INNOVATION MINING INC.

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Forward

The hydrometallurgical extraction of gold from ores concentrates, and tailings in both a cost-effective and environmentally safe manner offer an interesting challenge.

Gold, as one of the most valuable of the precious metals, is extracted from ores both physically, by concentration and smelting, and chemically using extractive hydrometallurgy. Both methods require a safe and effective alternative to their current extractive technologies. This paper will focus on the hydrometallurgical extraction of gold from several mining methods.

Conventional gold mining operations rely heavily on hydrometallurgy and the extensive use of cyanide as the primary leaching agent. Cyanide has been the leach reagent of choice in gold mining since 1887 due to its high recovery rates, robustness, simplicity, and relatively low cost. As a result, over 76% of all gold extracted worldwide is currently produced by hydrometallurgical extraction using cyanide.

Although new processes are being proposed regularly, there have been no dramatic changes in the metallurgical techniques for gold extraction since the introduction of the cyanide process (cyanide leaching or cyanidation) by McArthur and Forrester in 1887.

Recently, **Innovation Mining Inc**. announced the development and advancement of a unique, effective, and environmentally safe alternative to cyanide and the smelting of gold concentrates. The **Innovation Process** is eco-friendly, safe, efficient and provides similar recoveries and leach kinetics to cyanide.

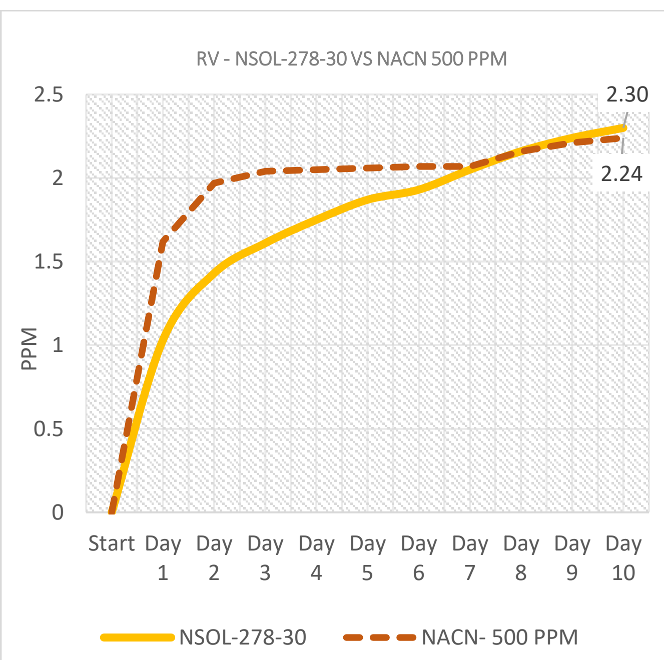


Figure 1 - Comparison of Innovations NSOL and Cyanide

The **Innovation Process** is very similar to conventional cyanide circuits. It involves dissolution of the valuable metals into aqueous solution by oxidation followed by extraction using conventional methods such as electrowinning, carbon absorption, or precipitation. The Innovation Process is simple and does not require complex process circuits. It operates at low pH levels and a wide range of temperatures. The Company's unique water-based chemical formula offers the following features:

Performance:	Similar gold/silver recoveries as cyanide
Kinetics:	Same leach kinetics as cyanide
Stability:	Long lasting and can be left open to atmosphere
Odour:	No odours
Off gassing:	No off gassing
Color:	No color
Safety:	No dangerous additives such as hydrogen peroxide
Application:	Suitable for tank, heap and vat leaching
Toxicity :	Very low
Solubility:	Very fast - similar to cyanide
Low dose:	Under 10 grams per liter
Reusability:	High reusability quotient – used 8 times in cycle testing
Copper:	Unlike cyanide, it is effective in copper/gold oxides
Cost:	Similar to cyanide – Est at $4.00 per tonne of ore

Introduction

Leaching using a cyanide-based lixiviant is the predominant method for recovering gold from ores and concentrates within the mining industry. Most of the gold extracted worldwide is produced using hydrometallurgical methods which incorporate cyanide.

The use of cyanide as a lixiviant and subsequent treatment of cyanide bearing tailings presents significant costs and environmental challenges. These costs, safety, environmental concerns, and associated permitting issues have become a significant driver for the industry to seek alternative lixiviants.

Cyanide is a hazardous compound, and due to the nature of its toxicity, there is significant environmental pressure by several groups globally to ban the use of cyanide in gold mining. Research cyanide alternatives has been ongoing for over 100 years, and has identified other potentially workable compounds, such as thiosulfate, thiourea, halides, and, ammonia, amino acids, thiocyanate, etc.

