

To: Anchorage Pebble Mine Information Organization
From: Paul Oliva
Subject: Pros and Cons of Pebble Mine
Date: July 12, 2014

The purpose of this memo is to discuss the pros and cons of Pebble Mine, a proposed large open-pit mine in southwest Alaska. Readers will have a better understanding of this controversial project and a better ability to form opinions based on factual information. The memo begins with a description of the project, followed by the primary arguments for and against the Pebble Mine. The conclusion summarizes the memo and gives an update on the current status of the project.

Description of the Pebble Mine Project

The Pebble Mine is a proposed copper, gold, and molybdenum mine to be built upon mineral deposits on state-owned land in southwest Alaska (Alaska Department of Natural Resources, Mining, Land, and Water, 2013). Figure 1 shows the proposed mine's location, about 200 air miles southwest of Anchorage (The Pebble Partnership, n.d.).



Figure 1: Proposed Location of Pebble Mine.

The mine was first proposed by The Pebble Partnership, a 50/50 partnership formed in 2007 between London-based Anglo American and Vancouver-based Northern Dynasty Minerals. Anglo American has since withdrawn from the partnership, leaving Northern Dynasty to head the project (Anderson, 2013).

According to a Northern Dynasty web page, “The Pebble deposit is one of the greatest stores of mineral wealth ever discovered.” Based on measurements, they estimate with a high degree of confidence it contains 5.94 billion tons of minerals, including 55 billion pounds of copper, 67 million ounces of gold and 3.3 billion pounds of molybdenum. They also estimate with a lower degree of confidence 4.84 billion additional tons in the inferred category, including 26 billion pounds of copper, 40 million ounces of gold and 2.3 billion pounds of molybdenum. They say the deposit also contains silver, palladium and rhenium in smaller quantities (Northern Dynasty Minerals Ltd, n.d.). Based on July 2014 mineral spot prices (InvestMine, 2014), the estimated value of Pebble’s mineral deposit is over \$477 billion. Figure 2 displays the valuation by mineral and estimated confidence level.

Estimated Deposits (Measured)			
<u>Mineral</u>	<u>Weight</u>	<u>July 2014 Spot Price Per Unit</u>	<u>Deposit Value</u>
Copper (Pounds)	55,000,000,000	\$ 3.23	\$ 177,650,000,000
Gold (Ounces)	67,000,000	\$ 1,338.59	\$ 89,685,530,000
Molybdenum (Pounds)	3,300,000,000	\$ 12.93	\$ 42,669,000,000
<i>Total</i>			\$ 310,004,530,000
Estimated Deposits (Inferred)			
<u>Mineral</u>	<u>Weight</u>	<u>July 2014 Spot Price Per Unit</u>	<u>Deposit Value</u>
Copper (Pounds)	26,000,000,000	\$ 3.23	\$ 83,980,000,000
Gold (Ounces)	40,000,000	\$ 1,338.59	\$ 53,543,600,000
Molybdenum (Pounds)	2,300,000,000	\$ 12.93	\$ 29,739,000,000
<i>Total</i>			\$ 167,262,600,000
Total Estimate (Measured + Inferred)			\$ 477,267,130,000

Figure 2: Estimated Value of Pebble Mineral Deposits

Primary Arguments in Favor of Pebble Mine

Supporters of Pebble Mine

The primary proponent of developing the Pebble Mine is the Pebble Partnership. According to the partnership, an additional 29 entities have passed resolutions or otherwise expressed support for the permitting process of the mine (The Pebble Partnership, n.d.). The list of supporters includes the Alaska Federation of Republican Women (Alaska Federation of Republican Women, 2007), Bristol Bay Borough (Swain, 2005), The Alaska Peninsula Corporation Board of Directors (Alaska Peninsula Corporation Board of Directors, 2008), and various other tribal councils, businesses, and organizations from the Pebble region.

Resource Independence

According to a United States Geological Survey report, the United States imports over one-third of its copper from foreign sources. At the same time, international demand for copper is increasing, especially in developing economies like India and China (United States Geological Survey, 2006). The Pebble Partnership argues that our dependence on mineral imports, coupled with projected rising foreign and domestic demand, could endanger our economy’s copper supply in the near future. However, they argue, the copper in the Pebble Deposit could supply the US with one-third of its annual copper consumption for years to come (The Pebble Partnership, n.d.).

