

The Risks of Pebble Mine

PROJECT OVERVIEW

Roughly 200 miles southwest of Anchorage, Alaska, and just north of Lake Iliamna, the Pebble Limited Partnership (commonly called the Pebble Partnership of Anglo American PLC and Northern Dynasty Minerals, intends to build the Pebble mine, which is projected to be the largest open pit mine in North America, and an additional large underground block-cave mine. Owners hope to excavate billions of tons of raw ore, primarily seeking significant quantities of copper, gold and molybdenum, along with smaller yields of silver, palladium and rhenium.¹ According to the Partnership, the mineral resource totals 10.78 billion tons. The Partnership holds a lease on about 153 square miles.²

THE PEBBLE PARTNERSHIP

Formed in July 2007, the Partnership consists of the wholly owned U.S. subsidiary of Anglo American PLC and a wholly owned affiliate of Northern Dynasty Minerals Ltd., a Canadian corporation. The Partnership is in the advanced exploration phase of the project and has not yet filed for final federal or state mining permits.³ To date, Anglo American has invested over \$250 million into the project, and the Partnership plans to spend another \$73 million in 2010 to prepare for permit applications in early 2011.⁴

HIGHLIGHTS

Final mine permit applications have not been submitted, but scientific studies, current ore projections and the company's 2006 applications indicate that:

- Pebble will be the largest open pit mine in North America.⁵
- It will generate as much as 10 billion tons of mine waste (tailings), which will be stored at the headwaters of Bristol Bay behind large dams in perpetuity.⁶ In 2006, company plans projected

¹ Pebble Partnership, Project Information Overview: <http://www.pebblepartnership.com/pages/project-information/project-overview.php>

² Economics of Wild Salmon Watersheds: Bristol Bay, Alaska, February 2007, John Duffield and David Patterson, Department of Mathematical Sciences, The University of Montana.

³ Ibid.

⁴ <http://www.northerndynastyminerals.com/ndm/NewsReleases.asp?ReportID=386596& Type=News-Releases& Title=Pebble-Limited-Partnership-Initiates-US-73-Million-Work-Program-for-2010>,

<http://www.pebblepartnership.com/sites/default/files/pub/PEB-0028%20press%20release%20feb-24-2010%20Budget.pdf>

⁵ The largest open pit mine in North American is the Bingham Canyon copper mine in Utah, which has mined 7 billion tons of material, (see <http://www.kennecott.com/educators/plan-a-field-trip/>) The Pebble Project is projected to be a 10.78 billion ton deposit. And, the 2006 application projected open pit dimensions larger than the Bingham Canyon Mine. See Northern Dynasty Mines, Pebble Project Tailings Impoundment An Initial Application Report (REF. NO. VA101-176/16-13); available at <http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm> .

tailings dams over 700 feet high⁷ (far bigger than the Grand Coulee Dam) to store 2.5 billion tons of mine waste. Since 2006, ore projections have tripled – from 2.5 billion to 10.78 billion – requiring three times the mine waste storage capacity.

- The mine site is located at the headwaters of the Bristol Bay watershed, which supports the largest remaining wild sockeye salmon fishery in the world.
- The ore deposit is directly underneath salmon spawning habitat. Thus, excavation of the deposit will destroy key salmon habitat.⁸
- Salmon are highly sensitive to pollution. Exposure to even miniscule increases in copper in freshwater (parts per billion), for example, interferes with their sense of smell, impairing their ability to locate spawning grounds and identify predators.⁹
- The Pebble site is an active seismic zone prone to frequent earthquakes.
- Due to the sulfides in the ore, the rock at the proposed Pebble Mine is considered “reactive” rock, at high risk for acid and metals pollution.¹⁰
- Pebble mine will require vast quantities of water. The 2006 water right application projected 35 billion gallons of water per year would be drawn from key salmon spawning streams¹¹ – more than the City of Anchorage uses each year.
- It will require the construction of a deep water port in Cook Inlet, and an 86-mile road with two pipelines to deliver the concentrate from the mine to the port.¹²
- It will also require an estimated 200 miles of transmission lines, and the development of 200-300 megawatts of power.¹³

THE REGION'S SUSTAINABLE RESOURCES

The site is located on state-leased land, an expanse of remote Alaska consisting of rolling hills, broad stretches of tundra and numerous creeks, streams and rivers. This pristine wilderness, which includes primes salmon-spawning habitat for the world's most productive wild sockeye fishery, would be industrialized by mining operations.

The regional habitat supports a wide array of wildlife (moose, bear and caribou) and fish (salmon, Dolly Varden and rainbow trout) important to subsistence and recreational hunters and anglers. Meanwhile, the largest commercial wild sockeye salmon fishery in the world exists at Bristol Bay, a fishery intimately

⁶ Current estimates indicate a total resource of 10.78 billion ton deposit. On average, after processing, 99% of which becomes mine waste. <http://www.pebblepartnership.com/files/PEB-0028%20press%20release%20feb%202010.pdf>.

⁷ Northern Dynasty Mines, Pebble Project Tailings Impoundment An Initial Application Report (REF. NO. VA101-176/16-13); available at <http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm>.

⁸ Dr. Carol Ann Woody, “Fish Surveys in the Headwater Streams of the Nushagak and Kvichak river Drainages, Bristol Bay Alaska, 2008,” Final April 28, 2009.

⁹ Dr. Carol Ann Woody, Summary of Copper: Effects on Freshwater Food Chains and Salmon, September 2007.

¹⁰ Dr. Moran, “Pebble Mine: Hydrogeology and Geochemistry Issues” September 2007.

¹¹ See Northern Dynasty Mines, Pebble Project Tailings Impoundment An Initial Application Report (REF. NO. VA101-176/16-13); available at <http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm>.

