NIPPON DRAGON RESOURCES

“An efficient, productive and GREEN mining method”

Thermal Fragmentation

GREEN MINING TECHNOLOGY
-THE CRISIS-

Many CEO’s will reluctantly agree that most if not all the ‘easy gold’ has been mined, the remaining high-grade ore is situated within narrow-vein ore bodies that are difficult to mine profitably. Considering the potential for huge cost overruns, mining companies tend to avoid these types of deposits. Many mines at being shut down, leaving behind vast quantities of the much sought after material. The ability to efficiently and profitably extract the mineralized ore will weigh heavily in the capacity for several publicly traded mining companies to remain listed on their respective stock exchanges.

Adding to this issue, the conventional drill and blast mining method is the most wide spread mining method and it has been so for centuries. While other industries rapidly adapt with innovation and technology, the mining industry seriously lags behind, which might just turn out to be the cause of their early demise.

Old ways never die...

they just change, adapt and move forward
Other problematic realities related to conventional mining methods

* Accidents often leading to serious injury and even death of miners

* Large scale usage of explosives and chemicals

* Severe negative impacts on the Environment

* Challenges in obtaining mining permits and project acceptance

* Difficulty renewing ore reserves and extending mine life

* Cost control issues, lack of skilled work force
South Africa's gold mines are the deepest in the world and ranked as some of the most dangerous.

“Responsible Mining”... claimed to be the ‘motto’ of most mining companies... But very few live up to their words and good intentions... Not because they do not want to... Simply because they underestimate the task of controlling the disposal of waste from rock blasting.

Poor working conditions. Life risking jobs. Low wages... Many miners around the world are unsatisfied, often leading to bloody clashes and work stoppages.
‘DRAGON’

Thermal Fragmentation Unit

Cost Effective
Reduces Dilution
Precision Mining
Extends Mine Life
Total Mechanization
Faster and more efficient
Resources converted to Reserves
Safer working environment
Significantly reduces environmental impacts
Strengthens Sustainability & Project Acceptance
Mining permits obtained faster and easier

Disruptive & Revolutionary
INNOVATIVE MINING SOLUTIONS
The thermal fragmentation mining extraction method is ideal for mineralised structures with widths ranging from 30 cm to 1.1 metre and is the perfect complement to any "room & pillar" conventional mining operation. Depending on the width of the precious/base metal vein, the thermal fragmentation unit can be set to extract a specific mining corridor. Here are some of the benefits of the mining method:

• **GREATLY REDUCES DILUTION**
The extraction method produces highly concentrated ore which results in 400% to 500% less dilution compared to shrinkage mining methods. There is no wall damage caused by blast vibrations.

• **SIGNIFICANT COST SAVINGS RELATED TO ORE HANDLING, ORE TREATMENT**
Since less rock is extracted, significant cost savings are realised throughout the entire chain of production. The compact size of the ore (0 - 13 mm) and concentration of the material brought to the processing plant increases the production capacity of existing installations and output of ounces.

• **COMPLETELY MECHANISED**
Thermal fragmentation mining method requires a 2 person team per unit to carry out entire extraction process. The mining method is fully mechanised reducing the risk of physical injury traditionally observed in labour intensive shrinkage mining methods.
• **LESSENS THE IMPACT ON THE ENVIRONMENT**
Since less waste rock is extracted and development is performed directly into ore, the thermal fragmentation method produces significantly less mining waste (1:5). Therefore, fewer chemical products per ounce mined are needed and fewer alterations are made to the terrain (smaller tailings and waste piles).

• **COST EFFECTIVE BULK SAMPLING**
Many exploration projects, especially multiple vein deposits, are very difficult to evaluate with diamond drill holes and traditional bulk samplings necessitate major field preparation work that are costly. However, the thermal fragmentation mining process requires minimal space to mobilise the equipment, minimal stripping of waste rock, and dilution is significantly reduced. The resulting environment impacts on surface are minimal and preparation costs are kept as low as possible.

• **LOW COST SLOT RAISING**
By using the thermal fragmentation mining method, large diameter holes (30 - 110 cm) can be quickly created and act as large cuts when blasting drop-raises. These large cuts greatly reduce the occurrence of rock freezing following a blast and reduce the amount of explosives needed to break the rock, significantly lowering costs per metre and reducing the time needed to perform the work.

![Conventional Mining](Mineral_conventionnel.png) ![Thermal Fragmentation](Fragmentation_thermique.png)
Comparison of dilution reduction between 2 mining methods

Conventional mining – Drilling & Blasting

Tons extracted: 2,700 tons

Material extracted to produce the same amount of precious metal

Thermal fragmentation

Tons extracted: 783 tons

26 truck loads!

90 truck loads!
Dilution – Conventional vs Thermal (vein)

Conventional mining – Drilling & Blasting

- Tons extracted: 2,700 tons
- Length: 30m
- Width: 2.0m
- Height: 18m

Thermal fragmentation

- Tons extracted: 783 tons
- Length: 30m
- Width: 0.58m
- Height: 18m

Blasts the Surrounding material to extract the vein

Precision! Extracts ONLY the vein
Mining industry trend: waiting for price recovery

Real changes in the mining industry with Thermal Fragmentation

Lower profit margin
Lower grade/ton
Mine closer
Limited production output
Analyst downgrade
Disputes leading to lawsuits
High risk investment
Requires significant capital

Higher profitability
Higher grade/ton
Extends mine life
Maximizes production
Analyst upgrade
Higher goal achievements
Rapid ROI
Smaller capital requirement
Mining industry is in the process of completely pricing themselves out of the market.

High-grade vein deposits are abundant around the world, Thermal Fragmentation’s growth potential is exponential!!
If you seek total mechanization of operations that are also FASTER, SAFER, COST effective and ENVIRONMENTALLY friendly. Our Dragon is “the solution” to help you achieve your goals!

End result;

If you have 20 g/t in a 50 cm vein, you will have 20 g/t at the mill. GOODBYE DILUTION!