Economic Impact

Job Creation

According to the Southwest Alaska Municipal Conference's 2014-2019 Comprehensive Economic Development Strategy, "The labor force in Southwest Alaska is largely structured to respond to the direct demands of the commercial seafood industry, as well as support functions ancillary to that industry," (Southwest Alaska Municipal Conference, 2014, p. 21). As such, unemployment in the region sees rampant seasonal fluctuation; unemployment in the Bristol Bay Borough dropped from 11.4 percent in January 2014 to 2.8 percent in May 2014, for example. Figure 3 gives the reader a visual representation of these fluctuations (Federal Reserve Bank of St. Louis, 2014). If developed, Pebble Mine could alleviate these fluctuations by bringing 1,000 full time, permanent jobs to the region (The Pebble Partnership, n.d.). Additionally, thousands of temporary jobs would be created during the mine's construction phase (The Pebble Partnership, n.d.).

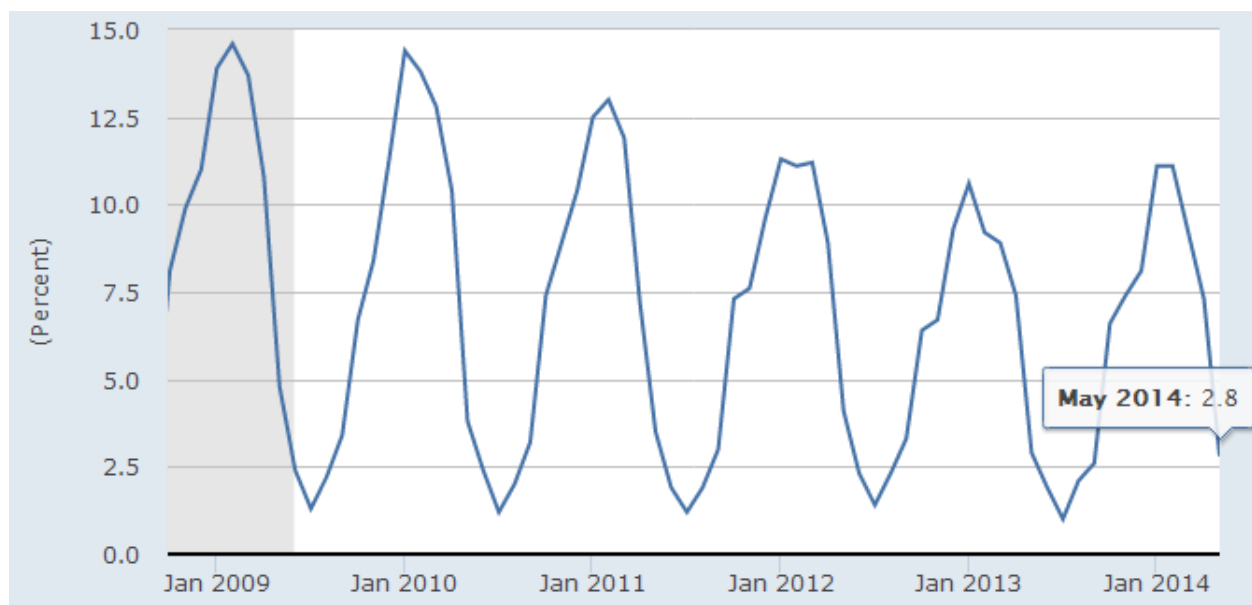


Figure 3: Unemployment in Bristol Bay Borough, AK

Taxes, Royalties, and Fees

Alaska has no state income or sales tax. 90 percent of the state's public budget comes from oil-related revenues. However, oil production has decreased by more than 60% since its peak in the 1980s (Wile, 2013). The Pebble Partnership says that, while mining could never replace oil, the state collected almost \$165 million in taxes, royalties, and fees from mining companies in 2011. These revenues would presumably increase if the mine were developed. Additionally, payments to Alaska Native Corporations, of which mining companies made \$172 million worth in 2011, would stand to increase (The Pebble Partnership, n.d.).

Infrastructure

Like many areas of Alaska, the Pebble Mine region is not connected to the rest of the state by a road system. If Pebble Mine was developed, new port facilities and infrastructure would be needed to move minerals out of the region. Local communities would benefit as a result. Better access to the region

would reduce shipping costs and the prices locals pay for consumer goods, for example (The Pebble Partnership, n.d.).