All of these alternative gold processes are still in the early development stages and none has been proven to be economic. A key factor for the commercial success of any of these alternative lixiviants relates to the overall process cost, stability, complexity, and the chemical consumption cost of the lixiviant.

The comparative matrix of the properties of the Innovation formula vs Cyanide is outlined in the following table:

Attributes	Cyanide	Innovation
• High gold recoveries	Yes	Yes
• Fast leach kinetics	Yes	Yes
• Eco Friendly	No	Yes
• Safe to handle	No	Yes
• Broad applicability	No	Yes
• Works with Cu/Au ores	No	Yes
• No toxic wastewater	No	Yes

Figure 1-Cyanide Vs. Innovation Mining formula

The company has invested over $2M during its formative 16-month research and development phase and has completed thousands of lab-scale tests on several gold ores and tailings. These tests have confirmed similar recoveries, leach kinetics, and process costs as cyanide on several low-grade gold ores.

Proprietary IP and Patents

The Company is in the process of filing 2 patents on the main components of the chemical solution and the methods of use.

Technology Overview

The Innovation formula is based on water-based chemistry and is created by stabilizers, combining several select complexing agents, and oxidizing compounds.

The Innovation formula functions at a low pH, and under ambient temperature and pressure. The process is simple to use and provides similar recoveries and leach kinetics to cyanide, yet is benign, non-toxic, and reusable.

The Innovation process is unique from all the current hydrometallurgical alternatives due to its environmentally friendly nature, simplicity and low-cost.

The formula and process produce a powerful and stable oxidizing solution that rapidly dissolves gold into solution. The gold is then extracted using conventional methods such as carbon, ion exchange resins and electrowinning. After gold recovery, the barren solution is then regenerated for reuse by employing a unique diamond-based electrochemical cell technology.

This low-cost, sustainable closed-circuit process provides extended reusability of both the reagent and the process rinse water resulting in no effluent or required tailings compound.

The Innovation formula can be incorporated into both heap/vat leach circuits for low-grade coarse ores, or agitated tank leaching for finely ground high-grade ores and concentrates.

Gold Leaching

Hydrometallurgical processes can be defined as the leaching of a desired metal into a solution, followed by the concentration and purification of the pregnant solution, and finally, the recovery of the metal or its compounds. The processing of gold and silver ore by leaching is one of the most prominent examples of early hydrometallurgy-based processes.

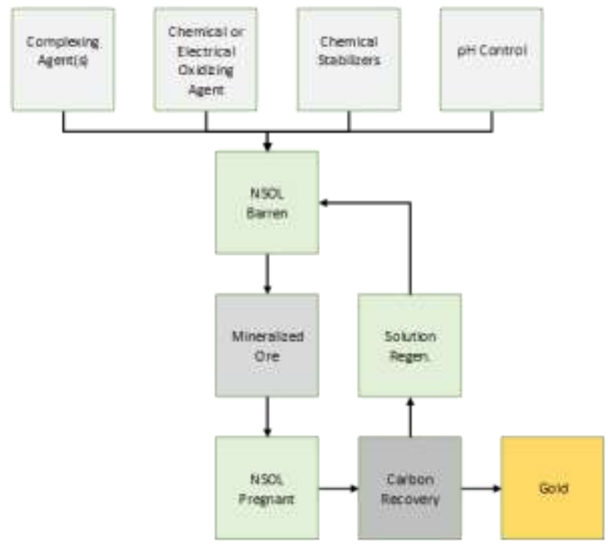


Figure 3 – The Innovation Formula and General Flow Sheet

Most of the gold extraction from ore is accomplished by the implementation of an alkaline cyanide leaching process. The chemical recovery of gold can be defined by two different operations: the oxidative dissolution of gold and the reductive precipitation of metallic gold from the solution. Cyanide is one of the most attractive lixiviants in the current industrial gold leaching process.

The hydrometallurgical extraction or leaching of gold is performed by heap leaching and/or tank leaching and have become fundamental for the processing of gold ores. Over the last 100 years the most applied method for gold extraction was cyanidation due to its high chemical stability, simplicity, and lower costs. However, the application of cyanide as a leaching agent causes serious environmental issues and concerns due to its high toxicity.

The rate of gold mine discoveries has declined over the past three decades, despite miners pumping more money into exploration, World Gold Council figures show.

The prospective impact of a lack of "world class" discoveries on future gold production can be gauged from the fact that such mines account for nearly half of the global gold production today. The average grade of the new gold deposits, the amount of gold that can be extracted per ton, has also been declining.

The average mine grade has fallen from over 10 grams per ton in the early 1970s to around 1.4 grams per ton today. The ability to cost-effectively mine these lower grade gold deposits relies on low-cost leaching of the ores. The gold leaching process relies heavily on cyanidation through heap leaching and tank leaching.

