

# ***EARTH FRIENDLY ORE-CRUSHING***

HIGH EFFICIENCY – LOW ENERGY – ORE-CRUSHING



*A Clean, Responsible, Environmentally Friendly solution to*  
*RECOVER MINERALS FROM ORE products our PATENTED and PROPRIETARY technology*  
*Reducing Costs, Recovering More Minerals without Greenhouse Emissions, Chemicals or Heat*

## Consider This



If there were a way to Crush Ore from its largest mined state to a sizes as small as 1 nanometer and at a Significantly Reduced Cost from Conventional Ore Crushing Operations with Favorable Environmental Impacts...

Would you be interested?

If this product was portable (transport trailer size) and could come to you.... could handle any type of Ore...

Would you be interested?

If it produced NO greenhouse gas emissions and was environmentally low energy and Required no chemicals/heat...

Would you be even more interested? Then read on...



# Introducing

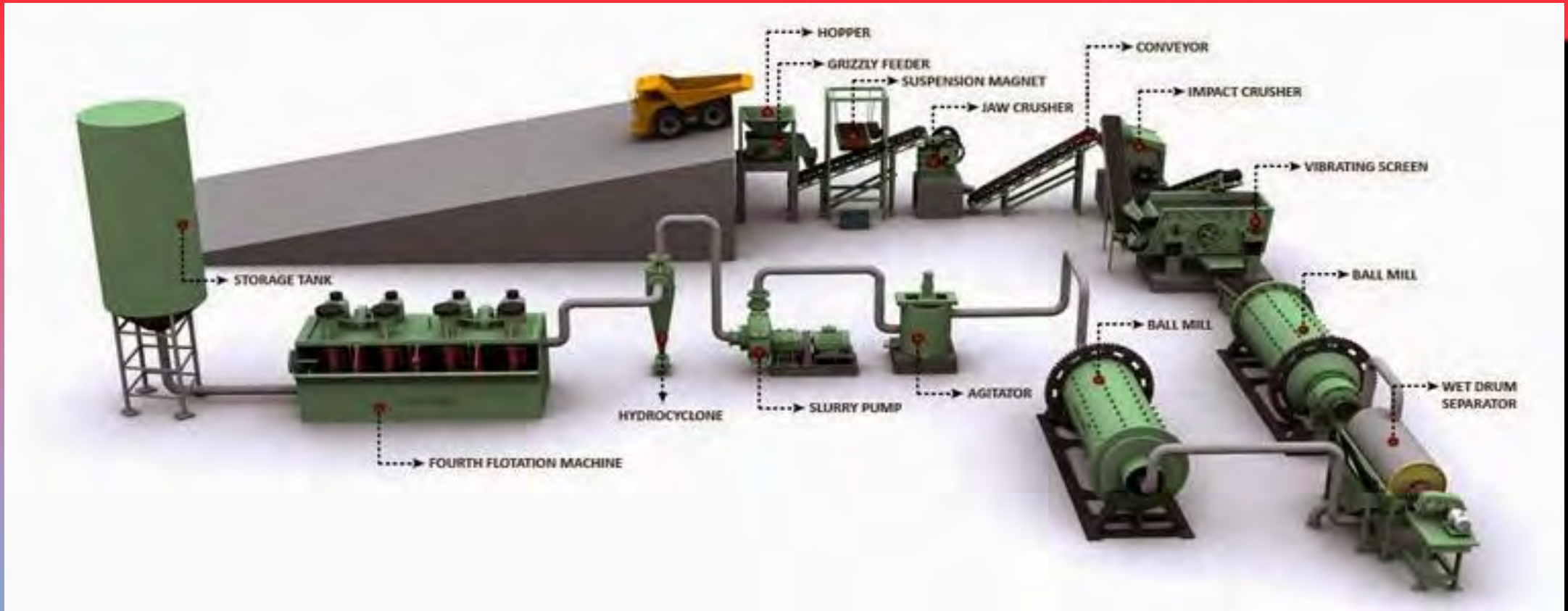
EcoCrushing has solved, for the next generation, a means of efficiently crushing ore to enable recovering 99%+ of minerals in that ore as small as  $1\mu$  (micron) or 1 micrometer [ $1/1,000,000$  of a meter =  $(3.93701 \cdot 10^{-4})''$ ] that are not chemically bound to the ore. Our ***Cavitation Disintegrator™*** process has the following environmental benefits:

- Vastly improved recovery
- Extremely efficient
- Extremely fast
- Quiet
- Low Cost/Portable Units
- Low Energy/No heating
- Small Carbon Footprint
- Chemical Free No Greenhouse Gases



**Introducing our patented and proven *Cavitation Disintegrator™*** that yields high controlled sizes of crushed ore as fine as 1 micron (or even less, if need be) or as large as desired.

