

ROCK KLEEN TAILINGS RECOVERY PROCESS

JUNE 6, 2024



AWARD WINNING GREEN TECHNOLOGY

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ITRONICS INC.

A CLEANTECH MATERIALS COMPANY AND HOLDING COMPANY WITH TWO WHOLLY OWNED SUBSIDIARIES



ITRONICS METALLURGICAL, INC. (IMI)

- MANUFACTURES GOLD’N GRO MULTI-NUTRIENT FERTILIZERS & ROCK KLEEN
- REFINES PRINTED CIRCUIT BOARDS
- RECOVERS “CRITICAL MINERALS”
- RECOVERS “BATTERY MINERALS”
- RECYCLES ALKALINE BATTERY BLACK MASS
- “ZERO WASTE ENERGY SAVING” R&D

ITRONICS INC. – CONT'D

— A CLEANTECH MATERIALS COMPANY AND HOLDING COMPANY WITH TWO WHOLLY OWNED SUBSIDIARIES



WHITNEY & WHITNEY, INC. (W&W)

- PROVIDES TECHNICAL AND ADMINISTRATIVE SERVICES
- MARKETS ROCK KLEEN TAILINGS RECOVERY PROCESSING TECHNOLOGY
 - Recovers silver/gold, base metals, ferrous metals, critical minerals, battery minerals, industrial minerals
- DESIGNS, BUILDS AND OPERATES FACILITIES USING ROCK KLEEN TAILINGS PROCESSING TECHNOLOGY
- MARKET STUDIES RELATED TO INDUSTRIAL MINERALS FROM ROCK KLEEN TAILINGS RECOVERY PROCESS

DEEP EUTECTIC SOLVENTS (D.E.S.) WHAT ARE THEY?

WHAT ARE D.E.S.'S

- Deep eutectic solvents or DESs are solutions of Lewis or Brønsted acids and bases which form a eutectic mixture.
- Deep eutectic solvents are highly tunable by varying the structure or relative ratio of parent components and thus have a wide variety of potential applications

USAGES

- Many of the applications in which DESs are currently employed involve the dissolution of metal ions in the liquid
- To date most of the applications of DESs have been focused in the area of metal finishing
- Researchers continue to explore their potential in fields such as green chemistry, pharmaceuticals, and materials science

DEEP EUTECTIC SOLVENTS (D.E.S.)

D.E.S. HISTORY

D.E.S. HISTORY

- The concept of a “deep eutectic solvent” was coined by Abbott and colleagues in 2003 when they observed that a mixture of choline chloride and urea had a significantly lower melting point than its constituent parts. Since then, DESs have garnered significant interest in the scientific community due to their unique properties.

D.E.S. HISTORY CONT'D

- In 2014 DES was formally recognized by the American Chemical Society as a "new field of chemistry"

DEEP EUTECTIC SOLVENTS (D.E.S.) ITRONICS HISTORY

ITRONICS HISTORY

- Itronics Inc. successfully pioneered and commercialized the technology to chemically recover and refine silver from spent silver bearing liquid photo-fixers and developers and to use the de-silvered liquid chemicals to make a line of environmentally friendly, award-winning liquid fertilizers in 1990. Each GOLD'n GRO fertilizer is a eutectic liquid.

ITRONICS HISTORY CONT'D

- Itronics has grown its knowledge of D.E.S. chemistry and has continued to advance and develop new applications using this knowledge. Itronics perfected and completed University trials of its first two fertilizers which are eutectic liquids by year end 1996. Itronics has almost 35 years experience developing products using this category of chemistry.

