ESG in Relation to Tailings Pollution in Precious Metal Mines

Sound economic theory states that a penny saved in a penny earned. Sound advise is to invest in the companies which are positioned to profit from other's mistakes, especially in lucrative industries.

ESG (Environmental, Social & Governance) is the new regime for investors. Metrics for measuring these values and their implementation are evolving now. Already we see that those companies who have adopted these evolving standards are delivering superior returns and it is my conviction that this trend will continue in strength across all industries.

Tailings on mines is a potential asset which is considered by accountants and analysts as liabilities, due to their content being acids, cyanide, and other noxious materials. Ultrasonic cavitation, explained below, is a breakthrough technology for cleaning up the liabilities, and delivering a cleansed balance sheet to the shareholders, without dilution.

Ultrasonic cavitation, used in a very specific way, and with innovations such as regenerative oscillators and advanced mathematics, can separate materials at the atomic level to remediate mining and tailing waters; to separate metals from tightly bound rock; and to increase economic recovery of metallurgical plants.

Let me first offer an example of ultrasonic cavitation: most people who have been on a motorboat will have noticed that the propeller, once raised from the water, displays pockmarks, some quite deep, on the nacelles. These are caused by the natural effect of the propeller in the water, which with speed creates bubbles which collect in the imperfections of the nacelles. Upon popping of the bubble, an inordinate amount of energy is generated in a concentrated but nano-second cycle. Repeated over time, the nano-bubbles collect in the larger imperfections, and as it grows, the size of the imperfections increases. Eventually, the propeller may fail.

It is possible to harness the powers of this natural entropic effect to create a counter-entropic result. Pollution becomes an asset instead of a liability. Previously unrecoverable liabilities can be entirely eliminated with this technology. The mining industry can be transformed.

In the second use case, metallurgy can become green and clean using ultrasonic cavitation. By controlling the formation and cavitation of the bubbles in a closed aqueous circuit, the milled ore is subjected to violent pressure changes which tear apart or cavitate the metals apart. This even separates metals from other metals.

Recoveries of metals from sulfide ores can now be superior to recoveries of oxide ores using heap leach techniques. A patented dynamic pump accomplishes this feat.

This is a game changer for gold complex group mines worldwide and will contribute to sounder economics and ecologics!

Coupled with H2 (hydrogen) fuel cells, a mine can become self-sufficient even off-grid and claim all the attendant compliance advantages and benefits. Economies will be multiple, and mining will become more profitable. Drilling machines, excavators, crushers etc. can be powered by H2 fuel cells, and the H2 can be generated on site by a sister technology called Molecular Energy™.

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Wikipedia (as is picture in text above):

Cavitation is a phenomenon in which rapid changes of pressure in a liquid lead to the formation of small vapor-filled cavities in places where the pressure is relatively low.

When subjected to higher pressure, these cavities, called "bubbles" or "voids", collapse and can generate a shock wave that is strong very close to the bubble, but rapidly weakens as it propagates away from the bubble.

Cavitation is a significant cause of wear in some engineering contexts. Collapsing voids that implode near to a metal surface cause cyclic stress through repeated implosion. This results in surface fatigue of the metal causing a type of wear also called "cavitation". The most common examples of this kind of wear are to pump impellers, and bends where a sudden change in the direction of liquid occurs. Cavitation is usually divided into two classes of behavior: inertial (or transient) cavitation and non-inertial cavitation.

The process in which a void or bubble in a liquid rapidly collapses, producing a shock wave, is called inertial cavitation. Inertial cavitation occurs in nature in the strikes of mantis shrimps and pistol shrimps, as well as in the vascular tissues of plants. In man-made objects, it can occur in control valves, pumps, propellers and impellers.

Non-inertial cavitation is the process in which a bubble in a fluid is forced to oscillate in size or shape due to some form of energy input, such as an acoustic field. Such cavitation is often employed in ultrasonic cleaning baths and can also be observed in pumps, propellers, etc.

Since the shock waves formed by collapse of the voids are strong enough to cause significant damage to parts, cavitation is typically an undesirable phenomenon in machinery (although desirable if intentionally used, for example, to sterilize contaminated surgical instruments, break down pollutants in water purification systems, emulsify tissue for cataract surgery or kidney stone lithotripsy, or homogenize fluids). It is very often specifically avoided in the design of machines such as turbines or propellers, and eliminating cavitation is a major field in the study of fluid dynamics. However, it is sometimes useful and does not cause damage when the bubbles collapse away from machinery, such as in supercavitation.

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