# PRESENT ORE-CRUSHING PROCESS



Final crushed output measured in inches or parts of an inch (millimeters) with Flotation Mesh usually #6 or #8 (3350 $\mu$ m - 2360 $\mu$ m) & 20% - 40% recovery

# PRESENT ORE-CRUSHING TECHNOLOGY



**Massive Size – High Energy Usage – Noisy - Slow  
Environmentally Unfriendly**



**Final crushed  
output measured  
in inches or parts  
of an inch only  
(millimeters)**



Cavitation Damage

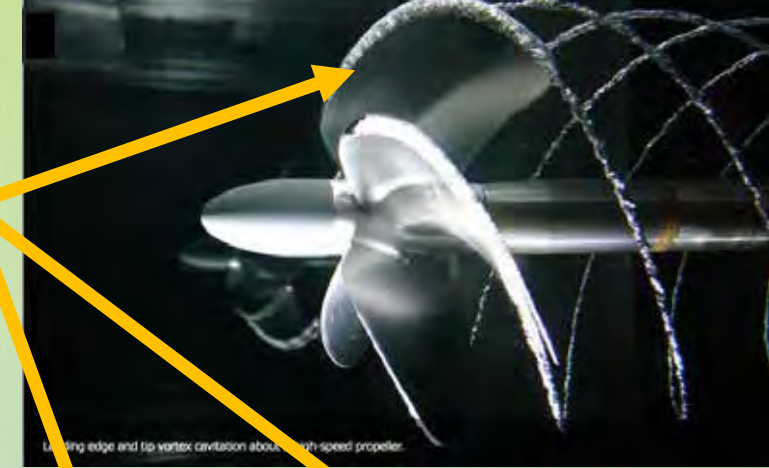
# Our Clean Science

Our scientific team are world experts in cavitation creation (holding multiple patents) and its controlled application because it can be created by low energy inputs, requires no chemicals or heat and yet is naturally powerful and it is a completely green process for liberating minerals from ore.

Cavitation is the rapid formation and collapse of vapor pockets in a flowing liquid in regions of very low pressure by means of mechanical forces. It begins with the initiation of collapse at the bubble surface, followed by the formation of center-directed micro-jets that induce pressure 'shocks' up to 25 times higher than the ambient pressure and up to 2500° K. These bubbles collapse at the speed of sound and can be very destructive when not controlled, damaging ship props (punching holes in them), even submarines, and any object in their 'force field'.

Cavitation is hard to control but 'controlled' cavitation can be used to achieve amazing results including crushing materials to extremely fine particle size (as low as 1 μ (micrometer)) and for recovery of minerals not chemically bound in ore.