DEEP EUTECTIC SOLVENTS (D.E.S.) ITRONICS USAGES

ITRONICS USAGES

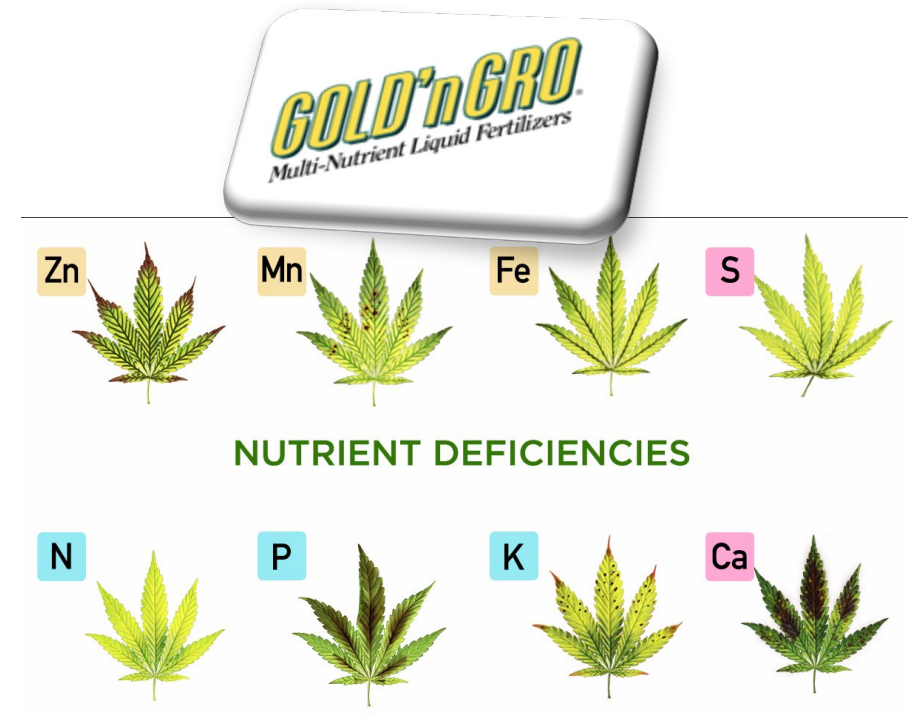
- GOLD'N GRO MULTI-NUTRIENT FERTILIZERS
- ROCK KLEEN
- PRINTED CIRCUIT BOARD RECYCLING

ITRONICS USAGES CONT'D

- ALKALINE BATTERY BLACK MASS RECOVERY
- FOUNDRY METAL FLUE DUST RECOVERY

GOLD'N GRO MULTI-NUTRIENT LIQUID FERTILIZERS

- GOLD'n GRO is a D.E.S. chelated liquid multi-nutrient fertilizer that uses Advanced Nutrient Transfer Technology to efficiently get the nutrients into the plant.
- Rock Kleen uses a GOLD'n GRO D.E.S. fertilizer base
- The Rock Kleen Processing Plant is a chemical plant that requires a bleed stream to refresh leaching fluids
- The Rock Kleen nutrient loaded bleed stream returns to IMI for fertilizer manufacturing.



ROCK KLEEN TAILINGS RECOVERY PROCESS

Royalty Companies should

- Support the adoption of the Rock Kleen Tailings Recovery Process
- Invest in the operational development of Rock Kleen

Rock Kleen can provide large royalty income growth!

3% Royalty paid for Rock Kleen Processing versus CN or Other Means on a one-million-ton silver tailings sample:

\$30 / Toz silver

1.77 oz/st silver assay

CN		\$320,888.61				
Other Leach Means		\$757,152.90				
RK		\$899,265.08	Plus, Industrial Minerals and GHG Credits			
RK Process		\$1,439,414.62	Plus, Industrial Minerals and GHG Credits			

448% increase in Precious Metal Royalty for the Rock Kleen Process over cyanide



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

A NEW GLOBAL REALITY

- Urbanization is Driving the Need for Mineral Materials
- Decarbonization is Driving the Need for a Broader Range of Metals
- Global Energy Shortage is Driving the Need for Reduced Energy Consumption
- All the above drive the need for materials use optimization

**With Rock Kleen Technology 'Mines Become Quarries'
This Maximizes Sustainability With Long Term Stable
Operations**



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ROCK KLEEN TAILINGS RECOVERY PROCESS

- Rock Kleen recovers residual gold, silver, and copper, as well as lead, nitrogen, sulphur, nickel, iron, and three U.S. critical minerals, zinc, potassium (potash) and manganese.
- After recovery efforts are complete, the remaining clean rock can then be sized and sold as industrial minerals or used for reclamation; in the end, nothing is left, all is recovered, profits are made, and the environment is cleaner.



