

CYANIDE – *MYTHS & FACTS*

by Frederick W. DeVries
Chem-Mining Consulting, Ltd.†

This position paper is an effort to furnish the public with facts and myths surrounding the use of cyanide in the world mining industry. References for statements herein are available from the author upon request.

CYANIDE CAN BE DEADLY: *FACT*

**CYANIDE IN MINING HAS CAUSED
WIDE-SPREAD ENVIRONMENTAL
DAMAGE:** *MYTH*

**EATING MEAT/FISH POISONED BY
CYANIDE IS DEADLY:** *MYTH*

CYANIDE IS A FERTILIZER: *FACT*

CYANIDE SPILLS POISON CROPS: *MYTH*

**THERE ARE MANY ANNUAL DEATHS FROM
USE OF CYANIDE AT MINES:** *MYTH*

For explanations, please see next pages.

Because of the high profile of the word cyanide, and its popular lethal use in murder-mysteries (and, most unfortunately, as a historic intentional poison), it is difficult to discount the *SENSATIONALISM* frequently encountered in (a) news-media reports and (b) the use of “cyanide” as a whipping boy for environmental activists’ anti-mining agenda.

Let’s continue with a few myths encountered over the last few years:

CYANIDE IS MERELY A CONVENIENCE IN RECOVERING GOLD FROM MINED ORES; OTHER METHODS ARE COMPARABLY ECONOMICAL AND EFFICIENT: *MYTH*

DAMS USED AS TAILINGS IMPOUNDMENTS ARE UNRELIABLE AND HAVE RELEASED DAMAGING VOLUMES OF CYANIDE: *MYTH AND FACT^{3,5}*

MONITORING OF CYANIDE AT MINING OPERATIONS AND ABANDONED SITES HAS BEEN POOR: *MYTH*

AREAS WHERE CYANIDE HAS BEEN RELEASED REMAIN DEADLY FOR EXTENDED PERIODS: *MYTH*

UNINTENTIONAL RELEASES OF CYANIDE FROM MINE SITES OCCUR: *MYTH AND FACT¹⁻⁵*

CYANIDE IS A BUILDING-BLOCK OF DNA AND IS PRESENT IN EVERYONE’S BLOOD: *FACT*

SURVIVING CYANIDE OVER-EXPOSURE IS LIKE ALMOST DROWNING, WITH SIMILAR AFTER-EFFECTS – USUALLY “BAD MEMORIES”! *FACT*

TABLE-SALT USUALLY CONTAINS CYANIDE (IN A HARMLESS FORM) TO PREVENT CAKING: *FACT*

CYANIDE IS NOT CUMULATIVE, CARCINOGENIC, NOR TERATOGENIC (NO DEFORMITIES IN OFFSPRING) TO HUMANS; IT DOES NOT PROPAGATE UP THE FOOD CHAIN -- YOU CAN'T BE POISONED FROM EATING FISH OR MEAT KILLED BY CYANIDE: *FACT*

MAMMALS SUBJECTED TO FATAL LEVELS OF CYANIDE WILL NOT "GO AWAY TO DIE" – CYANIDE IS RAPIDLY FATAL OR SOON METABOLIZED: *FACT*

CYANIDE EXPOSURE DOES NOT CAUSE DELAYED SYMPTOMS OF ILLNESS: *FACT*

CYANIDE ANTIDOTE KITS, PRESENT AT MINE SITES, ARE QUITE EFFECTIVE AGAINST ACCIDENTAL EXPOSURE: *FACT*

SURVIVORS OF ACCIDENTAL EXPOSURE SELDOM NEED ANY MEDICAL TREATMENT – EXPOSURE IS RARELY DETECTABLE AFTER 24 HOURS: *FACT*

CYANIDE USE IN GOLD MINING HAS CONTRIBUTED MORE THAN \$50 BILLION TO U.S. GDP SINCE 1980, MAKING THE U.S.A. THE WORLD'S NO. 2 GOLD PRODUCER: *FACT*

FEWER THAN FOUR FATAL CYANIDE ACCIDENTS HAVE OCCURRED IN NORTH AMERICAN MINING, IN OVER 100 YEARS OF CYANIDE USE (AND BILLIONS OF POUNDS): *FACT*

ALTHOUGH AN ESTIMATED 80 MILLION BIRDS DIE ANNUALLY IN THE U.S. BY FLYING INTO TALL BUILDINGS, THE U.S. MINING INDUSTRY HAS SPENT MILLIONS TO REDUCE BIRD-KILLS, WHICH HAVE TOTALLED SOMEWHERE AROUND TEN THOUSAND (IN FIFTEEN YEARS)*: *FACT*

*One site estimated it had spent \$32,000 per duck on preventatives.