Heap Leaching (HL)

Heap leaching is a flexible and constantly developing mineral processing and extraction technology that is gaining popularity and recognition for existing miners and developers. Heap leaching has solid advantages over traditional metallurgical methods, where economically feasible options have become limited.

Heap leaching is a method in which a leaching solution is sprayed with a spray leaching system to selectively leach the useful minerals in the ore and recover the useful mineral from the pregnant liquid flowing out of the heap during the infiltration process.

Low-grade gold ore heap leaching is a new gold extraction process developed and pioneered by **Chester Millar**, Innovation Mining's Chairman, in the 1970's. It is characterized by simple process, easy operation, short process, limited space, strong adaptability, large or small scale, and low investment. The production cost is low. The disadvantage of this method is that the leaching rate is lower; generally, only 60-80% can be recovered.

Heap leaching technology is vital for the future of gold mining. with plenty of opportunities, including HL application to extract massive amounts of precious metals sitting in abandoned tailings and waste management sites. Hopefully, recent developments including the Innovation Process will also allow the use of heap leaching to process primary sulfide ores. This would result in a dramatic expansion of the technology as ~80% of total ore types are sulfide in nature. The main advantages of heap leaching technology are, as follows:

- lower CAPEX and OPEX
- rapid payback
- no tailings disposal
- simple design and equipment
- less environmental concerns
- quick construction phase
- lower energy and water requirements
- applicable to low-grade ore, tailings and waste stockpiles
- Currently, HL technology is successfully used to extract gold, silver, copper, nickel, uranium, and even iodine.

The mineralized material to be treated is typically naturally oxidized making it amenable to leaching. Not all ores are amenable to heap leaching due to the nature of the mineralogy and the permeability of the rock. Generally, the HL process involves the following steps:

1. mine the ore
2. crush the ore (if necessary)
3. agglomerate the ore (if necessary)
4. place the ore on a lined pad
5. irrigate the ore with the appropriate lixiviant to dissolve the metals (leachate)
6. collect the leachate in a pond or tank (pregnant or value bearing solution)
7. process the pregnant solution to recover the metals
8. recycle the barren & regenerated solution back to the heap.

An overall process flowsheet for heap leaching is presented below.

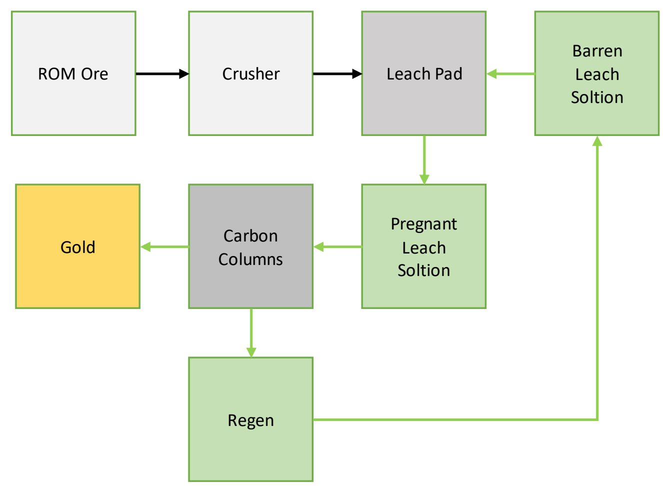


Figure 4– Typical Heap Leach Process Flow chart

Complex Copper/Gold Ore Heap Leaching

Often, gold may be found in conjunction with copper and silver in ores and concentrates. Hence, the application of cyanide to these types of ores can present some difficulty, as the diversity of minerals found within these ores can cause the application of cyanidation to become more complicated.

Currently, the mining industry faces the problem of separating these complex valuable minerals from the ore in which they reside. This paper outlines various options that hydrometallurgical processes offer for the treatment of these complex minerals, containing precious metals such as Cu, Ag, and Au.

The formation of copper and silver cyanide complexes affects the gold recovery in both the cyanide leaching process as well as the purification and refining stages. These effects mainly interfere with the gold cyanide reaction and the carbon adsorption. Most of the copper minerals react rapidly with cyanide, forming multiple cyanide complexes which inhibits the formation of stable gold complexes and consumes cyanide.

Recently, new processes have been developed to treat the main issues previously mentioned. One of these processes is the SART process. SGS Lakefield Group and Teck Corporation developed the SART process in the 1990s in an effort to extract copper and gold by using complex leach lixiviant treatments which provides satisfactory but expensive recoveries of both gold and copper and the recovery of some of the cyanide.

The SART process reduces the issues caused by the copper-cyanide complexes during the cyanide leaching process. It recycles cyanide to diminish cyanide consumption and provides operational cost savings. It avoids having free cyanide disposal, which can be a hazard for the environment. Additionally, the formation of Cu2S as a saleable product is one of the essential advantages of the SART process within cyanide leaching, because of the way it economically takes advantage of the copper content. The SART process is unfortunately very complex and expensive on both a CAPEX and OPEX basis.

