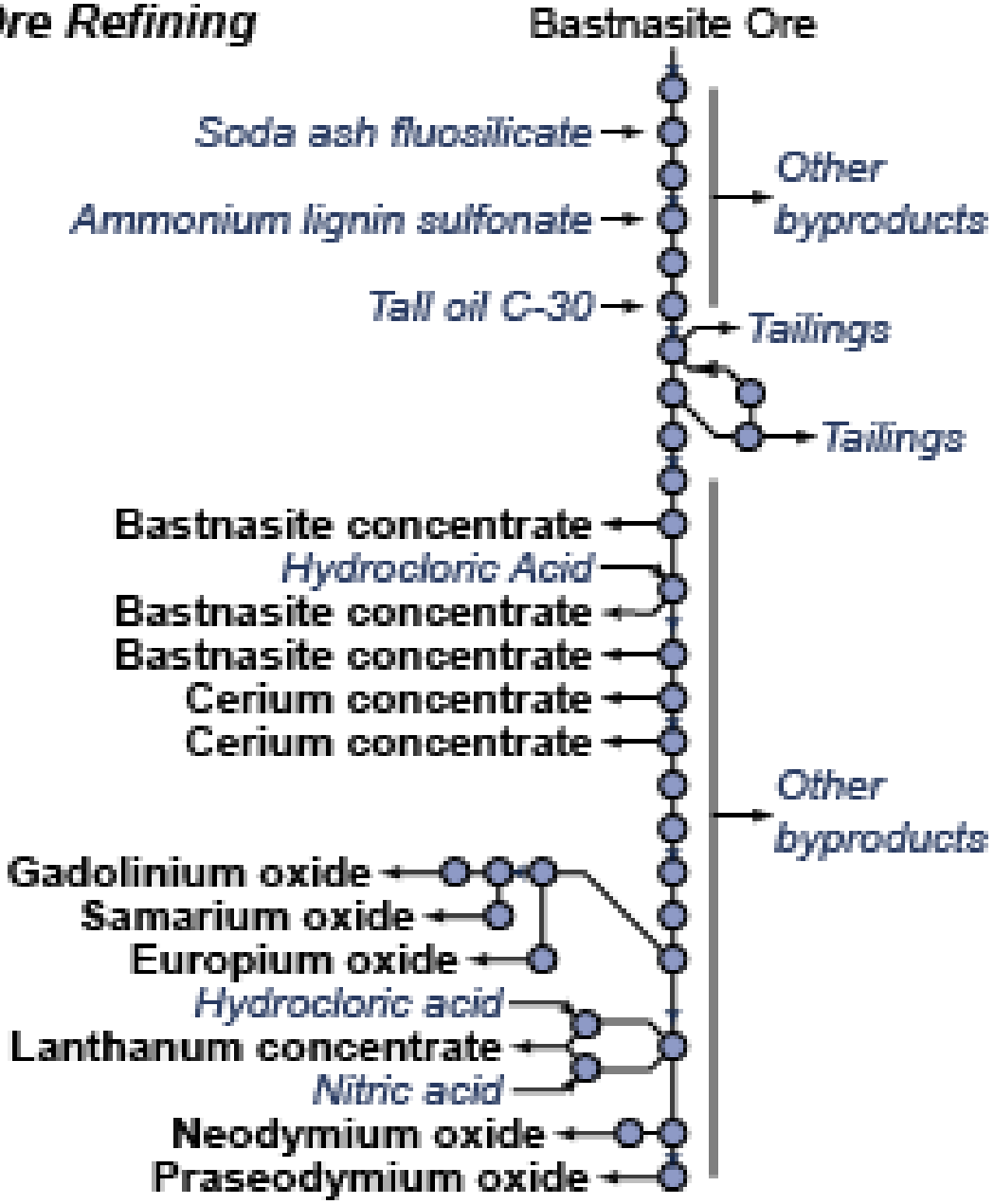
The Principal Rare Earth Elements Deposits of the United States—A Summary of Domestic Deposits and a Global Perspective U.S.G.S., (2010) at:

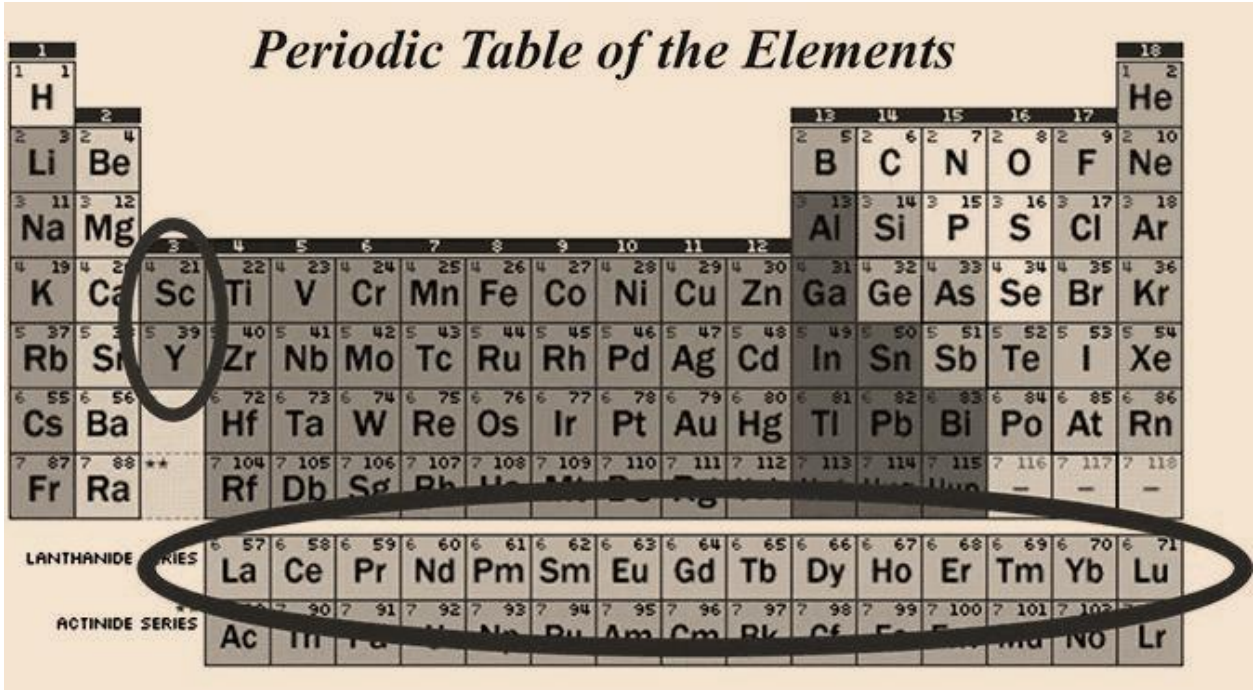
http://pubs.usgs.gov/sir/2010/5220/

Study on Rare Earths and Their Recycling, Final Report for The Greens/EFA Group in the European Parliament, (2011) at: http://www.oeko.de/oekodoc/1112/2011-003-en.pdf.


PRINCE OF WALES ISLAND
Labouchere Bay
Red Bay Lake
Salmon Bay Lake
Whale Passage
Kosciusko Island
Sarkar Lake
Coffman Cove
PRINCE OF WALES
CLARENCE STRAIT
Heceta I.
Thorne Bay
Shinaku Lake
No Name Lake
Noyes Island
Klawock
Klawock River
Salmon Lake
Karta Lake
Craig
Hollis
One Duck Lake
Baker Island
Suemez I.
Mellen Lake
Summit Lake
Hydaburg
Marge Lake
Bokan Mountain
ISLAND
Dall Island
Long I.
N
0 10 20 30 mi
0 10 20 30 km

33-Step Bastnasite Ore Refining




Periodic Table of the Elements
LANTHANIDE SERIES
ACTINIDE SERIES