Because of the general emotional extremes raised when there is a cyanide release, it may be worth reviewing some specific incidents:

1. Summitville CO: Despite many headlines about environmental damage from cyanide releases, the final report of the State of Colorado concluded that NO damage was caused by any traces of cyanide at this very costly clean-up; evidence has been put forth that many tax dollars were unwisely spent to clean up the “non-problem” of cyanide there.

2. Kyrghizstan (Central Asia): Despite headlines and on-the-spot TV newscasts, the final report confirmed that there were no deaths attributable to cyanide released when a truck overturned. No damage to crops was suffered; livestock supposedly reacting to cyanide were actually victims of a remediable endemic sheep disease (“ORF”) seen in many parts of the world.

3. Guyana (South America): No fatalities, or even proved illnesses, were attributed to the failure of a dam, releasing over 3 million cubic meters of cyanide-containing water. (Releases at the recent dam failure in Romania were estimated at 100,000 cubic meters, or about 3% of that volume.) Although several hundred fish died, the main economic losses were (a)suspension of mine operations, which cost the country about \$20 million and (b)suspension of fishing activities because of public fear of cyanide.

4. Papua New Guinea: Several hundred kilograms of sodium cyanide were spilled in late February/early March (of 2000) in one incident; the mine operators decontaminated the spill site within about two days, with no known damage.

5. Baia Mare, Romania: At the end of January, a breached dam released significant water and cyanide. Fish kills in the Tisza River that flows through Hungary were reported; it is not yet established to what extent these are attributable to cyanide, although there is circumstantial evidence to infer that cyanide was at least partly responsible. Some drinking water contamination was reported within Romania, and the mine site supplied temporary drinking water to at least one village. Symptoms reported by villagers and others are not typical of cyanide exposure, but seem rather to be fear-induced reactions to the term “cyanide”.

Aquatic species are undoubtedly the creatures most sensitive to cyanide. Major reductions in fish populations have on occasion occurred from accidental cyanide releases. However, what little quantitative evidence that has been gathered indicates that the self-destruction that cyanide undergoes is so rapid that repopulation occurs probably within a matter of weeks or months. This is most unfortunate but not necessarily catastrophic.

Contrary to some recent reports, many bacteria metabolize cyanide quite readily. This should not be surprising, as cyanide is a fertilizer, and bacteria are vegetable. In one test, algae rapidly reduced 100 parts per million cyanide to zero. (This concentration could cause quite adverse symptoms if consumed by mammals in moderate volume.)

A note on cyanide non-persistence: The mining industry uses alkaline cyanides, while the truly toxic form of cyanide is hydrogen cyanide (also known as HCN, hydrocyanic acid, or prussic acid). When alkali cyanide solutions are neutralized, the HCN forms. It boils at 75°F (24°C) and is lighter than air, so that it rises rapidly into the upper atmosphere, where it is harmlessly dispersed. In neutral water, it soon disappears. In flowing water, where mixing occurs, it is not persistent. Studies show in a matter of two or three days it is essentially eliminated even from a pond, with the only mixing from solar heating and nocturnal cooling. This explains in great part why cyanide spills have caused little damage on land – it evaporates so rapidly. In addition, it is absorbed by vegetation, which use it as a nutrient (fertilizer).

It would be well for companies using cyanide to educate local residents of the real and imagined hazards of this material, so that near-hysteria does not cause emotional and physical damage to neighbors, should a spill occur. It would also be helpful if journalists sought technical information when reporting on such incidents, rather than fueling the fires of ignorance that have caused so much concern in the past to the populace in these areas.

The mining industry is aware that their image is severely tarnished whenever a toxic release occurs and that dams must be designed, constructed, operated, and monitored with the greatest of care to avoid such incidents in the future. Emergency steps should be taken whenever abnormal situations arise, to take preventive action well in advance of foreseeable spills, to neutralize/divert/dilute cyanide-containing waters.

Cyanide has a 120-year “track record” of being by far the most economical reagent for recovering gold. This position has been maintained despite greatly increased controls to minimize releases to surrounding areas, and millions of dollars spent testing alternative leaching chemicals. When cyanide was first introduced to gold mining, it replaced amalgamation (mercury) as a reagent for collecting gold, providing huge health and environmental benefits. Its efficiency today is not threatened by a host of other materials tested, some of which may have more severe toxicity and environmental consequences than cyanide itself.

This paper is not intended to pass judgment on the historic coveting of precious metals by so many people in the world, for whatever motive. It **IS** clear that using cyanide in the gold industry has significantly benefited the U.S. economy and has not made a sufficiently negative impact on the health of the surrounding environment to the extent it should be abandoned or replaced.

†25 Hillendale Road
Chadds Ford PA 19317-9345