Southeast Conference
Mid-Session Summit

Deantha Crockett, Executive Director
Alaska Miners Association
March 13, 2014
Alaska Miners Association
Over 1,500 members
Prospectors and Placer Miners
Large-scale mines
Vendors, suppliers
Seven statewide branches
Established in 1939
Alaska Mining

Importance of minerals in our lives
Landscape of Alaska’s mines
Why mine in Alaska?
Challenges to mining in Alaska
Opportunities for mining in Alaska
Minerals Make Life

iPhone

Why iPhone  Features  Design  Built-in Apps  App Store  iOS  iCloud  Tech Specs  Buy Now

iPhone 5

Loving it is easy.
That’s why so many people do.
Minerals Make Life

Broken-down Raw Materials of Worth in Your iPhone 5

- **Platinum**: 0.000012 oz., $0.02
- **Gold**: 0.0012 oz., $1.58
- **Aluminium**: 0.88 oz., $0.05
- **Silver**: 0.012 oz., $0.36
- **Copper**: 0.56 oz., $0.12
Did you know that without mining the bicycle would never have been invented? In fact, without mining, none of the everyday products we take for granted would exist. If you look beneath the surface, you’ll find that mining has something to do with everything.
Minerals Make Life

- Copper (bolts)
- Copper (sealing washers)
- Copper (lights)
- Copper (battery)
- Copper (head gasket)
- Copper (drive chain)
- Copper (spark plugs)
- Copper (connecting rods)
- Copper (crankshaft)
- Copper (sprockets)
- Copper (alternator)
- Copper (starter motor)
- Molybdenum (camshaft)
- Molybdenum (crankshaft)
- Molybdenum (sprockets)
- Molybdenum (lubricants)
- Copper (wiring)
lithium
barium
copper
magnesium
Minerals Make Life
"RELIABLE ACCESS TO CRITICAL MINERALS IS A MATTER OF BOTH ECONOMIC AND GEOSTRATEGIC IMPORTANCE TO THE UNITED STATES. ALTHOUGH CONCERN ABOUT ACCESS TO MINERALS WAXES AND WANES, IT IS RISING NOW DUE TO INCREASING DEMAND, NEW COMPETITORS CAPTURING LARGE MARKET SHARES AND OTHER TRENDS THAT DEFY EASY PREDICTION. THESE SAME TRENDS CAN INTERFERE WITH FOREIGN AND DEFENSE POLICY GOALS AND GIVE MINERAL SUPPLIERS EASY LEVERAGE OVER THE UNITED STATES AND OTHER COUNTRIES RELIANT ON GLOBAL SUPPLY CHAINS."

CHRISTINE PARTHEMORE
FORMER FELLOW
CENTER FOR A NEW AMERICAN SECURITY

<table>
<thead>
<tr>
<th>Rank</th>
<th>Material</th>
<th>Regular DoD Demand in STONS/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ALUMINUM METAL</td>
<td>275,219.8</td>
</tr>
<tr>
<td>2</td>
<td>COPPER</td>
<td>105,625.8</td>
</tr>
<tr>
<td>3</td>
<td>LEAD</td>
<td>88,464.8</td>
</tr>
<tr>
<td>4</td>
<td>FLUORSPAR ACID GRADE</td>
<td>56,544.5</td>
</tr>
<tr>
<td>5</td>
<td>ZINC</td>
<td>51,085.5</td>
</tr>
<tr>
<td>6</td>
<td>RUBBER (NATURAL)</td>
<td>29,490.3</td>
</tr>
<tr>
<td>7</td>
<td>MANGANESE ORE CHEM/METALGRADE</td>
<td>25,041.8</td>
</tr>
<tr>
<td>8</td>
<td>NICKEL</td>
<td>17,311.8</td>
</tr>
<tr>
<td>9</td>
<td>CHROMIUM FERRO (FERROCHROMIUM)</td>
<td>9,667.8</td>
</tr>
<tr>
<td>10</td>
<td>CHROMITE ORE (ALL GRADES)</td>
<td>9,630.5</td>
</tr>
</tbody>
</table>


Nearly 750,000 Tons of Minerals Annually
335 tons steel
700 lbs rare earths
3 tons aluminum
4.7 tons copper
Zinc
Molybdenum
Alaska’s Mining Projects

Mining Activity in Alaska
No Single Permit to Mine: there are many permits & authorizations

Mine permitting is a mixture of State, Federal and, potentially, local permitting requirements. Each project is unique.