The Company has performed a series of successful leach tests on a complex low-grade copper/gold deposit in Nevada with positive results.

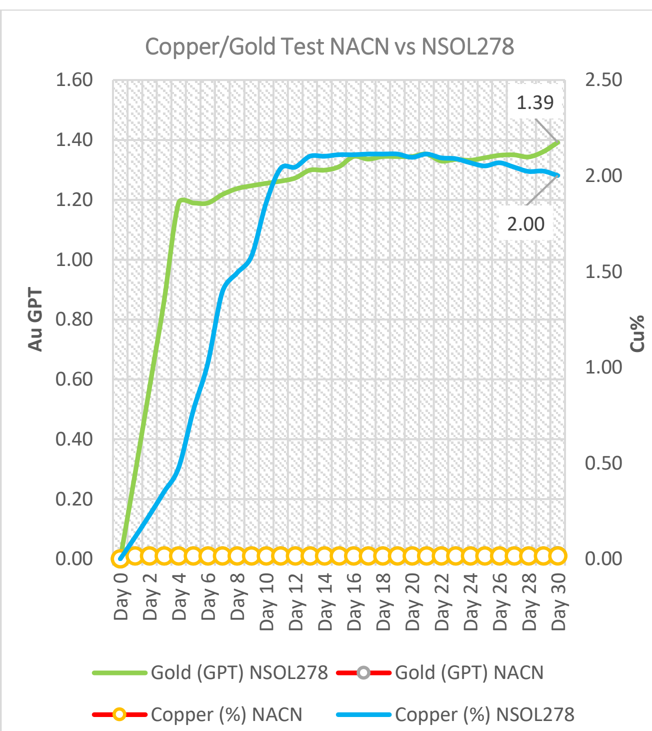


Figure 5 – 30-day test results on complex copper/gold material

The material is from a project with a reported Indicated Mineral Resource of 1.058 million ounces of gold equivalent or 0.676 million ounces of gold, 1.964 million ounces of silver and 261.3 million pounds of copper. The gold-copper mineralization is reported to be hosted within sills associated with an alkaline gold/copper porphyry.

A series of tests were performed in the Innovation laboratory using a flooded column leach technique using both the Innovation NSOL 278 formula and a cyanide solution.

The results of the tests were positive for Innovation formula and negative for cyanide. The Innovation formula dissolved both the copper and gold in solution simultaneously and proved to be very stable complexes. The formula required occasional pH adjustments, but no additional chemicals were added during the 30-day test.

Tank Leaching

With the continuous development of gold production and the rapid development of gold resources, the process of agitation gold leaching is also improving day by day and has been widely used.

The agitation leaching method is to concentrate the slurry, obtained after grinding and classifying of the gold-containing ore, to a suitable concentration, place it in a leaching tank, add a cyanide solution, and aerate to carry out leaching. The main equipment used in the agitation leaching process is a cyanide leaching tank.

Agitation leaching is suitable for process materials having a finer particle size, i.e., less than 0.3 mm. The advantages of this method are high leaching speed, large processing capacity, mechanized operation, and high gold extraction rate. This conventional cyanidation method is one of the more widely used methods in the gold cyanidation process.

The process of the agitation leaching process comprises the following steps:

1. crushing and grinding of raw materials
2. agitation leaching
3. washing solid-liquid separation
4. clarification and deoxidation of pregnant solution
5. recovery of metal from solution

For general non-sulfide gold-bearing ores, it is usually ground to 80% passing 100 mesh (150um). Cyanide is added to the grinding operation, and side immersion is performed to improve the leaching efficiency.

For sulfide gold-bearing ores, flotation enrichment is often used. Or separating out some gold-bearing sulfide concentrates from flotation concentrates, such as gold-bearing copper concentrates, and finely grinding them to

90%-95%, -325 mesh to shorten the leaching time and improve the leaching efficiency.