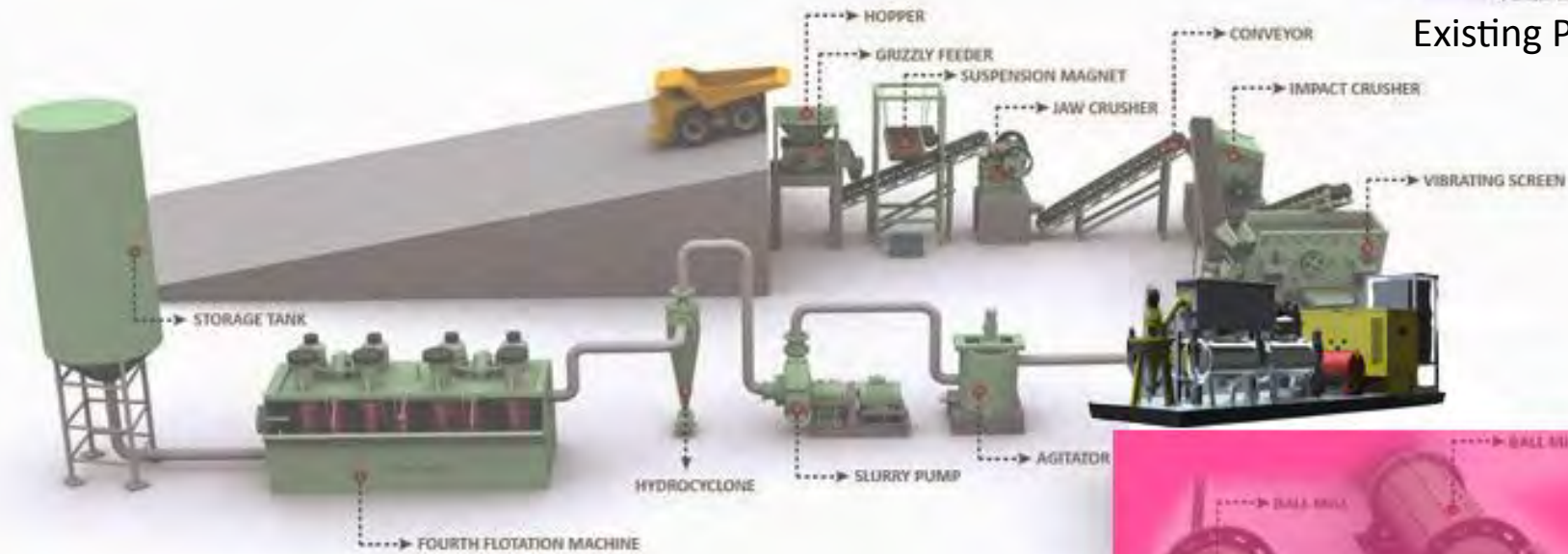
This unique science is the basis for  
EcoCrushing's unique: *Cavitation Disintegrator™*



# ECO-ORE-CRUSHING PROCESS



Existing Process



Flotation Mesh to #500 (25 $\mu$ m) or Finer!

**Final crushed output 1-10 $\mu$ m 225X+ Finer!  
99%+ recovery vs. 20%- 40% conventional**





# ENVIRONMENTALLY RESPONSIBLE ORE-CRUSHING TECHNOLOGY

*Smaller Size Particles (1,000,000X finer than present!) allows more complete mineral recovery*  
– *Portable - Low Energy Usage – Quiet - Fast*  
*Environmentally Friendly*

**Cavitation  
Disintegrator™**

Clean Recycled Water



Crushed Ore



Final crushed output as small as  
1 – 10  $\mu\text{m}$  or any larger size desired  
Up to 99%+ recovery

# Mined-Ore *Cavitation Disintegration*™

## Process Flow Diagram



**1** Feedstock (FS) Module for delivery of mined ores to treatment

← II

I – Delivering a treatment prepped ore  
II – Electric power driver for FS Module **1**

**2** Module for electro-hydrodynamic destruction of mined ores

← III

III – Delivering narrow-pulse, high-voltage discharges

← IV

IV – Water feed

**3** Module for hydrodynamic disintegration of ore

← V

V – Mechanical and electrical power for the Module **3** Driver

← VI

VI – Water delivery for Module **3**

**4** Module for ultrasonic disintegration of ore

← VII

VII – Ultrasonic oscillation feed for Module **4**

**5** Module for dimensional separation of output product

← VIII

VIII – Electrical power feed for Module **5**

**6** Module for separating liquid and solid fractions

← IX

IX – Electrical power feed for Module **6**

X ←

X – Liquid fraction output – water recycled for a contiguous utilization in the technological process

**7** Solid fraction dryer

← XI

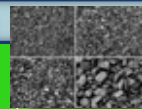
XI – Warm water delivery for Module **7**