<table>
<thead>
<tr>
<th>STATE</th>
<th>FEDERAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Â Plan of Operations (DNR)</td>
<td>Â US EPA Air Quality Permit review</td>
</tr>
<tr>
<td>Â Reclamation and Bonding (DNR)</td>
<td>Â US EPA Safe Drinking Water Act (UIC Permit)</td>
</tr>
<tr>
<td>Â Waste Management Permits and Bonding (ADEC)</td>
<td>Â US ACOE Section 404 Dredge and Fill Permit</td>
</tr>
<tr>
<td>Â CWA Section 402 APDES Water Discharge Permit</td>
<td>Â US ACOE Section 10 Rivers and Harbors Act</td>
</tr>
<tr>
<td>Â Certification of ACOE Permits (ADEC)</td>
<td>Â US ACOE Section 106 Historical and Cultural Resources Protection</td>
</tr>
<tr>
<td>Â Sewage Treatment System Approval (ADEC)</td>
<td>ÂNMFS Threatened and Endangered Species Act Consultation</td>
</tr>
<tr>
<td>Â Air Quality Permits (ADEC)</td>
<td>ÂNMFS Marine Mammal Protection Act</td>
</tr>
<tr>
<td>Â Fish Habitat and Fishway Permits (ADF&amp;G)</td>
<td>ÂNMFS Essential Fish Habitat</td>
</tr>
<tr>
<td>Â Water Rights (DNR)</td>
<td>ÂNMFS Fish and Wildlife Coordination Act</td>
</tr>
<tr>
<td>Â Right of Way/Access (DNR/DOT)</td>
<td>ÂUSFWS Threatened and Endangered Species Act Consultation</td>
</tr>
<tr>
<td>Â Tidelands Leases (DNR)</td>
<td>ÂUSFWS Bald Eagle Protection Act Clearance</td>
</tr>
<tr>
<td>Â Dam Safety Certification (DNR)</td>
<td>ÂUSFWS Migratory Bird Protection</td>
</tr>
<tr>
<td>Â Cultural Resource Protection (DNR)</td>
<td>ÂUSFWS Fish and Wildlife Coordination Act</td>
</tr>
<tr>
<td>Â Monitoring Plan (Surface/Groundwater/Wildlife) (DNR/DEC/DFG)</td>
<td></td>
</tr>
</tbody>
</table>

These are only some of the permits required!
Responsible Closure

Å Alaska law (AS 27.19) requires that a mine site must be returned to a stable condition compatible with the post-mining land use.

Å Financial assurance reassessed every 5 years.

Å Applies equally to US and non-US companies.
Reclamation of historic dredging area
Reclamation of historical dredging area

Poker Flats

July 2003

9 Years Later
Mining “Works” for Alaska

4,600 mining jobs
9,100 total in industry
$100,000 average wage
$630 million payroll

Jobs for residents of 80 Alaskan communities
Mining “Works” for Alaska

$17 million in revenues to local governments
$150 million in revenues to state government
$144 million to Alaska Native Corporations
$500 million to over 600 Alaskan businesses for purchases of goods and services
Greens Creek Mine - Juneau
Kensington Mine - Juneau
Bokan–Dotson Ridge
Prince of Wales Island
What in the world is a Rare Earth Element?

UCORE – Bokan Mountain

### Heavy vs Light Rare Earth Elements

<table>
<thead>
<tr>
<th>Pure Metal Oxide</th>
<th>Principle Uses</th>
<th>Price US $ / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanthanum Oxide</td>
<td>Re-chargeable batteries</td>
<td>$173</td>
</tr>
<tr>
<td>Cerium Oxide</td>
<td>Catalysts, glass, polishing</td>
<td>$157</td>
</tr>
<tr>
<td>Praseodymium Oxide</td>
<td>Magnets, glass colourant</td>
<td>$250</td>
</tr>
<tr>
<td>Neodymium Oxide</td>
<td>Magnets, lasers, glass</td>
<td>$335</td>
</tr>
<tr>
<td>Samarium Oxide</td>
<td>Magnets, lighting, lasers</td>
<td>$129</td>
</tr>
<tr>
<td>Europium Oxide</td>
<td>TV colour phosphors: red</td>
<td>$5,860</td>
</tr>
<tr>
<td>Terbium Oxide</td>
<td>Military: Guided missiles, smart weapons</td>
<td>$4,500</td>
</tr>
<tr>
<td>Dysprosium Oxide</td>
<td>Military: Lasers, high powered magnets</td>
<td>$2,830</td>
</tr>
<tr>
<td>Gadolinium Oxide</td>
<td>Magnets, superconductors</td>
<td>$201</td>
</tr>
<tr>
<td>Yttrium Oxide</td>
<td>Phosphors, ceramics, lasers</td>
<td>$180</td>
</tr>
</tbody>
</table>

* Rounded from source: metal-pages.com; Mar 2011
300+ Placer Mines
Challenges to Alaska Mining

- Public perception, NIMBY
- Attacks on permitting process
- Unpredictable federal regulation/overreach
- Initiatives, Litigation
- Exploration investment down
- Commodity prices down
- Costs NOT down: ENERGY, labor
- Proximity of mines to existing infrastructure
No such thing as a “little bit” pregnant

The Pebble Partnership claims it will only damage a small part of America's richest salmon spawning streams in Alaska's Bristol Bay.

But Pebble Mine would sit 950 feet above Bristol Bay, which produces 51% of the wild sockeye salmon in North America – and we all know what flows downhill.

Every large gold/copper mine in the world has had environmental disasters. Every one.

Pebble Mine is a Trojan Horse that must never be allowed through the gates of Bristol Bay.

The only “safe mining” in Bristol Bay, is ABSTINENCE.
### Operating Costs Keep Rising

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average mining salary</td>
<td>$70,750</td>
<td>$100,000</td>
</tr>
<tr>
<td>6 yard underground loader</td>
<td>$570,000</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>40 ton underground haul truck</td>
<td>$560,000</td>
<td>$1,300,000</td>
</tr>
</tbody>
</table>
Opportunities

Tremendous mineral potential
Alaska is a secure jurisdiction
Strong State permitting system
Supportive lawmakers in Alaska
Commitment to workforce development
Ability to justify infrastructure
Support from Alaskan communities
Mining Day – May 10th
What can YOU do?

Â Talk to your legislators
Â Talk to the Alaska Delegation
Â Talk to your friends, family, neighbors, colleagues
Â Talk to me!
Thank you!

Deantha Crockett, Executive Director
deantha@alaskaminers.org