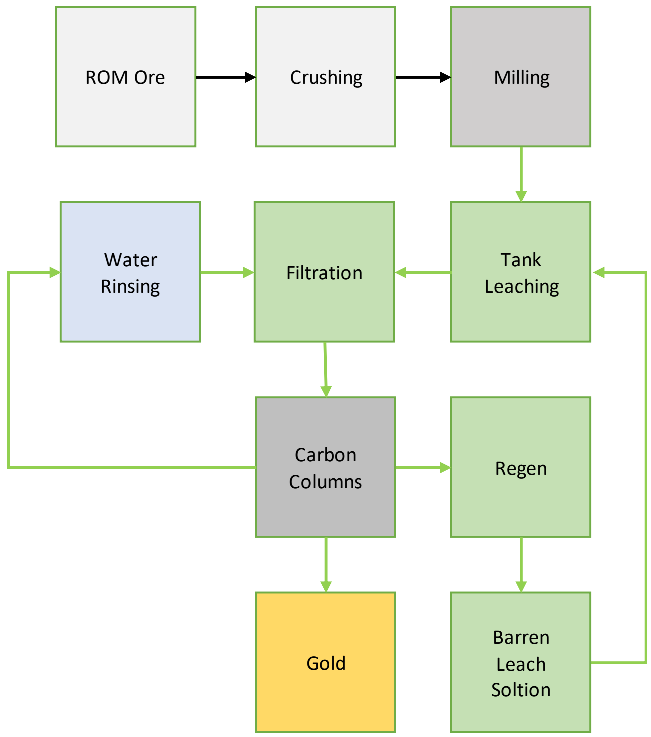


Figure 6 – Typical Agitated Tank Leach Process Flow Sheet

For ore with higher arsenic or pyrrhotite, flotation concentrate ore roasting desulfurization or arsenic removal is carried out, and then the calcine is cyanided and leached. Ore with higher carbonaceous minerals, chlorinated and then leached.

The pulp is generally leached at a concentration of 35% to 50%. The solution pH for the Innovation Process is adjusted to be between 1.2 and 1.6, and for cyanide, the pH is adjusted to be between 10 and 10.5 to prevent decomposition of cyanide and inhibit the cyanidation of the sulfide.

The concentration of chemicals in the Innovation formula is approximately 6,000 PPM and cyanide is usually maintained at about 1,000 to 2,000 PPM, and the mixture is typically agitated for 24 hours or more, so that 95% or more of gold is dissolved.

An overall process flowsheet for agitated tank leaching is presented below.

In order to obtain sufficient separation between the leachate and the leach residue, a rinsing process of 1-3 stages of thickening, filtration or a mixture of the two is generally employed.

Regeneration and Reuse of Formula

The Innovation formula is based on an element-based metal complex. Because an element cannot break down in a chemical reaction, the base ingredient can theoretically be reused indefinitely.

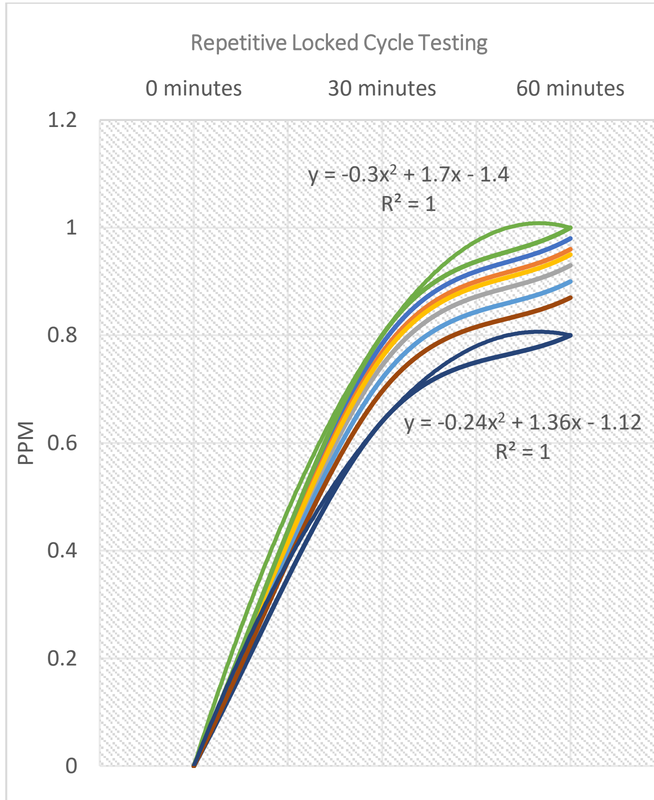


Figure 2-Locked cycle test performance.

In contrast, other reagents such as cyanide and aqua regia are based on chemical compounds which combine with the gold to create complexes that must be broken down to recover the gold from the solution and the resulting byproduct cannot be reused. This results in toxic liquid discharges that must be treated or subjected to cyanide destruct circuits before disposal.

Following the primary leach cycle, the chemical formula may need to be regenerated to an oxidative state periodically. After gold recovery, the resulting barren solution is then regenerated for reuse by pumping it through a proprietary diamond-based electrochemical cell technology.

These specialized bipolar electrochemical cells are manufactured by Element 6, a division of DeBeers. Innovation Mining has secured the North American exclusive rights to this revolutionary technology.