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

Key features of Rock Kleen

- Rock Kleen is a “green” Deep Eutectic Solvent (D.E.S.).
- Rock Kleen recovers precious metals, base, ferrous metals and mineral nutrients.
- Rock Kleen recovers industrial minerals including crushed rock, crushed sand, clays, and mineral nutrients.
- Rock Kleen’s chemistry can be tuned to target specific groups of metals and mineral nutrients.
- The Rock Kleen model targets making 100% of tailings salable products or environmentally clean reclamation materials.



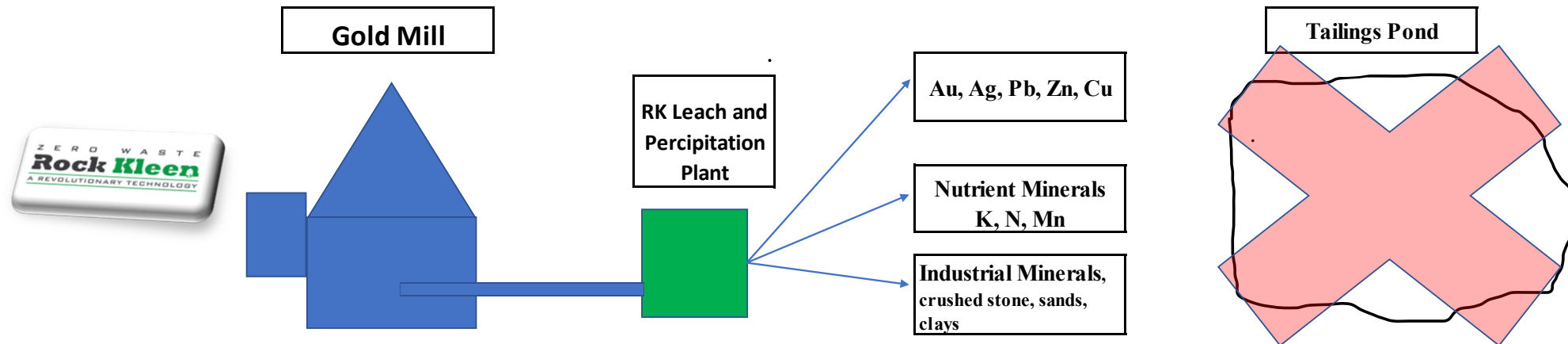
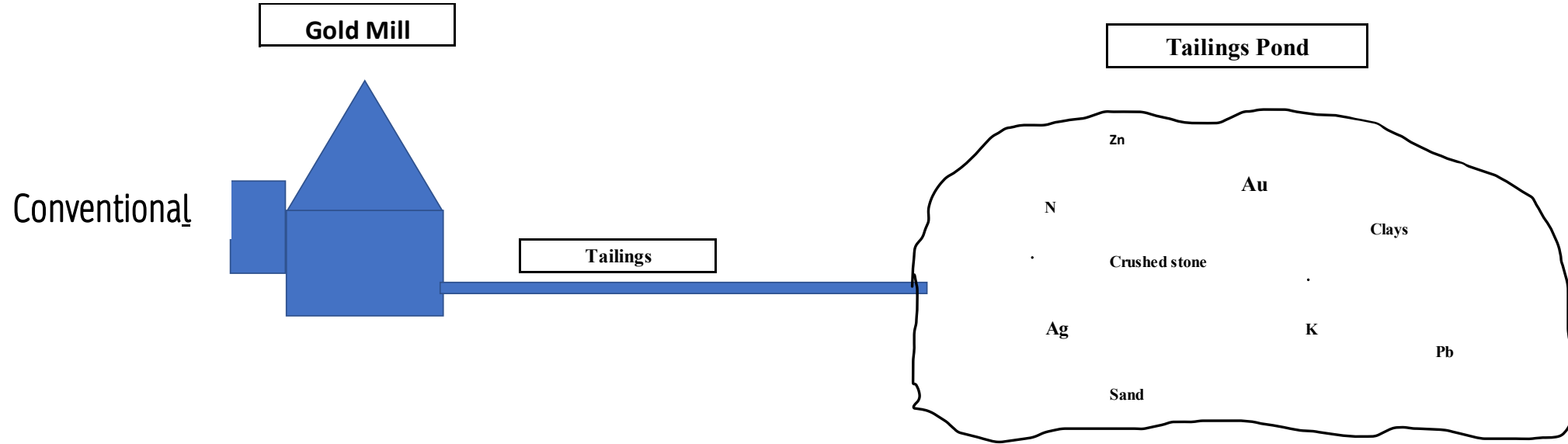
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ROCK KLEEN TAILINGS RECOVERY PROCESS

Key features of Rock Kleen – Cont'd.

