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Executive Director
Association of Professional Engineers of Yukon
312B Hanson Street
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RE: Nomination for Yukon Engineering Excellence Award

Please accept this letter and power point presentation as my nomination for Randy Clarkson P.Eng. for the Yukon Engineering Excellence Award. I have known Randy since 1976 when we both attended the faculty of Mineral Engineering at the University of British Columbia and graduated together in 1979.

Randy Clarkson has developed a new innovative method of upgrading difficult gold concentrates by taking advantage of a gold particle's malleability. A small rod mill is used to grind the brittle waste minerals to powder in 6 to 10 minutes while only flattening gold particles. The ground slurry then is washed through a fine (0.3 mm openings) screen. The flattened and polished gold particles remain on top of the screen while the finer ground waste minerals are washed through the screen.

The procedure has been tested on many types of gold concentrates including those with high density minerals such as galena (mineral containing lead), cassiterite (tin), hematite (iron), illmenite (iron) and pyrite (fool's gold) as well as more durable minerals such as garnet (used in sandpaper). The cleaned concentrates are generally 97% or purer native gold and are suitable for direct sale to a gold buyer.

Many Yukon placer miners have been storing these difficult concentrates on site in coffee cans, peanut butter jars and other containers for years waiting for an efficient method of upgrading to be developed. Previously the concentrates would have to be sorted by hand, one by one, a tedious and very time consuming process.

The small rod mill can also be used to grind up gold furnace slag to recover any lost gold and to regrind concentrates which have become cemented together due to oxidation of the contained minerals. A small rod mill can be fabricated using a piece of steel pipe, rolled rods and an adapted portable cement mixer for a total cost of less than \$2000.

The concentration process does **not** use any chemicals or substances harmful to the environment and would have applications in any placer or hard rock gold mine using gravity recovery techniques such as sluiceboxes or centrifugal concentrators. It could also be used in the developing world at artisanal mines to help eliminate any harmful chemicals used to upgrade gold concentrates

The two year field and metallurgical research program was funded by contributions from CanNor, Government of Yukon's Strategic Investments in Northern Economic Development, the Yukon College Cold Climate Innovation Fund and the Klondike Placer Miner's Association.

Background - Placer Gold

Placer gold ranges in size from finer than 74 microns (200 mesh) to coarse nuggets depending on the source of the gold, size and gradient of the stream and many other factors. Sluiceboxes are the primary means of concentrating the low grade alluvial gravels and can provide relatively efficient concentration (in excess of 95% recovery efficiencies) at high ratios of concentration (20,000:1).

These primary sluicebox concentrates must be upgraded to a purer saleable product. Secondary concentration methods generally include long toms (small sluices), hydraulic jigs, hand panning, hand-held magnets and hand sorting. Many of the secondary concentration methods are very labour intensive, arduous and result in some gold losses. Often the tailings from secondary kking@apey.yk.ca concentrates are stored in buckets for years awaiting time-consuming hand sorting methods. Extended periods of hand sorting of gold concentrates also pose a security risk to placer miners.

Separation of both the coarser >1 mm and fine <150 micron particles can be tedious and problematic. Generally the coarser gold sizes are hand-picked. Magnetic minerals such as magnetite and tramp iron are removed with hand held magnets. In the Yukon and Alaska, the finer gold particles are processed in small sluices, concentrating tables and gold wheels, often with gold losses.

Professional Profile

Randy Clarkson is a Canadian and resident of Whitehorse, Yukon since 1980. Mr. Clarkson is a professional mining engineer registered in the Yukon Territory (since 1982) and British Columbia (since 1983). He has both a bachelor of applied science in mining engineering from the University of British Columbia (1979) and a diploma of mining technology from the B.C. Institute of Technology (1974). Mr. Clarkson is completely proficient in his native English and is learning Spanish. He has over thirty years of diversified worldwide experience in underground and surface mining engineering, mineral processing, research, permitting and small hydro development. Mr. Clarkson is recognized as a world leader in placer mining and gravity recovery. He is also a project manager, researcher, designer and planner. He has appeared as an expert witness for the Supreme Courts of British Columbia and the Yukon as well as the B.C. Arbitration Board. Mr. Clarkson is the president of NEW ERA Engineering Corporation (since 1985). He is also the designer, co-owner/operator of NEW ERA Hydro Corporation's 300 kW Fraser Micro hydro station (since 1990). His experience includes:

Randy Clarkson is recognized as a world authority on placer gold recovery and drilling, author of several publications and seminars. He developed a revolutionary method to evaluate the gold recovery efficiency of sluiceboxes, jigs and drills with radioactive gold particles as tracers. He has designed, modified and refitted dozens of successful high-volume gold processing plants including the portable high-volume "Z" screened sluice box system. Mr. Clarkson has also designed and conducted dozens of field and laboratory research programs using nuclear tracers to evaluate the efficiency of sluices, placer drills and other gold saving and sampling systems under private and public contracts on a world-wide basis. He has presented numerous technical papers regarding gravity gold recovery and nuclear tracers at various lode gold and placer mining courses, forums and conferences in North America, South America and Australia.

Please accept my nomination for Randy Clarkson P.Eng. for the Yukon Engineering Excellence Award. Please email or call me if you have any questions.

Regards,



William Dunn P.Eng. APEY # 1048