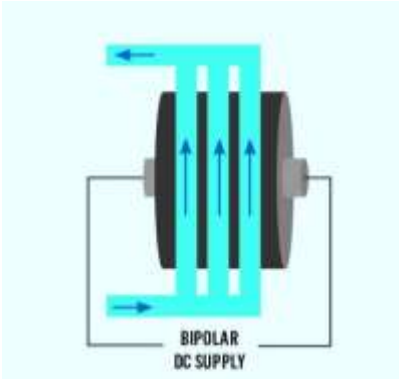


Figure 7 – Illustration of the E6 Bipolar Electrochemical Cell

This low-cost, sustainable closed-circuit process provides extended reusability of the formula without adding harsh oxidizing chemicals on site.

There will be chemical consumption caused by residual formula in the residual moisture content in post-leached tails, but this loss can be mitigated by simply rinsing the tails in fresh water and subsequently recovering the chemicals from solution using conventional ION Exchange resins similar to a household water softening units.

Recovery from Solution

Gold is recovered from pregnant (gold bearing) solution by the process of using activated carbon or electrowinning. The use of carbon is common throughout the gold mining sector. Following leaching, the activated carbon is mixed with the pregnant leaching solution. The gold is adsorbed onto the surface of the activated carbon, now considered loaded.

The gold can then be desorbed from the loaded carbon in a process known as elution (this step is often referred to as stripping), which produces a high gold concentration solution from which gold can be electrowon.

For recovery using electrowinning, an electric current is passed through the solution causing solid gold to plate out on steel wool or stainless-steel cathodes.

Cathode Reaction - Gold Deposition Gold is electrolytically displaced from the pregnant solution or pregnant eluate and deposited on the cathode surface.

Lab Scale Testing

Innovation's research team has completed hundreds of tests at the Company's North Vancouver facility on multiple samples from several mining projects. The tests included agitated beaker leach, bottle roll, flooded column leach, drip column leach, locked cycle reusability testing, recovery to carbon and ion exchange resins, as well as electrochemical oxidation and regeneration tests.

The tests were performed in conjunction with identical 1,000 PPM cyanide-based sample tests which were used as a baseline for comparative results. The Innovation Formula frequently outperformed cyanide on both leach kinetics and recoveries on all test methods.

Additionally, a series of agitated beaker locked cycle tests have been completed and several more are underway at the time of writing. The purpose of the locked cycles tests is to determine the reusability of the formula on repetitive cycles of new material.

Pilot Scale Testing

The Company is planning a several pilot scale column tests at its North Vancouver location in April/May2024. The leach column simulates the effects of heap leaching of an ore, in a controlled, lab environment.

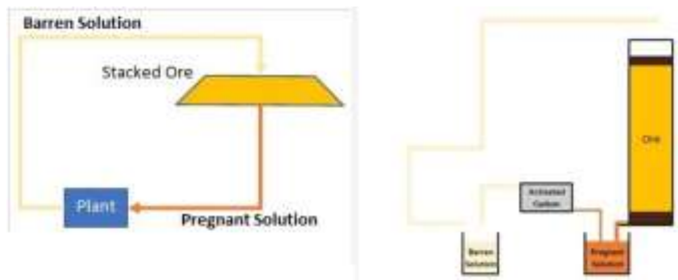


Figure 9 – Typical Column Test Configuration

Column leaching using the Innovation formula or cyanide solution to assess heap-leaching potential of gold bearing ores and test process usually follows the following processes:

Agglomeration testing

After sample preparation and crushing to the target crush size, samples destined for column testing will very often require agglomeration testing. This includes assessment of moisture and binder additions (cement and/or lime) required to produce suitable agglomerates, as appropriate, to enable the cyanide solution to percolate through the column (heap) to be collected via the impermeable base layer.

Agglomeration is performed in a modified cement mixer suitably sized for sample charges of 3kg to 15kg.

Percolation testing

Agglomerated batches are tested in small scale columns to assess the degree of solution percolation through the sample mass and the flow characteristics (i.e. laminar or tunneling). The correct moisture level is critical to achieving competent agglomerates. Cement additions should provide agglomerates with sufficient strength to ensure integrity is largely retained under flooded conditions resulting in adequate percolation rate and minimal slump in the small-scale test. The test should also result in drain solution pH in the approximate range of 9.5 to 11.5 for cyanide and 1.5 to 2 for the Innovation formula. This determines the ore's acidity or alkalinity demand. The empirical test outcomes considered suitable in the small-scale tests are: <10% slump and >10,000 L/m2/hr drain rate.

Column testing

The Innovation facility allows for a large number of column tests, of varying dimensions, to be operated concurrently. A mobile carbon column is employed in each test for the removal of gold / silver from rich solutions and the recycling of the spent solution. Dosing pumps are fitted with quick-connect fittings allowing single pump operation to deliver solution to ore and carbon columns. All tests are monitored daily for solution volume and subsamples collected for pH and free chemical determinations as well as metals analysis. The columns are fabricated from clear PVC to allow visual assessment of agglomerate structure and integrity.