- Rock Kleen is energy saving as it uses a waste product, tailings, to produce products that are primarily mined in other locations, saving the energy required to mine and crush this additional rock for the same products..
- Rock Kleen eliminates residual cyanide by breaking it down into its components, carbon and nitrogen, then recovers the nitrogen.
- Rock Kleen breaks down residual nitrates left by blasting the rock and recovers the nitrogen.
- Rock Kleen neutralizes residual sulfuric acid and recovers the sulfur.

ROCK KLEEN VS. CONVENTIONAL





Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

Targeted Opportunities

- Nevada Gold Heap Leaches
- Nevada Copper Tailings
- Australian Gold Mine Tailings Dam Recovery
- Other Gold/Silver Opportunities



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

Social Benefits – Communities in the Mine Vicinity

- Long term jobs – 50–100-year project life
- Improved long term viability for rural communities
- Mine Tailings Eliminated – Better Public Acceptance
- Aesthetics When Complete – Major Permitting Issue
- Sustainability – Total usage of what is mined



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

Social Benefits – Governments

- Eliminates mine tailings and legacy issues
- Reduces the need for new industrial minerals quarries
- Simpler – quicker permitting by eliminating legacy issues
- Community support versus community rejection of proposed projects
- Addresses Critical Mineral deficit and potentially REEs



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

What Companies can Benefit?

Gold/Silver Mining

- Higher Recovery
 - Gold Recovery can go from 80% in heap leaches to 98% total recovery using Rock Kleen
 - Silver recovery can go from 50% in heap leaches to 95% total recovery using Rock Kleen
- Move recoverable Gold/Silver Ounces in tailings to the total reserve ounces
- Clean tailings for industrial minerals or reclamation
 - Transportation and market dependent
 - Elimination of legacy costs associated with tailings



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

What Companies can Benefit? – Cont'd

Copper Mining

- Copper recovery from tailings
- Move recoverable Copper pounds in tailings to the total reserve ounces
- Clean tailings for industrial minerals or reclamation
 - Transportation and market dependent
 - Elimination of legacy costs associated with tailings



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

What Companies can Benefit? – Cont'd

Royalty Companies

- More recoverable ounces in the mine reserves
- Placing ounces in the reserves that have been written off as waste
- With lower cut-off grade – more tons of ore in reserves
- Increased recoverable gold ounce reserve without financing drilling, a sure thing versus a high-risk expenditure
- Potential for industrial mineral royalty when the Royalty Company finances the Rock Kleen Tailings Recovery Plant
- Clean tailings that can be used for reclamation or sale



Rock Kleen changes the definition of ore and lowers the cut-off grade, thereby increasing mineable reserves for most all types of mines.

ROCK KLEEN TAILINGS RECOVERY PROCESS

What Companies can Benefit? – Cont'd

Investors

- By increasing recoverable gold ounces by expansion of reserves and higher recovery
- By eliminating tailings using a Cleantech process
- Quicker permitting and less required capital
- Itronics investors selling Rock Kleen and operating Rock Kleen Tailings Recovery Plants



When Rock Kleen eliminates tailings – converting waste to beneficial use –

You save Energy and get paid for it!