Primary Arguments against Pebble Mine

Opponents of Pebble Mine

According to Trout Unlimited, a conservation organization dedicated to preserving coldwater fisheries and maintainer of SaveBristolBay.org, the opposition to Pebble Mine “enjoys broad, nationwide support from thousands of groups and individuals across the political spectrum and with diverse interests.” Due to concerns over the proposed mine’s impact on the region’s thriving wild salmon fishery, Nunamta Aulukestai, an association of native corporations in Bristol Bay (Cardwell, 2013), numerous outdoor recreation retailers and publications, hunting and fishing lodges, hunting and fishing associations, conservation groups, and chefs have expressed opposition to the mine. Additionally, many jewelers, including Zale and Tiffany & Co have come out against the mine due to ethical concerns (Trout Unlimited, n.d.).

Potential Environmental Impact

In February 2014, the Environmental Protection Agency initiated a process under the Clean Water Act to identify options to protect Bristol Bay’s salmon fishery. Calling Pebble Mine’s impact “potentially destructive,” an EPA press release said that a mining permit could not be approved during the process (Environmental Protection Agency, 2014). The action stemmed from a previously released assessment of the Bristol Bay watershed that concluded that “even without a major accident or catastrophe, a mine the size of the Pebble deposit will eliminate or block up to 87 miles of salmon streams and remove or bury up to 4200 acres of wetlands that are part of salmon habitat.” (Trout Unlimited, n.d.)

Another environmental concern is the mine waste Pebble Mine would generate. An estimated 2.5 to 10 billion tons of waste would be generated in the mine’s lifetime. The waste would be contained by a dam and 10 square-mile pond. Critics of the mine have expressed concern that the dam could not withstand the potential seismic activity in the Pebble region, and if leaked into the watershed, the waste’s acidity would negatively impact the salmon spawning habitat. Figure 4 is an image released by Trout Unlimited displaying the size of the waste containment pond, superimposed over the city of Seattle for scale (Trout Unlimited, n.d.).

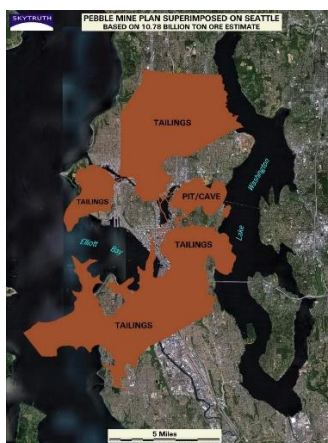


Figure 4: Pebble Mine Superimposed on Seattle.

Potential Economic Impact

According to the National Maritime Fisheries Service's Annual Fisheries Economics of the US report, "Alaska's seafood industry generated \$4.7 billion in sales impacts, \$2 billion in income impacts, and over 63,000 jobs in 2011," (National Maritime Fisheries Service, 2012, p. 17). While commercial fishery employment data is limited due to "high self-employment numbers, limited reporting, proprietary information of large sole-owner processing facilities and other factors," (Southwest Alaska Municipal Conference, 2014, p. 21) the McDowell Group estimates that 32,000 workers are directly employed in commercial fishing in Alaska. Ancillary services, like seafood processing, contribute a substantial number of additional jobs. Figure 5 summarizes the direct employment impacts of Alaska's seafood industry (McDowell Group, 2013, p. 1).

Alaska Seafood Industry: Direct U.S. Employment, Earnings, and Production, 2011

	Number of Workers	Avg. Monthly Employment	Labor Income (\$Millions)	Economic Output (\$Millions)
Commercial Fishing	32,000	16,500	\$1,078	\$2,160
Seafood Processing	32,000	16,300	\$695	\$2,450
Mgmt/Hatcheries/Tenders	4,900	3,400	\$289	\$653
Wholesale/Distributors	1,000	1,000	\$79	\$180
Grocers	6,200	6,200	\$176	\$347
Restaurants	17,900	17,900	\$464	\$1,310
Total Direct Impacts	94,000	61,200	\$2,782	\$6,447

Notes: These data represent direct impacts of the industry; they do not include multiplier effects.

Figure 5: Direct Employment Impact of Alaska's Seafood Industry.

While the Pebble Mine would create 1,000 local jobs, opponents argue that the potential destruction of the Bristol Bay salmon fishery would affect a net decrease in overall employment, regionally and nationally (Trout Unlimited, n.d.).

Conclusion

The proponents of Pebble Mine argue that it will promote American resource independence, promote job creation, and lead to development of regional infrastructure and tax bases. Opponents say that the potential for the mine to negatively impact the region's wild salmon fishery is a risk that outweighs any potential benefits the mine may bring.

The Pebble Partnership is currently in the process of submitting a project plan for permitting review, a process that can take several years. If approved, construction of the mine would take 4-5 years. The mine would then operate for 20-25 years (The Pebble Partnership, n.d.).

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