Figure 10 – Typical Column testing Equipment

Bulk Test Parameters

The leach column/vat tests will comprise the leaching ore samples from the Company's Royal Vindicator Gold Mine in Georgia, USA. The ore is prepared to a minus 1 inch plus 150 microns (100M) fraction. The barren solution is pumped from single container containing 20% by weight of the sample material. The amount of material tested in each column varies from 1kg to 500 kg.

Fire assays are taken on the test ore sample prior to the leach test to determine the estimated head grade. 4 ml solution samples are taken every day during the column test and the assay results are recorded to determine and plot leach kinetics and recovery of gold to solution. At the end of the column test, the columns are emptied, and a sample of the solids tails is assayed and compared to the final solution assay to determine metal recoveries.

Column and vat leach testing provides a technical evaluation of the metal extraction process. Column/vat tests can be used both before and during heap leach operations. The diagram below shows a typical column test operation. Calculations can be done with the column test data and modeling can be created according to these calculations. This resulting data accurately depicts the recoveries, leach kinetics, and reagent consumption costs.

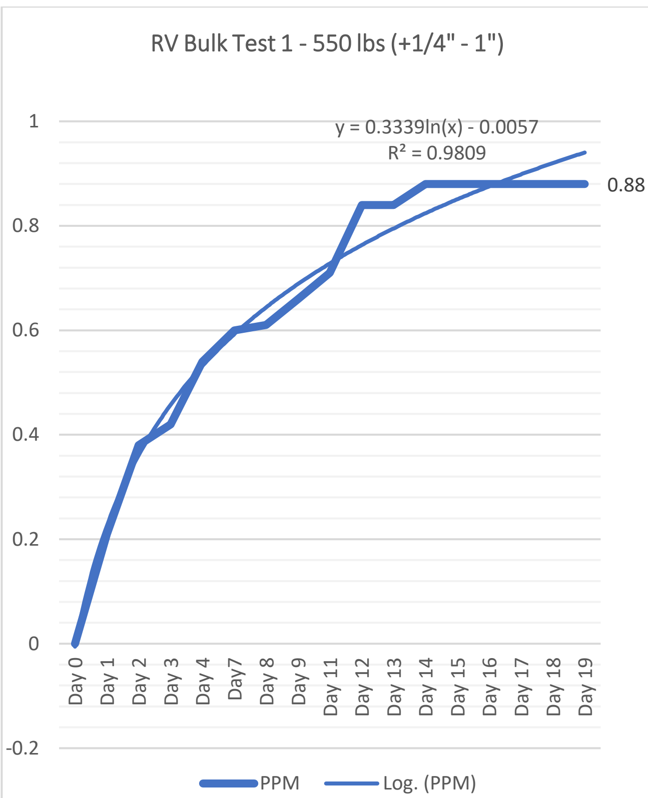
Bulk Leach Test 1 Interim Preliminary Results

The Company commenced a 250 kg (550Lb) bulk-scale test of minus 1 inch run of mine (ROM) non-crushed mineralized material from the Royal Vindicator Gold Mine in Tallapoosa, Georgia, USA on April 25th, 2024.

The test was designed to determine the scalability, permeability, gold recoveries, and leach kinetics of the uncrushed, larger fraction of the minus 1-inch (ROM) material. The 250 kg sample was dry screened at the mine to remove the majority of the minus ¼ inch material.

Upon inspection of preliminary post leached materials, It was evident that significant fine particles were still present in the subject material that could adversely affect the percolation and permeability of solution – (*it's recommended that the material should be wet screened or agglomerated prior to heap or vat leaching*). Lab-scale testing has demonstrated that these residual fines can be tank leached within a 3 hour leach residence time in the same solution for recoveries of over 85%).

Estimated cost of chemical per tonne of treated ore based on 5:1 solid/ liquid ratio, is approximately $4.26. This estimated cost is based on one-time use and does not include any residual values of chemistry left in solution This estimated cost is very similar to the estimated cost per tonne of ore using cyanide. (Based on the typical 1kg per tonne NaCN of processed ore.



Preliminary interim tests results after 19 days are conclusive. The test demonstrated positive at-scale leach kinetics and gold recoveries on the tested material. The test indicated positive leach recoveries to 0.88 PPM gold after 20 days in a non-agitated flooded environment.

The resulting pregnant leach solution also tested positively for effective residual chemistry and demonstrated comparable positive leach kinetics and gold recoveries on similar mineralized material.

Supplemental 1,000 PPM cyanide tests and fire assays on the post 19 day leached material (tails) will be completed to determine residual free gold availability and estimated gold recoveries. A more comprehensive 500 kg vat leach test on minus 1 inch – plus 100M (150um) material is being prepared for a similar 60-day leach cycle at the time of writing (05/16/2024).