ROCK KLEEN VISION

BUILDING RESERVES BY ELIMINATING TAILINGS

Mine Reserves increase through:

- Converting tailings (waste) into a profitable reserve (recoverable metal & minerals)
- In-Line processing at mines, Rock Kleen Systems increase recovery
 - Making cut-off grade lower
 - Increasing value per ton (metals & minerals)
 - Expanding the pit shell

Management will support Rock Kleen Systems when:

- Increased Reserves extend the mine life
 - Rock Kleen projects can operate for 50 – 100 years
- In Precious Metals – Rock Kleen Systems put ounces on the books
- Project gets paid for saving energy
- Legacy issues are eliminated



When Rock Kleen eliminates tailings – converting waste to beneficial use –

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ROCK KLEEN TAILINGS RECOVERY PROCESS

Status - Ready to advance

- Extremely successful in laboratory (5# samples)
- Gold and Silver recovery from tailings at 85% to 92%
- Base metal and ferrous metal recovery at approximately 50% when targeting gold and silver
- Identification of industrial minerals
- Removal of soluble nasties – Cd, Se, blasting nitrates
- Ready for Pilot Plant operations
 - Need funding support for Pilot Plant
- Pilot Plant provides data for design of Demonstration Plant
 - Demo Plant will be designed at a rate to be profitable



When Rock Kleen eliminates tailings – converting waste to beneficial use –

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ROCK KLEEN TAILINGS RECOVERY PROCESS

Status - Ready to advance

- Rock Kleen leaches and retains mineral nutrients.
- Rock Kleen is a chemical process and requires a bleed stream to control the build-up of nutrients
- The bleed stream will be used to manufacture GOLD'n GRO fertilizers.



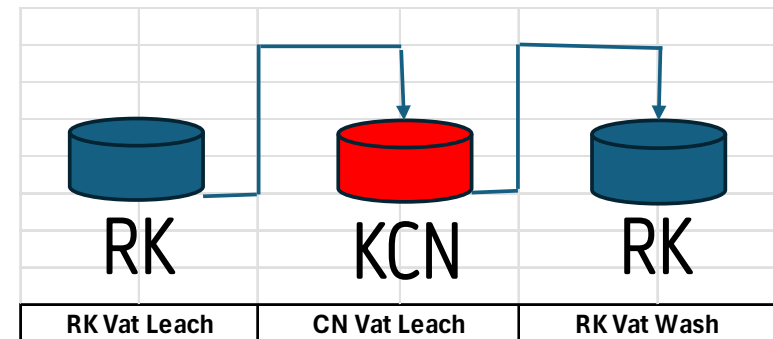
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ROCK KLEEN TAILINGS RECOVERY PROCESS

Status - Ready to advance

- The optimized gold/silver recovery is derived by using a combination of Rock Kleen followed by a potassium cyanide wash.
- The cyanide wash tailings are then washed with Rock Kleen to recover additional mineral content and to eliminate residual cyanide.
- The rock is clean.



ROCK KLEEN TAILINGS RECOVERY PROCESS

Silver Mine

	Ag Grade oz/st	CN Shake Only % Recovery	RK60 Leach % Recovery	Rock Kleen Process % Recovery
Test 1	1.92		57.81	79.84
Test 2	1.78	20.65	57.87	92.63
Test 3	1.76	20.02	63.07	90.91

Gold Mine

	Au Grade oz/st	RK60 Leach % Recovery	Rock Kleen Process % Recovery
Gold Mine Historical Tailings			
Test 1	0.0635	57.24	74.71
Gold Mine Heap Leach Tailings			
Test 1	0.0103	41.94	80.27
Gold Mine Waste			
Test 1	0.0039	89.83	

ROCK KLEEN TAILINGS RECOVERY PROCESS

Silver Mine								
		Ag Grade oz/st	CN Shake Only % Recovery	Value Recovered	RK60 Leach % Recovery	Value Recovered	Rock Kleen Process % Recovery	Value Recovered
Test 2		1.78	20.65	\$11.03	57.87	\$30.90	92.63	\$49.46
Test 3		1.76	20.02	\$10.57	63.07	\$33.30	90.91	\$48.00
Silver	\$30/Tr Oz							
Current Testing by Other Means								
		Ag Grade oz/st	% Recovery	Value Recovered				
		1.77	49.00	\$26.02				

Competitor recovery is 49% versus Rock Kleen at 60% or almost \$6.00 per ton more or \$6 million per one million tons.

Competitor recovery is 49% versus Rock Kleen Process at 91% or \$22.00 per ton more or \$22 million per one million tons.

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