¹² <http://www.pebblepartnership.com/pages/project-information/road-port-power.php>

¹³ At this point, the power lines are projected to parallel the road from the mine to port (86 miles); cross Cook Inlet (estimated 50 miles), and extend to Kiniski (estimated 50 miles). See maps of possible submarine transmission lines available at http://www.northerndynastyminerals.com/ndm/P_PD.asp; <http://www.pebblepartnership.com/images/ProposedPowerline-map.pdf>

linked to the region.¹⁴ In recognition of the region's extraordinary and unique resources, the Alaska State Legislature designated much of the Bristol Bay watershed as a Fishery Reserve in 1972, with restrictions on oil and gas development.¹⁵

Feeding that fishery are spawning grounds in rivers and streams within or adjacent to the mine site. All would be at immediate risk of pollution from mining operations, including Upper and Lower Talarik creeks, and the Koltuli, Stoyahok, Chulitna and Newhalen rivers, as well as Iliamna Lake and the Kvichak River that drains the lake into Bristol Bay. Those spawning grounds have fed countless generations of Alaska Natives and today also support a healthy, sustainable fishing industry that is critical to the statewide economy.¹⁶

THE THREAT TO SALMON AND CLEAN WATER

Metal mining requires prodigious quantities of water, and such mining has historically degraded those resources. Due to the sulfides in the ore, the ore at the proposed Pebble Mine is considered "reactive,"¹⁷ at high risk for acid and metals pollution. When the sulfides in the ore are excavated from the ground and exposed to air and water, they react to form acid that can increase copper and other harmful pollutants downstream. The science is clear. A 2006 study of modern hardrock mines found that 93% of the mines studied with characteristics like Pebble -- high acid generating potential and close proximity to surface and groundwater -- resulted in water pollution.¹⁸

Even minute increases (two parts per billion) of copper in freshwater harm salmon, damaging their olfactory senses (i.e., "sense of smell"), and causing them to become disoriented and lose their ability to migrate successfully upriver to their spawning beds.¹⁹

LOSS OF SALMON HABITAT

Furthermore, the ore deposit is directly underneath currently productive salmon spawning habitat.²⁰ According to a recent scientific report, "our findings remove any doubt that the construction of a mine will destroy salmon and salmon rearing habitat."²¹

¹⁴ Alaska Department of Fish and Game: http://www.cf.adfg.state.ak.us/geninfo/features/b_bay/bayvisit.php

¹⁵ AS 38.05.140(f)

¹⁶ Alaska Department of Fish and Game: http://www.cf.adfg.st.ak.us/geninfo/features/b_bay/bayvisit.php

¹⁷ Draft Environmental Baseline Studies, 2004 Progress Reports, Chapter eight, Geochemical Characterization and Metals Leaching/Acid Rock Drainage, Northern Dynasty Mines Inc. June 2005.

¹⁸ Kuipers, Jim and Ann Maest, "Comparison of Predicted and Actual Water Quality at Hardrock Mines," 2006, available at <http://www.pebblescience.org/pdfs/ComparisonsReportFinal.pdf>.

¹⁹ Dr. Carol Ann Woody, Summary of Copper: Effects on Freshwater Food Chains and Salmon, September 2007.

²⁰ Dr. Carol Ann Woody, "Fish Surveys in the Headwater Streams of the Nushagak and Kvichak river Drainages, Bristol Bay Alaska, 2008," Final April 28, 2009.

²¹ Ibid.

THE MINE LOCATION IS AN ACTIVE SEISMIC ZONE

While mine operations might last several decades, mine waste would last for centuries, even millennia, requiring safety and containment measures to last equally long. That may be impossible, given that the Pebble mine site sits only a few miles from a known earthquake fault in one of the most seismically active zones in the world.²² More than half of all earthquakes in the United States occur in Alaska. The state sustains a quake between magnitude 6 and 7 at least five times a year, gets hit with a magnitude 7 at least once a year, and a magnitude 8 roughly every 13 years.²³

Worldwide, approximately 2-5 major tailings impoundment failure incidents occur each year.²⁴ If tailings dams were damaged by earthquakes, mine waste could be released into the environment and the rivers and streams that support fisheries with devastating results.

EMPTY PROMISES: WATER VIOLATIONS HAVE ALREADY OCCURRED

Partnership spokespeople have attempted to assure Alaskans that safety and mitigation measures would suffice to reduce and eliminate risk. But nowhere in the world has such a mine ever left the environment undamaged. In fact, Anglo American, the Partnership's corporate arm that actually has mining experience, has a checkered track record that includes polluting air and water resources, uprooting whole communities and violating safety regulations.²⁵

Already, the Pebble project has violated state law.²⁶ In February 2010, the state issued a fine for 45 water violations extending over the past three years of exploration activity.²⁷ While there may be metal wealth in the ground, its value is fleeting when compared to the enormous economic and social riches to be derived forever from the sustainable fisheries and wildlife habitat a Pebble mine would ruin.

²² Alaska Earthquake Information Center: http://www.aeic.alaska.edu/maps/southcentral_seismicity_map.html

²³ Alaska Earthquake Information Center: http://www.aeic.alaska.edu/html_docs/fag.html#How_many_earthquakes_do_we_have_in

²⁴ Davies, Michael P., Waste GeoTechnics, "Tailings Impoundment Failures: Are Geotechnical Engineers Listening? Geotechnical News, September 2002.

²⁵ Anglo American's Track Record: Rhetoric or Realty? By Philip Mattera; http://eyeonpebblemine.org/wp-content/uploads/anglo_trackrecord_final1.pdf

²⁶ <http://www.adn.com/2010/02/12/1136582/pebble-mine-developers-to-pay.html>.

²⁷ Ibid.