Full Scale Testing

The company has planned a full-scale vat/heap leach test to be completed the Companies Royal Vindicator Gold mine which is located 65 miles west of Atlanta Georgia.

The test will be performed in/on a covered on/off vat/heap leach pad which is designed to hold 100 tonnes of mineralized material.

The test will determine full-scale leach kinetics and recoveries of gold and determine the chemical consumption of the Innovation Formula in a heap leach environment.

Leach Phase

The company will prepare approximately 50,000 liters (13,500 gallons) of solution which will be applied to the material using buried pad manifolds, driplines, and sprinklers.

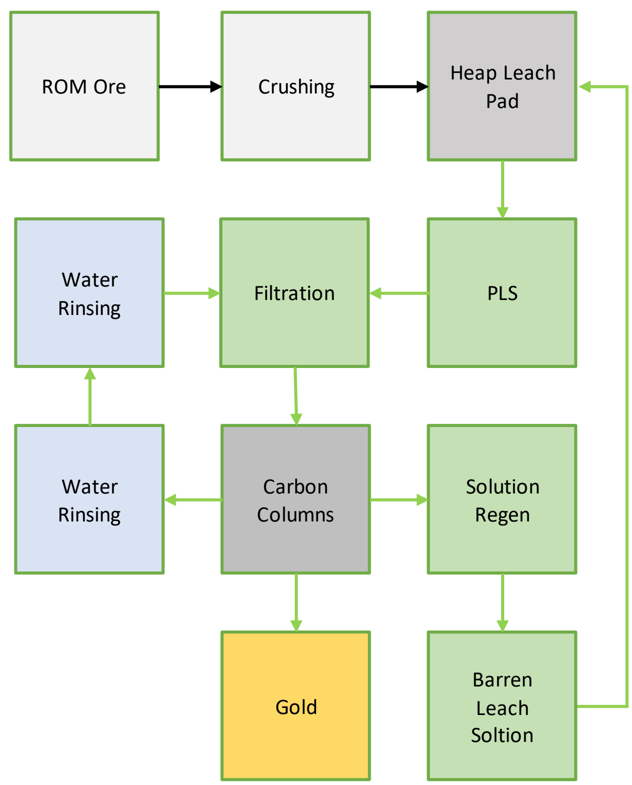


Figure 12 – 1,000 Tonne Vat/Heap Leach Test Flowsheet

The solution is constantly monitored for pH and ORP (oxygen reduction potential) and the solution will be automatically adjusted as needed. All supplemental additives will be tracked for final chemical consumption analysis.

Once the leaching phase is done, solid/liquid separation is performed, and the solution will pass through Activated Carbon and gold is absorbed into the media. The activated carbon is then shipped to a processor and refinery to recover gold in a highly pure form.

Rinse Phase

If applicable, following the 30-day leach cycle, approximately 25,000 gallons of fresh water will be applied to the pad in the same fashion as the lixiviant for a 24-hour period. The solid material typically holds 7% moisture content which, if left untreated, would result in a significant 7% loss of chemicals in the solution. By diluting the lixiviant moisture content with fresh water, and subsequently recovering the gold and reagent chemicals, results in a reduced loss to approximately 0.5% to 1.0%. This has a significant economic impact on the economic analysis.

Gold miners that adopt technologies such as Innovation's sustainable recovery formula can make gold mining operations safer, more environmentally friendly, at similar costs to that of cyanide.

Lab-Scale-Based Estimated Chemical Consumption Costs

The cost of the Innovation Formula is based on the initial chemicals added to water plus any additional chemicals added to the leach cycle. The costs are estimated to be approximately $0.01 per liter of solution at the time of writing.

In a vat leach scenario, based on preliminary bulk tests, one liter of solution will treat 2 kgs of solids, for an initial CAPEX cost of $0.005 per kg or approximately$5 per tonne of solids. Preliminary bulk-leach tests have confirmed that adequate amounts of chemistry remain in solution to effectively leach gold from additional test material. This indicates a positive, but not quantified, reusability profile.

Summary

The Innovation gold recovery process was developed over a 2.5-year research and development period, during which time the Company completed hundreds of successful laboratory test programs to establish the efficacy and leach kinetics, which compare favorably to those of cyanide.

Due to the closed-loop design and proprietary process technology, the Innovation process recycles chemistry and process water to further reduce the environmental impact of gold mining. Furthermore, the Innovation process efficiencies and broad applicability present a significant opportunity for gold miners to improve operating costs by the on-site recovery of gold from ores and concentrates without the inclusion of cyanide leaching or downstream processing by smelting. Innovation's process is ready for field testing and subsequent commercialization.

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