

CENTER for SCIENCE in PUBLIC PARTICIPATION

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"Technical Support for Grassroots Public Interest Groups"



April 17, 2019

Fm: David M. Chambers, Ph.D., P. Geop.

Re: Professional Opinion on the Consequences of the proposed 20-Year Pebble Closure Plan

1. I am a professional geophysicist and the president of the Center for Science in Public Participation (CSP2). CSP2 is a non-profit corporation based in Bozeman, Montana, which provides technical assistance on mining and water-quality issues to public interest organizations and tribal governments throughout the United States.

2. I received a Mineral Engineering-Physics degree from the Colorado School of Mines in 1969. I received a Master's degree in Geophysics in 1976 and a Ph.D. in Environmental Planning in 1985, both from the University of California at Berkeley.

3. I am a Registered Professional Geophysicist (GP #972) in the State of California. I received my certification in 1991.

4. I have over 40 years of experience in the field of mineral exploration and development, including 15 years of technical and management experience relating to mining and mineral exploration. During this time, I have advised public interest organizations and tribal governments on the environmental effects of mining projects, both nationally and internationally.

5. I have provided technical assistance to various entities on proposed, operating, and abandoned mines in 17 states (including Alaska), four Canadian provinces (including British Columbia), Kyrgyzstan, and Northern Ireland. This assistance has included review of underground and open pit mine design, seismic stability for tailings dams, waste rock facilities design, water quality monitoring, water treatment facility design, reclamation planning, and financial assurance for mine closure.

6. Through my education, research, and work experience I have developed an expertise in assessing the environmental impacts of mining operations with a focus on metal mines and their impacts to surface and groundwater quality. I also have extensive experience in analyzing the occurrence of tailings dam failures, and their impacts and cost; and, the costing of reclamation and closure sureties for hard-rock mines.

7. I have been asked by Earthworks to explain why the closure plan for the mining project currently being analyzed by the US Army Corps of Engineers in the Pebble Project Draft Environmental Impact Statement (USACE 2019), would have a significant impact on potential future mining at the site. I address each subject matter in what follows.

8. According to Northern Dynasty Minerals, Ltd., the current owner of the Pebble Deposit located in the Bristol Bay region of southwest Alaska, the mineral resource as December, 2017, consisted of 10.91 billion tonnes (12.03 billion tons) of measured, indicated, and inferred mineral resource at 0.3% Cu cutoff (Gaunt 2018).

9. The “20-Year” mine plan proposed in the Draft Environmental Impact Statement would mine 1.17 billion tonnes (1.29 billion tons) of the mineral resource. This is approximately 11% of the total 10.91 billion tonne mineral resource.

10. There is only one mine closure option being proposed in the Draft Environmental Impact Statement. After mining is complete, the closure plan will require backfill of the open pit with 150 million tonnes (160 million tons) of tailings and 45 million tonnes (50 million tons) of potentially acid generating waste rock, and flooding the pit with water. The tailings and waste rock would be maintained in a subaqueous condition (under water) in perpetuity.

11. This would “sterilize” the remaining mineral resource, and prohibit any future open pit mining, and possibly underground mining, for the foreseeable future. Before any future mining could take place, the pit would need to be drained of any accumulated water and the backfilled tailings and waste

rock would need to be removed. In order to remove the waste material from the open pit to resume mining, I estimate the cost would be at least \$100 million, and quite possible several times that amount.

12. Backfilling the pit could also prevent mining of the underground mineral resource. When the backfilled waste is saturated with water, it will flow like a liquid. If there are any fractures that could connect the pit with the underground workings, the underground miners are at risk. This is exactly what happened at the Mufulira Mine in Zambia, killing 89 miners. Since this accident in 1970, mine engineers have been reluctant to mine under tailings because the fracture systems that would allow the migration of tailings to the underground workings are difficult to detect.

13. Backfilling the pit could sterilize the remaining 89% of the mineral resource. At best, open pit mining would be uneconomic for several generations at a minimum, and at least a portion of the underground resource would also be unminable until the backfilled waste from the pit could be removed.



David M Chambers, Ph.D., P. Geop.

References

14. Gaunt 2018. 2018 Technical Report on the Pebble Project, Southwest Alaska, USA, Northern Dynasty Minerals Ltd., Effective Date – December 22, 2017, Issue date February 22, 2018.

15. USACE 2019. Pebble Project Draft Environmental Impact Statement, US Army Corps of Engineers, February 2019.