XII ←

XII – Module 7 water vapor outlet

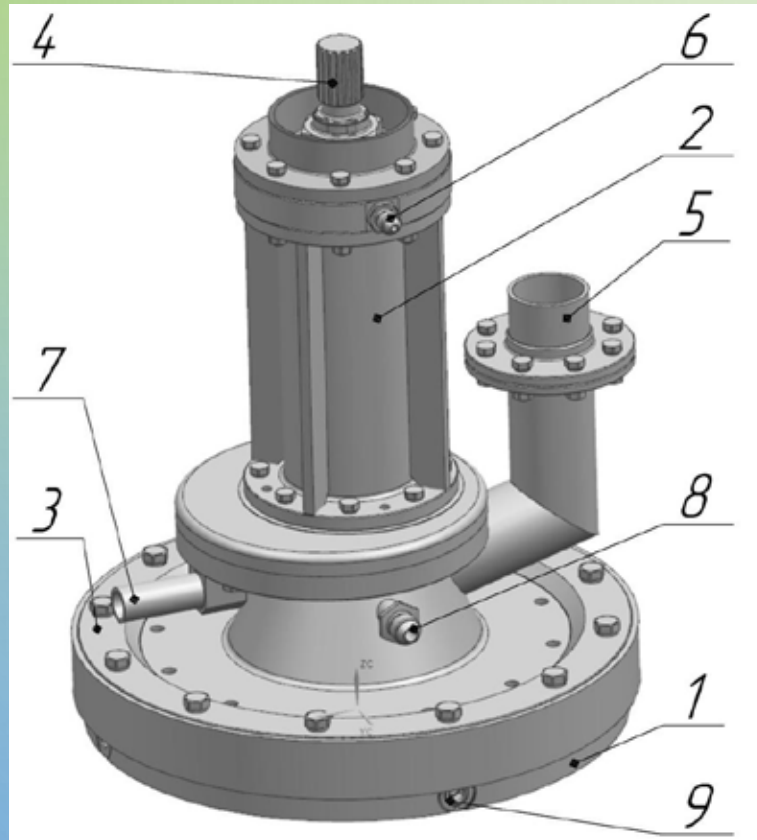
↓ XIII

XIII – Finished product output



# Cavitation Rotor™

A Key Component of the *Cavitation Disintegration™* Module



- 1 – Rotor
- 2 – Mounting Assembly
- 3 – Water feed Housing
- 4 – Shaft Flange end
- 5 – Water feed Pipe
- 6 – Oil Input Fitting
- 7 – Oil-dumping System
- 8 – Space pressure boost  
between oil and air cavities
- 9 – Water output Nozzle

# A SELECTIVE LIST OF TECHNICAL CHARACTERISTICS OF PILOT PROTOTYPE

1. <b>Productivity</b> , kg/sec	<b>25 ... 50 kg/sec</b>
2. <b>Feedstock dimensions</b> not exceeding, mm	<b>30 ... 50 mm</b>
3. Resulting <b>product (output) dimensions</b> , $\mu$ (micron)	<b>1 ... 40 <math>\mu</math></b>
4. <b>Moisture</b> of resulting solid fraction not exceeding, %	<b>0.5 ... 1.0%</b>
5. <b>Electrical power consumption</b> not exceeding, kW	<b>20 kW</b>
6. <b>Mechanical power feed</b> for a rotor of hydrodynamic ore-disintegration module driver, kW	<b>200 ... 300 kW</b>
7. <b>Electrical power consumption</b> of a US-cavitation ore-disintegration module not exceeding, kW	<b>10 kW &lt;</b>

## **ECO-CAVITATION™ BENEFITS:**

- Crushed particle size up to 1,000,000 x finer
- Controllable particle size
- Recovery of up to 99%+ versus 20% - 40%
- Portable unit (8' x 40' x 9')
- Very high speed processing (up to 400 kg/ sec -~35,000 tpd)
- Very low energy
- Very quiet operation
- Chemical free
- No EPA issues, No GHG

# TARGET MARKETS:

- TAILINGS- Gold, Silver, Copper, Manganese, Zinc, Etc.
- Smaller High-grade Deposits
- Mine Remediation Sites
- Discarded Stockpiled Ore From Mills
- Contamination Sites - Government / Military / Private Industry
- E Waste Recyclers

# COST – OPERATING PARAMETER

- Processing Speed Range: 200 - 400 kg/sec
- Mineral % available for recovery from feed stock: 99%+
- Hourly Processing: 793.67 tons/hr – 1587.3 tons/hr (short)
- Daily Processing: 17, 280 tons/day – 34,560 tons/day
- Annual Processing: 13,914,000 tons/year
- Maintenance Days: 3 per year
- Portable Unit Cost: determined by processing capacity